

History

Issued December 2009

2000 Census of Population and Housing

PHC-R-VI

Volume 1

Chapter 1: The Context of Census 2000

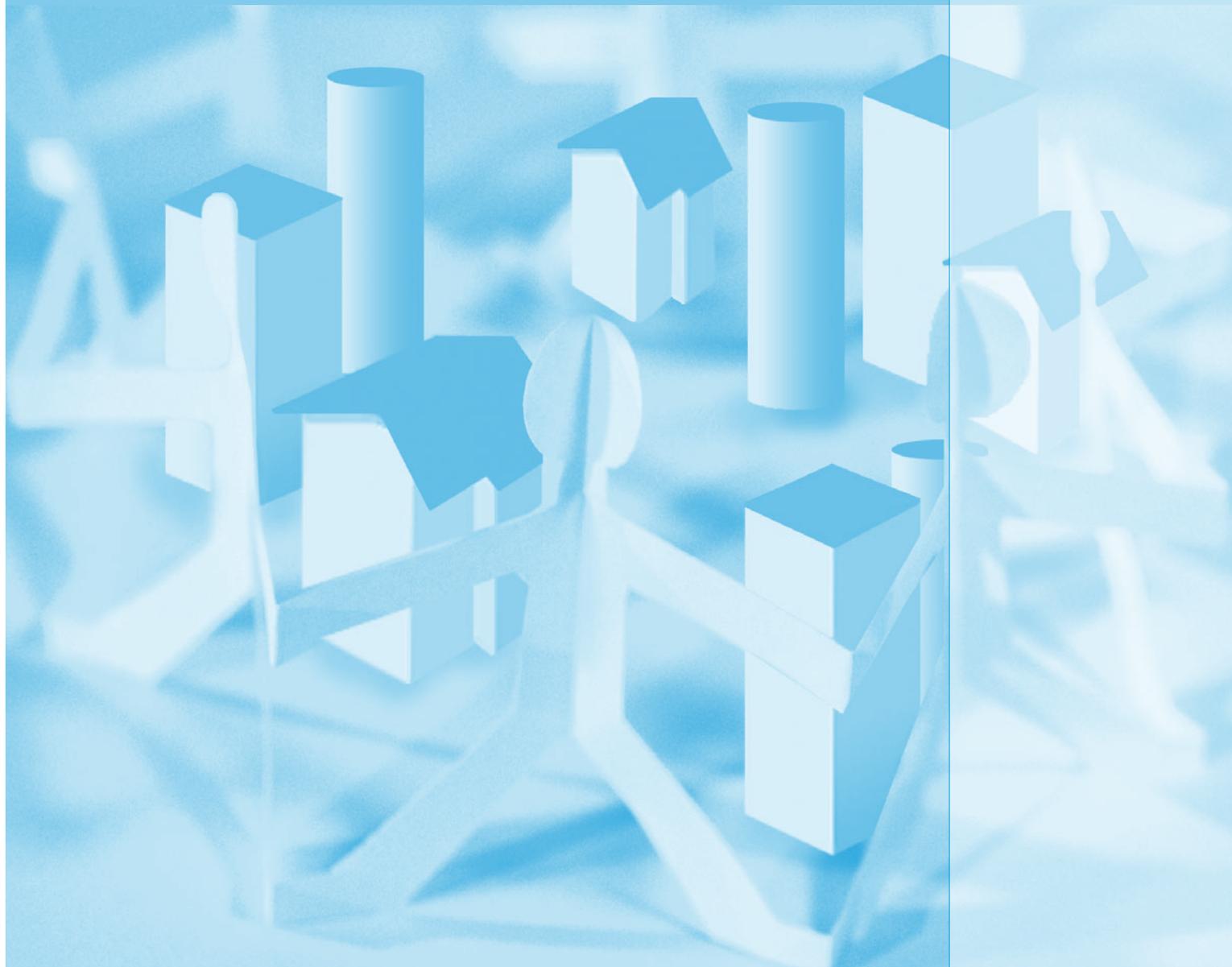
Chapter 2: Planning the Census

Chapter 3: Population and Housing Questions

Chapter 4: The Partnership and Marketing Program

Chapter 5: Data Collection

Chapter 6: Data Capture and Processing



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Volume 1: Preface

This volume includes the six chapters that constitute the first half of the *History: 2000 Census of Population and Housing*. These chapters present detailed descriptions of many aspects of Census 2000, including the early stages of research and planning, questionnaire development, advertising and outreach, and data collection and processing.

Chapter 1, “The Context of Census 2000,” contains summary population totals for the United States, Puerto Rico, and the Island Areas and for major race groups and an overview of the political, statistical, and technological context in which the census took place. **Chapter 2, “Planning the Census,”** describes preparations for the census, including lessons learned from the 1990 census, consultations with governmental and other data users, recommendations from the National Academy of Sciences and other advisory groups, and the plans for and results of census tests conducted between 1992 and 1998. **Chapter 3, “Population and Housing Questions,”** summarizes the history of each question on the short and long forms, the response categories, data uses, and any associated editing, allocation, and coding instructions. **Chapter 4, “The Partnership and Marketing Program,”** reviews evaluations and recommendations from the 1990 program, the decision to use paid advertising in Census 2000, developing and implementing an integrated marketing strategy, components of the partnership program, and a series of special initiatives. **Chapter 5, “Data Collection,”** describes the organization and distribution of regional census centers and local census offices, the hiring and training of temporary field staff, the hardware and software used to track and assess census progress, and the different components of the enumeration process. **Chapter 6, “Data Capture and Processing,”** summarizes the decision to hire contractors to conduct data capture and manage the data capture centers, the hardware and software used to capture census data, the headquarters tabulation process, identification and deletion of duplicates, editing and imputation, intermediate data files, and the creation of the 100 percent and sample detail files.

Volume 2 of this *History: 2000 Census of Population and Housing* covers such topics as data collection and tabulation geography, mapping, creating and updating the census address list, data products and their dissemination, the experimental and evaluation programs, legislation, litigation, the debate over sampling, and the census in Puerto Rico and the Island Areas.

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Census Day, 2000

By the President of the United States of America

A Proclamation

Every 10 years, as mandated by our Constitution, all persons living in the United States are called upon to participate in the census. As the foremost method of gathering information about our Nation, the census plays a crucial role in helping us to maintain our democratic form of government.

An accurate census helps to ensure that the rights and needs of every person are recorded and recognized as we shape public policies, programs, and services. Too often in the past, children, minorities, and low-income individuals have not been counted and, as a result, have not been fully and fairly served. Census data are also used to determine the number of seats each State is allocated in the U.S. House of Representatives, and State and local governments depend upon these data to draw legislative districts that accurately represent their residents.

The census also serves as the basis for many public funding and private investment decisions. Census results play a part in determining the portion each State receives of more than \$185 billion in funds distributed by the Federal Government each year. State and local public officials use census data to decide where to build public facilities such as schools, roads, hospitals, and libraries. Census data also are a valuable resource for businesses that are trying to identify where to build stores, office buildings, or shopping centers.

The census is unique. It reaches every population group, from America's long-time residents to its most recent immigrants, and every age group from newborns to centenarians. The census touches every social class and every racial and ethnic group. The census is truly a democratic process in which we all can participate.

Census 2000 offers each of us an important opportunity to shape the future of our Nation. By taking part, we help ensure the well-being of our families and our communities, and we fulfill one of our fundamental civic duties. The U.S. Census Bureau has taken unprecedented steps to ensure full participation in this first census of the new millennium. At the same time, the Bureau will continue its long tradition of protecting the personal information of America's citizens, and no other Government agency will be able to see any individual or family census form. I strongly urge every man and woman living in the United States to fill out and return his or her census form or to cooperate with census takers who will help them do so.

NOW, THEREFORE, I, WILLIAM J. CLINTON, President of the United States of America, by virtue of the authority vested in me by the Constitution and laws of the United States, do hereby proclaim April 1, 2000, as Census Day. I call upon all the people of the United States to observe this day with ceremonies, activities, and programs that raise awareness of the importance of participating in Census 2000.

IN WITNESS WHEREOF, I have hereunto set my hand this first day of April, in the year of our Lord two thousand, and of the Independence of the United States of America the two hundred and twenty-fourth.

William J. Clinton

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Chapter 1: The Context of Census 2000

INTRODUCTION

The 2000 Census of Population and Housing—the twenty-second decennial census of the United States—was taken as of April 1, 2000, by the U.S. Census Bureau, an agency of the U.S. Department of Commerce. This census covered the 50 states, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands of the United States, the Pacific Island Areas (American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and a number of smaller islands), and federal civilian and military employees and their dependents living overseas in 2000.

The population and number of housing units counted and tabulated in each of the areas covered by Census 2000 were as follows in Table 1-1.

Table 1-1.
Population and Number of Housing Units on April 1, 2000, by Political Unit

Political unit	Population	Number of housing units
United States	281,421,906	115,904,641
Puerto Rico	3,808,610	1,418,476
American Samoa	57,291	10,052
Guam	154,805	47,677
Northern Mariana Islands	69,221	17,566
U.S. Virgin Islands	108,612	50,202
U.S. minor outlying areas	316	(NA)
U.S. population abroad	576,367	(NA)

(NA) Not applicable.

Source: U.S. Census Bureau, 2000 Census of Population and Housing, *United States Summary: 2000, Population and Housing Unit Counts*, Part 1 (PHC-3-1), Table 1.

The data collected for the 50 states, the District of Columbia, and Puerto Rico were derived from a limited number of basic questions asked about every person and about every housing unit (referred to as the “100 percent” or “short-form” items) and from an additional set of questions asked of only a sample of the population and their housing units (referred to as “sample” or “long-form” questions). The Census Bureau relied on two basic questionnaires to collect these data: a “short form,” containing only the 100 percent questions, and a “long form,” containing both the 100 percent questions and the additional sample questions. In the Virgin Islands and the Pacific Island Areas, the data were derived from questions asked about the entire population and about every housing unit; no questions were asked on a sample basis.

Census stakeholders (government agencies, nonprofit organizations, academic and policy researchers, and private companies) showed considerable interest in demographic change and its political implications in the United States during the 1990s. Interest focused particularly on the racial and ethnic composition of the population that occurred during a decade of immigration and differential birth and death rates. The 2000 Census figures revealed the breakdowns shown in Table 1-2.

Table 1-2.
Population by Race and Hispanic Origin for the United States: 2000

Race	Population	Percent of total population
Total population	281,421,906	100.0
One race.....	274,595,678	97.6
White.....	211,460,626	75.1
Black or African American.....	34,658,190	12.3
American Indian and Alaska Native.....	2,475,956	0.9
Asian.....	10,242,998	3.6
Native Hawaiian and Other Pacific Islander.....	398,835	0.1
Some Other Race.....	15,359,073	5.5
Two or more races.....	6,826,228	2.4
Hispanic origin (of any race).....	35,305,818	12.5

Source: U.S. Census Bureau, Census 2000 Summary File 1 (SF 1), 100 Percent Data, Table DP-1 ("Profile of General Demographic Characteristics: 2000").

The increase of 32.7 million people in the U.S. population during the 1990s was the largest census-to-census increase in American history.¹ An important change between the 1990 and 2000 censuses was that in 2000 respondents had the option of selecting one or more race categories to indicate racial identity. Because of this and other changes, Census 2000 race data are not directly comparable with data from earlier censuses. In the table above, the total population (281,421,906) is equal to those reporting themselves as identifying with one race (274,595,678) added to those reporting two or more races (6,826,228). In this classification system, respondents claiming Hispanic origin may identify with any race or combination of races. While the overwhelming majority of respondents (97.6 percent) reported only one race, when given an opportunity to express themselves, nearly 7 million respondents identified with two or more races.²

Major Events in the Planning and Conduct of Census 2000

Modern census taking is an enormously complex process. The chronological list of events in Appendix A, "Major Events in the Planning and Conduct of Census 2000" gives a sense of the range of issues and activities with which the Census Bureau had to grapple in planning and conducting Census 2000.

The Census Cycle and Cost of Census 2000

Traditionally the census budget cycle lasted for 10 years, from October 1 of the year ending in "3" before the census year until September 30 of the year ending in "3" after the census. However, the amount of planning, testing, and rethinking that characterized Census 2000 required that the Census Bureau begin preparations in 1987. After a thorough assessment of the 1990 census, the agency adopted an ambitious plan in 1995 involving extensive expansion in the use of probability sampling in Census 2000. However, the U.S. Supreme Court concluded in January 1999 that the Census Bureau's governing statute, Title 13 of the U.S. Code, forbade the use of sampling for determining congressional reapportionment. Since sampling for reapportionment purposes was a key element of the 1995 plan, this ruling caused a significant compression of the time schedule.

Census 2000 cost approximately \$6.5 billion in nominal dollars, created about 860,000 jobs, and employed as many as 550,000 people during the peak of operations in 2000.

¹ Marc J. Perry and Paul J. Mackun, "Population Change and Distribution: 1990 to 2000," Census 2000 Brief, C2KBR/01-2, April 2001, p. 1.

² Elizabeth M. Grieco and Rachel C. Cassidy, "Overview of Race and Hispanic Origin," Census 2000 Brief, C2KBR/01-1, March 2001, pp. 1-3, 5, 10-11.

Legal Authority

Census Day for the United States was April 1, 2000.³ On December 28, 2000, Secretary of Commerce William M. Daley delivered to President William Jefferson Clinton the Census Bureau's official population counts by state for purposes of reapportioning the seats in the U.S. House of Representatives. The President formally transmitted the tabulations to the House on January 6, 2001. Included in the delivery was a statement of the number of seats per state calculated according to the "equal proportions" method the Congress had specified.⁴

The transmission of the reapportionment information occurred because the U.S. Constitution required the Congress to carry out the census in "such manner as they shall by Law direct" (Article I, Section 2). In 1954, Congress codified the statutes authorizing the decennial census, other censuses, and economic and demographic surveys conducted by the Census Bureau under a pledge of confidentiality to respondents as Title 13, U.S. Code.⁵ Following its adoption, Title 13 was amended several times, and it governed Census 2000.

Initially, apportionment data had to be delivered to the President 8 months from Census Day. In 1976, Public Law (P.L.) 94-521 extended the date for delivering apportionment data to the president to 9 months from Census Day.

In 1975, P.L. 94-171 amended Title 13 and required the Census Bureau to deliver to each state, within 1 year after Census Day, population counts for officials to use in drawing state and local legislative boundaries that would comply with court mandates for "equal representation." The agency transmitted all these materials—for more than 8 million census blocks and nearly 130,000 state-provided voting districts—by March 31, 2001.

The apportionment that followed Census 2000 shifted 12 seats in the U.S. House of Representatives among 18 states (see Table 1-3). Eight states increased their representation in the 108th Congress that convened in January 2003, while ten states lost seats. Of the eight states that gained seats, four (AZ, FL, GA, and TX) gained two seats each; four others (CA, CO, NV, and NC) gained one seat each. Two states, NY and PA, lost two seats each; CT, IL, IN, MI, MS, OH, OK, and WI each lost one seat.

Between 1990 and 2000, the regional pattern of change in representation reflected the country's shift in population from the Northeast and Midwest to the South and West (see Figure 1-1). The South and West experienced net gains of five seats each, while the Northeast and Midwest each lost five seats. Of the four census regions, the South had the largest share of seats (35 percent), followed by the Midwest and the West (23 percent each), and the Northeast (19 percent).

³ Census Day has been April 1 for each decennial enumeration since 1930. Most census questions were to be answered with reference to April 1, 2000, regardless of the actual date the respondent or enumerator completed the questionnaire. (The question, "LAST WEEK, did this person do ANY work for either pay or profit?" and related questions on labor force status referred to the full calendar week or other time period prior to the completion of the questionnaire. However, the question on residence 5 years ago specified April 1, 1995, as the reference date.) In remote Alaska, enumerators began making their rounds in January, before the spring thaw, but asked all questions in relation to Census Day. If a birth was expected between then and April 1, the enumerator asked the respondent to mail in a report for the new arrival.

⁴ See U.S. Census Bureau, "Computing Apportionment," 2001, available on the Internet at <<http://www.census.gov/population/www/censusdata/apportionment/computing.html>>, accessed on October 10, 2007. For an overview of the various methods used to apportion seats in the U.S. House of Representatives, see U.S. Census Bureau, "Counting for Representation: The Census and the Constitution," 1987; and David McMillen, "Apportionment and Districting," in *Encyclopedia of the U.S. Census*, Margo J. Anderson (ed.) (Washington, DC: Congressional Quarterly Press, 2000), pp. 34-42.

⁵ The Census Bureau also takes surveys on a reimbursable basis for other sponsoring agencies under the authority of Title 15, U.S. Code, which does not extend the confidentiality guarantee of Title 13 to the information provided by respondents but does extend the confidentiality standards, if any, of the sponsoring agency to respondent information.

Table 1-3.

**Apportionment Population and Number of Representatives by State:
Census 2000**

State	Apportionment population	Number of apportioned representatives based on Census 2000	Change from 1990 census apportionment
Total apportionment population¹	281,424,177	435	(NA)
Alabama	4,461,130	7	0
Alaska	628,933	1	0
Arizona	5,140,683	8	+2
Arkansas	2,679,733	4	0
California	33,930,798	53	+1
Colorado	4,311,882	7	+1
Connecticut	3,409,535	5	-1
Delaware	785,068	1	0
Florida	16,028,890	25	+2
Georgia	8,206,975	13	+2
Hawaii	1,216,642	2	0
Idaho	1,297,274	2	0
Illinois	12,439,042	19	-1
Indiana	6,090,782	9	-1
Iowa	2,931,923	5	0
Kansas	2,693,824	4	0
Kentucky	4,049,431	6	0
Louisiana	4,480,271	7	0
Maine	1,277,731	2	0
Maryland	5,307,886	8	0
Massachusetts	6,355,568	10	0
Michigan	9,955,829	15	-1
Minnesota	4,925,670	8	0
Mississippi	2,852,927	4	-1
Missouri	5,606,260	9	0
Montana	905,316	1	0
Nebraska	1,715,369	3	0
Nevada	2,002,032	3	+1
New Hampshire	1,238,415	2	0
New Jersey	8,424,354	13	0
New Mexico	1,823,821	3	0
New York	19,004,973	29	-2
North Carolina	8,067,673	13	+1
North Dakota	643,756	1	0
Ohio	11,374,540	18	-1
Oklahoma	3,458,819	5	-1
Oregon	3,428,543	5	0
Pennsylvania	12,300,670	19	-2
Rhode Island	1,049,662	2	0
South Carolina	4,025,061	6	0
South Dakota	756,874	1	0
Tennessee	5,700,037	9	0
Texas	20,903,994	32	+2
Utah	2,236,714	3	0
Vermont	609,890	1	0
Virginia	7,100,702	11	0
Washington	5,908,684	9	0
West Virginia	1,813,077	3	0
Wisconsin	5,371,210	8	-1
Wyoming	495,304	1	0

(NA) Not applicable.

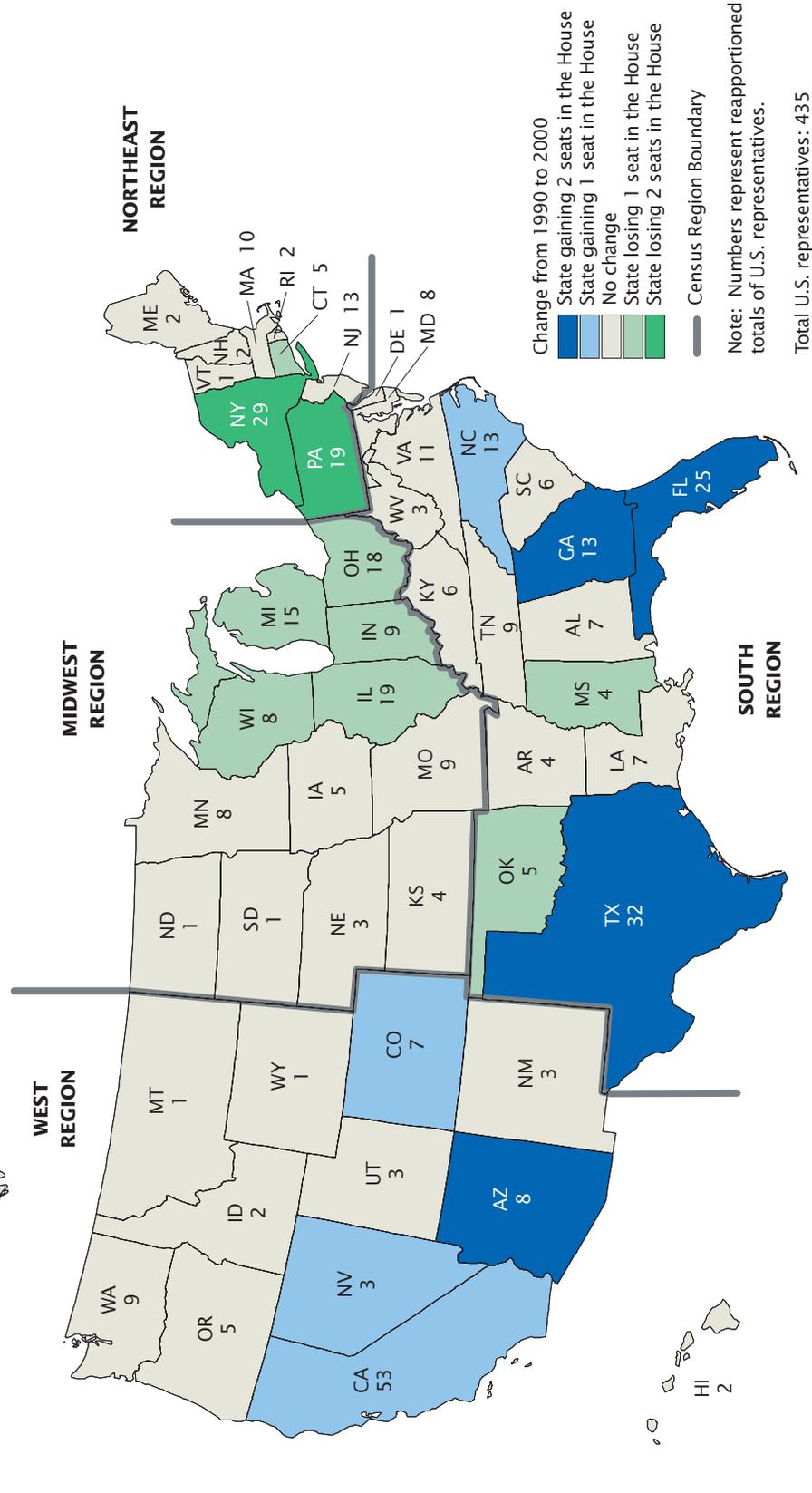
¹ Includes the resident population for the 50 states, as ascertained by the Twenty-Second Decennial Census under Title 13 U.S. Code, and counts of overseas U.S. military and federal civilian employees (and their dependents living with them) allocated to their home state, as reported by the employing federal agencies. The apportionment population excludes the population of the District of Columbia.

Note: As required by the January 1999 U.S. Supreme Court ruling (*Department of Commerce v. U.S. House of Representatives*, 525 U.S. 316, 119 S.Ct. 765 (1999)), the apportionment population counts do not reflect the use of statistical sampling to correct for overcounting or undercounting.

Source: U.S. Census Bureau <<http://www.census.gov/population/www/censusdata/apportionment.html>>. Internet release date: December 28, 2000.

Figure 1-1.

Apportionment of the U.S. House of Representatives for the 108th Congress



Source: Karen M. Mills, "Congressional Apportionment," Census 2000 Brief, C2KBR/01-7, July 2001, p. 3; available online at <www.census.gov/population/www/cen2000/briefs.html>.

Organization of the Census Bureau

Census 2000 was administered from the Census Bureau's headquarters building in Suitland, MD, with added space in nearby "satellite" locations as needed. Large-scale clerical operations were handled at the agency's National Processing Center in Jeffersonville, IN. To house its centrally managed computer resources and as part of its recovery plan for dealing with potential disasters, the agency established a computer center in Bowie, MD, in 1997.

Twelve regional offices (ROs) throughout the country undertook various current surveys and supervised decennial census activities in their areas. These offices were located in Atlanta, GA; Boston, MA; Charlotte, NC; Chicago, IL; Dallas, TX; Denver, CO; Detroit, MI; Kansas City, KS; Los Angeles, CA; New York, NY; Philadelphia, PA; and Seattle, WA. For the census field enumeration, each RO established a companion "regional census center" (RCC) nearby. The 12 RCCs managed 520 temporary local census offices (LCOs) throughout the 50 states and the District of Columbia for data collection. The Boston RCC also supervised nine LCOs and an area office in Puerto Rico, while headquarters directed five LCOs in the Virgin Islands and the Pacific Island Areas.

Whereas the 1990 census had seven processing offices (Albany, NY; Austin, TX; Baltimore, MD; Jacksonville, FL; Jeffersonville, IN; Kansas City, KS; and San Diego, CA), Census 2000 involved four data capture centers, located in:

- Phoenix, AZ
- Pomona, CA
- Rosedale, MD
- Jeffersonville, IN (in the Census Bureau's permanent facility there).

The agency awarded data-processing contracts to:

- Lockheed Martin Mission Systems to develop and test the hardware and software needed to control census mail returns and to convert the answers on the questionnaires into an electronic format suitable for computer processing.
- TRW, Incorporated, to supply three data capture centers including staff, office equipment, supplies, and training and procedures to process completed census questionnaires.

The Census Bureau's permanent staff provided planning, direction, and support services for Census 2000. However, temporary staffs in the RCCs, LCOs, and data capture centers were by far the largest component of the decennial census work force.

THE POLITICAL CONTEXT

Critics noted that despite some improvements, the 1990 census cost considerably more per person and per household than earlier censuses and produced an increase in both the relative and absolute numbers of people missed (or "undercounted").⁶ In November 1990, Secretary of Commerce Robert Mosbacher created the "Task Force for Planning the Year 2000 Census and Census-Related Activities for 2001–2009" to develop an effective design for Census 2000. The resulting plan sought to improve the quality and availability of data for federal and nonfederal data users and increase overall census coverage, while keeping a lid on costs.⁷ The agency's review of its decennial census assumptions and methodologies took on greater urgency in the wake of Secretary Mosbacher's decision (on July 15, 1991) not to adjust 1990 census data to correct for the differential undercount and criticism of the Census Bureau's planning for the 1990

⁶ See, for example, Barry Edmonston and Charles Schultze (eds.), *Modernizing the U.S. Census* (Washington, DC: National Academy Press, 1995), pp. 30–58.

⁷ For a discussion of the work of the task force, see Chapter 2, "Planning the Census."

census as well as implementation of the plan. Many groups, organizations, and jurisdictions with which the agency had worked to improve census coverage during data collection joined lawsuits that attempted to force the Census Bureau to adjust the 1990 census.⁸

Without significant changes in census-taking methodology, a number of members of Congress on both sides of the aisle saw no reason to believe that the next census would not fall prey to many of the difficulties that affected the 1990 effort. Congressman Thomas Sawyer (D-OH), the chair of the Census Bureau's oversight subcommittee in the House, introduced a bill in late 1990 that required the Secretary of Commerce to hire the National Academy of Sciences (NAS) to examine ways for the government to conduct the most accurate census possible in 2000 and beyond, by improving enumeration methods, assessing alternative ways of collecting population data, and evaluating the appropriateness of using probability sampling to refine the population information collected via traditional census methods. The bill also required the NAS to assess the extent to which sample population data were still needed and if so, whether viable alternatives existed to traditional data collection methods such as mailout/mailback of census questionnaires and personal interviews. That bill, the Decennial Census Improvement Act, was signed into law in October 1991.⁹

In response to this congressional mandate, NAS established a panel to examine ways to improve census enumeration methods, collect the information needed for a basic population count, and determine the appropriateness of using sampling methods to obtain the population count. The panel was also instructed to evaluate the strengths and weaknesses of each alternative and analyze its cost effectiveness. The Census Bureau also asked NAS to conduct a second study to assess technical issues associated with the implementation and evaluation of promising methodologies. By the middle of the decade, the NAS panels had concluded that expanding traditional census methods would improve neither coverage nor data quality. NAS recommended that Census 2000 significantly expand the use of sampling to address both coverage improvement and cost control.¹⁰ Similarly, the General Accounting Office (GAO)—renamed the Government Accountability Office in July of 2004—urged the agency to explore using statistical sampling for part or all of nonresponse follow-up (NRFU), the process of collecting census information for housing units for which there was no response during the mailout/mailback phase of the census, both to reduce costly data collection activities and to improve census coverage.¹¹ Members of several of the Census Bureau's advisory committees also suggested that the agency explore the possibilities for cost reduction and improved accuracy associated with the increased use of sampling in Census 2000, but they cautioned that a substantial educational effort would be needed to explain sampling procedures to nonstatisticians.

One improvement both critics and supporters generally favored involved Census Bureau efforts to increase the quality and comprehensiveness of the decennial census address list. The Census Address List Improvement Act of 1994 modified Title 13 to allow the Census Bureau to share its address list with state, local, and tribal governments, which in turn permitted those jurisdictions to review the Census Bureau's list and suggest modifications and corrections based on local knowledge.¹² The goal was to help the Census Bureau compile the most accurate and complete address list for use in its censuses and surveys.

This law required the Secretary of Commerce to publish standards for address information that local jurisdictions could submit for use in the development of census address lists and to develop and publish a schedule for the Census Bureau to receive, review, and respond to submissions. It

⁸ For more detail on the lawsuits associated with the 1990 census, see U.S. Census Bureau, *1990 Census of Population and Housing History, Part D*, 1990 CPH-R-2D (Washington, DC: Government Printing Office, 1996), Chapter 12, "Legislation and Litigation." For a description of the resolution of the principal lawsuit seeking to adjust the 1990 census, *Wisconsin v. City of New York* (517 U.S. 1 (1996)), see Chapter 11, "Legal Issues" of this history.

⁹ House of Representatives (H.R.) 3280, Decennial Census Improvement Act of 1991. This bill was signed into law as P.L. 102-135 on October 24, 1991.

¹⁰ See Edmonston and Schultze, *Modernizing the U.S. Census* and Duane L. Steffey and Norman M. Bradburn (eds.), *Counting People in the Information Age* (Washington, DC: National Academy Press, 1994).

¹¹ U.S. General Accounting Office, "Decennial Census: 1990 Results Show Need for Fundamental Reform," GGD 92-94, June 9, 1992.

¹² H.R. 5084 became P.L. 103-430 on October 31, 1994.

ordered the Secretary to give locally appointed census liaisons access to census information and an explanation of their duties and obligations. The law also subjected these liaisons to the confidentiality requirements and wrongful disclosure penalties authorized in Title 13. Finally, the statute required the U.S. Postal Service to provide address and address-related information to the Census Bureau for use in the construction and updating of the latter's address list to be used in censuses or surveys.

Early in the 1990s, members of the Census Bureau's Year 2000 Research and Development Staff and the Task Force for Planning the Year 2000 Census held focus group meetings with stakeholders representing hundreds of organizations to discuss the kinds of changes that might be needed to conduct a successful census in the social, economic, and technological environment that was likely to exist in 2000. One of the task force's components, the technical committee (composed of senior statistical staff from the Census Bureau and other federal statistical agencies), developed 14 alternative census designs that served as the basis for a major census test in 1995 and several later tests. The task force's Census 2000 Advisory Committee recommended that the Census Bureau test sampling and estimation techniques for enumerating nonresponding households. The task force's final report advocated five avenues for improving Census 2000:

- Fostering greater involvement of census stakeholders.
- Implementing new ways to reduce the differential undercount.
- Using new technology to capture census information more efficiently.
- Increasing the use of statistical methods to reduce the differential undercount.
- Using new methods to collect long-form data.¹³

Evaluations of the 1990 census and of small-scale research early in the 1990s encouraged Census Bureau executives to conclude that a redesigned census that incorporated sampling for NRFU, relied on Integrated Coverage Measurement (ICM) (see below) to help reduce the differential undercount, used optical mark and character recognition hardware and software, and included a comprehensive outreach and promotion program could improve census accuracy and reduce cost. The Census Bureau's plan for Census 2000, released in February 1996, used these conclusions as guidance. Among other elements, the plan included four central strategies: (1) build partnerships at every stage of the process, (2) keep the census simple for respondents, (3) use technology intelligently, and (4) increase the use of statistical methods.¹⁴

Reaction to the plan from advisory groups and the professional statistical and demographic community was generally positive. However, significant criticism did arise in some quarters, notably among members of Congress. Some congressional critics believed that the Census Bureau's plan to use probability sampling techniques (see the next section, "The Statistical Context") to produce reapportionment and/or redistricting data violated the Constitution and/or Section 195 of the agency's operating statute, Title 13, U.S. Code.

Republicans won control of both houses of Congress in the 1994 mid-term election. During the next few years, legislators opposed to the administration's plan proposed legislation to prevent the Census Bureau from implementing it. The proposed legislation included attempts to amend Title 13 to explicitly prohibit the use of sampling or other statistical techniques to determine state population totals for the purpose of apportionment and attach language to appropriations bills preventing the use of appropriated funds for the development of a census plan that would involve statistical sampling in the production of the apportionment and/or redistricting data. Congressional critics also prepared a freestanding report that opposed the Census Bureau's plan to use statistical sampling to determine apportionment population counts. Votes often adhered to party lines, with the Republican majority opposing the use of statistical sampling for producing apportionment counts and supporters of the Democratic Clinton administration favoring it.

¹³ U.S. Census Bureau, "Reinventing the Census: Global Report of the Task Force for Planning the Year 2000 Census," April 1995.

¹⁴ U.S. Census Bureau, "The Plan for Census 2000," February 28, 1996; a slightly revised version incorporating suggestions from several sources was released on April 5, 1996.

By the fall of 1997, risks of stalemate over the issue had become quite substantial. Negotiations produced a compromise that was embodied in the FY 1998 Department of Commerce appropriations bill. The compromise allowed the Census Bureau to continue to plan for the use of sampling, but required the agency to develop a plan for taking Census 2000 without using sampling. For the next year or so, the Census Bureau continued to flesh out its plan for a census that incorporated sampling while also laying out a detailed proposal for a census using traditional data-collection methods. The process was called “dual-track planning.” The 1997 compromise also contained provisions for judicial review of the use of sampling techniques to produce apportionment population counts or redistricting data. The statute also established an oversight panel called the Census Monitoring Board, composed of four members appointed by the administration and four by the Senate and House majority leadership.

In February 1998, opponents of sampling filed two lawsuits challenging the legality and constitutionality of the sampling procedures the Census Bureau planned to use in Census 2000. Ultimately, the two cases reached the U.S. Supreme Court, where they were consolidated.

On January 25, 1999, the Supreme Court ruled that Section 195 of Title 13 precluded the use of sampling to produce congressional apportionment counts.¹⁵ The political battle over the role of sampling in Census 2000 was nearly over, but Census Day was just over 14 months away. Dual-track planning was scrapped, but the census plan that the agency had been working on for more than 5 years went with it. The Census Bureau had to implement a revised and expanded version of the 1990 census, within a relatively short period of time.

A little over 2 years later, in March 2001, a committee of senior Census Bureau managers and statisticians confronted another politically charged issue when the committee recommended against adjusting the official Census 2000 block-level data for the purpose of congressional redistricting.¹⁶ Unresolved statistical inconsistencies in the adjusted data led to this recommendation, which was adopted by Secretary of Commerce Donald Evans on March 6, 2001.¹⁷

THE STATISTICAL CONTEXT

Since its introduction in the 1940 decennial census, probability sampling has remained an integral part of U.S. census taking. The Census Bureau, together with several other government agencies, was instrumental in developing the theory and practice of applying probability sampling to finite human populations. Though initially introduced as a data collection device, over the years the Census Bureau expanded its use of sampling for quality assurance, research and development, and improving and evaluating census coverage. In the late 1940s, a comparison of aggregate Selective Service registration information and 1940 census data revealed that efforts to count the entire population of the United States were subject to a systematic “undercount” of certain population groups (specifically, African American males and young children).¹⁸ During the 1970s, the Census Bureau was deeply involved in coverage evaluation studies to determine the characteristics of those typically missed during the census. The agency devoted considerable resources during the 1980s to expand its understanding of the characteristics of undercounted and overcounted (i.e., double counted) populations and of how to use statistical techniques to correct these errors in raw census counts.

For Census 2000, the agency planned to use sampling for four major purposes:

- **Long-form population and housing characteristics.** The Census Bureau planned to collect detailed information, such as educational attainment, income in 1999, year the housing unit was built, etc., on a representative portion of the nation’s people and their living quarters. The results were to be used to estimate the characteristics of the nation’s entire population and housing stock.

¹⁵ *Department of Commerce v. U.S. House of Representatives*, 119 S.Ct. 765 (1999).

¹⁶ U.S. Census Bureau, “Report of the Executive Steering Committee for Accuracy and Coverage Evaluation Policy,” March 1, 2001.

¹⁷ For a description of some of these inconsistencies, see the “Coverage Measurement” section of Chapter 10, “Testing, Experimentation, Evaluation, and Coverage Measurement Programs.”

¹⁸ See Daniel O. Price, “A Check on Under-Enumeration in the 1940 Census,” *American Sociological Review*, Vol. 12, Issue 1, February, 1947, pp. 44–49.

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- **Nonresponse follow-up (NRFU).** Following the conclusion of the mailout/mailback phase of the census, the Census Bureau expected to send enumerators into the field to collect census information from enough residents of housing units in each census tract (an administrative unit containing an average of about 1,700 housing units and 4,000 people) to increase the response rate in each tract to 90 percent. After reaching the 90 percent target, the remaining 10 percent of the housing units and their inhabitants would be enumerated on a sample basis. Information from the residents of a 1-in-10 sample of the remaining housing units would be used to estimate the number of nonrespondents and their characteristics.
 - **Vacant housing unit follow-up.** Between Census Day (April 1, 2000) and the end of NRFU, census workers planned to visit 30 percent of the housing units designated as vacant by the U.S. Postal Service to verify their occupancy status and gather information on the number and characteristics of vacant units.¹⁹
 - **Integrated Coverage Measurement (ICM).** After NRFU, census enumerators would interview residents of a random sample of about 750,000 housing units. The purpose of this survey was to determine the proportions of the population living in the sample blocks included in and excluded from earlier phases of the census. This would be accomplished by matching housing units in the ICM sample with the same housing units in the census. The results of this survey would be used to statistically adjust the original census counts.

The U.S. Supreme Court's January 25, 1999, decision prohibiting the use of sampling to produce state population counts for reapportioning seats in the U.S. House of Representatives effectively ended the Census Bureau's effort to use statistical sampling for the last three of these activities.²⁰ However, the agency continued to entertain the possibility of using statistically adjusted data for nonapportionment purposes.

Data Collection Forms

For Census 2000, the agency designed a 100 percent ("short") questionnaire containing seven inquiries that elicited information about all inhabitants of the United States. The agency needed the information that was generated in the responses to the age, race, and ethnicity items to fulfill its mandate under the Constitution; subsequent "one-person, one-vote" decisions of the U.S. Supreme Court; and the Voting Rights Act of 1965. These precedents require the Census Bureau to supply such data with a high degree of accuracy for the purposes of legislative reapportionment and redistricting. A sample ("long") form, containing an additional 46 questions as well as the 100 percent inquiries, was designed to collect detailed demographic and housing characteristics. These questions were required by law to be included in the census, specifically to implement certain federal programs or because the government concluded that the decennial census was the only practical source of the data.²¹ The Census Bureau used sampling to control costs and to maintain or reduce respondent burden.

Several of the alternative census designs the Census Bureau considered in 1992 and 1993 contained components that called for significant modifications to collecting sample data in the census.²² One alternative was called matrix sampling, which involved the use of two sample forms containing overlapping questions. For example, a 20 percent sample could be divided into a 15 percent sample and a 5 percent sample. Some questions would appear on only one version of the questionnaire while others would be printed on both versions. This design would enable the Census Bureau to collect data on a larger number of topics while minimizing respondent burden. After consulting a variety of stakeholders, the Census Bureau determined that this option was

¹⁹ After the January 1999 Supreme Court ruling in *Department of Commerce v. U.S. House of Representatives*, the Census Bureau's revised plan included a 100 percent follow-up of such units.

²⁰ *Department of Commerce v. U.S. House of Representatives*, 119 S.Ct. 765 (1999).

²¹ U.S. Bureau of the Census, "Preparing for Census 2000: Questions Planned for Census 2000," March 1998, and Edmonston and Schultze, *Modernizing the U.S. Census*, p. 23.

²² U.S. Bureau of the Census, "2000 Census Research and Development Alternative Designs Program," June 1992 (unpublished paper), and U.S. Bureau of the Census, "Design Alternative Recommendations," May 17, 1993 (unpublished paper).

unacceptable because it would sacrifice certain small-area data needs, particularly the ability to produce cross tabulations at low levels of geography with acceptable accuracy and reliability and because of the difficulty of controlling multiple versions of the same questionnaire during data collection.

Another option was to eliminate direct data collection altogether and rely on administrative records to provide the necessary information. The agency rejected this approach for a variety of technical reasons (for example, potential coverage error and its implications for the undercount, difficulties in obtaining the necessary data sets in suitable machine-readable formats and in matching and unduplicating those data sets, etc.). The number of statutory amendments needed to implement this option and concern about public perception also precluded its use.

Several designs were proposed to severely reduce or eliminate sample data collection and focus on collecting only the data required by the Voting Rights Act. While these options did reduce cost and respondent burden, most entailed an unacceptable loss of data needed for federal, state, and local programs. However, a variation on this approach—that is, minimal data collection in the decennial census year supplemented by the collection of more detailed personal and housing data from a changing sample of between 250,000 and 400,000 housing units per month—has been designated as the methodology that will be used in the 2010 Census.²³

The sampling design for the detailed questionnaire that the Census Bureau implemented in Census 2000 was similar to that used in the 1990 census and included:

- An overall sampling rate of about 1-in-6 addresses, or 17 percent.
- A sampling rate of 1 in 2 in general purpose governmental units with fewer than 800 housing units and in remote Alaska.
- A sampling rate of 1-in-4, 1-in-6, or 1-in-8 households in other governmental units.

The Census Bureau argued that variable-rate sampling would allow it to allocate the sample efficiently while reducing respondent burden and maintaining the accuracy and reliability of census data for lower geographic levels.²⁴

Sampling for Nonresponse Follow-Up

Sampling for NRFU represented an attractive option for several reasons. Nearly 20 percent of the \$2.6 billion cost of the 1990 census was spent on NRFU (the process of collecting census information for housing units for which there was no response during the mailout/mailback phase of the census). The Census Bureau estimated that nonresponse in Census 2000 would total approximately 34 million housing units. By sampling these housing units instead of trying to contact someone living in each one, the agency proposed it could achieve significant cost savings and reduce substantially the amount of time needed to complete the operation. Finally, this later phase of data collection typically suffers a marked decrease in data quality. The agency therefore argued that sampling for NRFU might actually increase data quality by allowing the Census Bureau to concentrate its resources on obtaining reliable data from a portion of nonrespondents over a shorter period of time rather than requiring it to contact all nonrespondents.²⁵

Following a largely successful test of sampling for NRFU in 1995, Census Bureau statisticians and managers evaluated the results of the test and consulted with a wide variety of stakeholders. On February 26, 1996, the Census Bureau released “The Plan for Census 2000,” which announced that the agency would cut off NRFU at 90 percent (“truncation at 90 percent”) and sample the remaining 10 percent as the design for sampling for nonresponse.

²³ The survey component of this program is called the American Community Survey. For an overview, see U.S. Census Bureau, *Design and Methodology: American Community Survey*, Technical Paper No. 67, May 2006.

²⁴ U.S. Census Bureau, “Census 2000 Operational Plan Using Traditional Census-Taking Methods,” January 1999, and U.S. Census Bureau, “Program Master Plan: Census 2000 Long Form Sampling Plan,” Census 2000 Informational Memorandum No. 39, February 9, 2000.

²⁵ Michael L. Cohen, Andrew A. White, and Keith F. Rust (eds.), *Measuring a Changing Nation: Modern Methods for the 2000 Census* (Washington, DC: National Academy Press, 1999), pp. 26–30, and Steffey and Bradburn, *Counting People in the Information Age*, p. 98.

Over the next 7 months, senior Commerce Department and Census Bureau officials, led by Census Bureau Director Martha Farnsworth Riche, traveled throughout the country explaining the Census 2000 plan to stakeholders and other interested people. Census Bureau staff and invited stakeholders also discussed the new census plan at congressional committee hearings, agency advisory committee meetings, and at numerous academic forums.

One result of these meetings and consultations was that early in 1997, Census Bureau officials agreed to modify several aspects of the plan.²⁶ Direct sampling replaced truncation at 90 percent because of the superiority of the former in operational terms and in mathematical accuracy, the positive responses from the agency's advisors, and the agency's efforts to accommodate congressional requests for a less costly census. The agency also decided to use census tracts rather than counties as the basis for implementing direct sampling for NRFU because low mail-response areas within counties might be undersampled if counties were used to measure response rates.

Throughout the latter part of 1997 and 1998, the agency further refined this portion of the plan, but the U.S. Supreme Court's January 1999 decision prohibiting the use of sampling in the production of population statistics to be used for reapportionment ended the Census Bureau's plan to use sampling for NRFU.

Integrated Coverage Measurement (ICM)

Evaluations of past decennial censuses revealed a persistent greater-than-average net undercount of minorities and other hard-to-count population groups and areas. These studies also indicated that increasing the number of conventional counting operations did not eliminate or reduce these undercounts in the 1990 census. The Census Bureau concluded that the design for Census 2000 should incorporate the results of a coverage measurement survey conducted immediately following basic data collection as an integral part of completing the census—that is, Integrated Coverage Measurement (ICM).

The agency used a post-enumeration survey (PES) to measure coverage in the 1990 census. This approach involved conducting an independent survey of the population after completing data collection for the regular census. Analysts combined the results of the PES with the census to produce an estimate of the total population. The technique used to estimate total population size was called dual system estimation (DSE), because it used two independent sources of information (the census and the PES).

While the Census Bureau assessed the characteristics of the PES and alternative approaches to possibly reducing undercounts and worked on ways to overcome the inherent problems of each, it also pursued the development of a one-number census.²⁷ By the term "one-number census," the Census Bureau meant that the decennial census should be designed to produce the best possible single set of results for persons, housing units, and households by the legally mandated deadlines. The one-number census began with the belief that the results of ICM would be incorporated, or integrated, into the official census results. The purpose of ICM was to measure and correct for overall and differential net coverage error ("undercount") that characterized previous censuses and in so doing, produce a one-number census.

²⁶ U.S. Census Bureau, "Changes to the Census 2000 Plan Since Its Roll Out (February 28, 1996)," March 4, 1997.

²⁷ The one-number census is discussed in U.S. Bureau of the Census, "Issues in Coverage Measurement and a Single-Number Census," September 22, 1992. See also Catherine Keeley and Susan M. Miskura, "Reducing Differential Undercount and Improving Coverage Overall in the 2000 Census," June 8, 1993.

In the 1995 Census Test, the Census Bureau compared the effectiveness of DSE in correcting for the undercount with alternative statistical adjustment methodologies.²⁸ One major criterion for evaluating the estimates derived from DSE was whether DSE accounted for more people in the traditionally undercounted population groups than the alternatives. The ICM evaluation revealed that DSE resulted in increased estimated counts for some traditionally undercounted groups (mainly Blacks and renters), while the alternative approach (called CensusPlus) did not.²⁹ Both DSE and CensusPlus produced increased estimates of Hispanics, but only DSE resulted in increased estimated counts for Asians and Pacific Islanders.

Census Bureau officials believed that ICM was the most important of all the innovations designed to improve census accuracy. Further evaluations of the 1995 and 1996 Census Tests, combined with the necessity of finalizing a decision on the method to be used in the 1998 Dress Rehearsal, led agency officials to choose the DSE approach in the spring of 1997. During the remainder of 1997 and 1998, Census Bureau planners focused on refining this method and preparing to test these modifications in the Census 2000 Dress Rehearsal in 1998.

As agency statisticians drafted evaluations of dress rehearsal operations, the Supreme Court ruled that statistically adjusted census data derived from sampling could not be used for reapportioning seats in the House of Representatives. That ruling ended the Census Bureau's effort to implement ICM in Census 2000. A smaller version of this coverage measurement survey, renamed the Accuracy and Coverage Evaluation (A.C.E.) survey, was used to evaluate the coverage of Census 2000 and possibly to statistically adjust census counts for nonapportionment purposes (although, as discussed elsewhere in this chapter, poor data quality caused such an adjustment from taking place.)

Contingency Planning

In the summer of 1997, Census Bureau staff began to prepare for the possibility of a census that would include neither sampling for NRFU nor an ICM.³⁰ Early work focused on preparing alternative operational time schedules, identifying the activities to be dropped from the regular census schedule, and specifying those that would have to be expanded to compensate for the lack of planned sampling procedures.

By fall 1997, the contingency plan began to take shape. Spurred on by significant congressional opposition to sampling and well aware that its FY 1998 appropriations statute (P.L. 105-119) required the agency to “become prepared to implement a 2000 decennial census, without using statistical methods . . . ,” the Census Bureau increased efforts to identify elements and operations common to both designs to facilitate planning. By early 1998, two lawsuits had challenged the Census Bureau's plan to use statistical sampling to produce population figures for reapportionment.³¹ All the while, the Census Bureau continued to plan for a census with sampling for NRFU and ICM, as well as a traditional census without them. Additionally, the agency modified plans for the 1998 Dress Rehearsal to incorporate this dual-track strategy. In keeping with its dual-track approach, the agency issued its “Census 2000 Operational Plan Using Traditional Census-Taking Methods” in early January 1999. As noted above, the Census Bureau's original plan for Census 2000 included the following four strategies: (1) build partnerships at every stage of the process,

²⁸ Mary H. Mulry and Richard Griffin, “Comparison of CensusPlus and Dual System Estimation in the 1995 Census Test,” *Proceedings of the Survey Research Methods Section*, American Statistical Association, 1996, pp. 848–53. For a description of CensusPlus, see Chapter 2, “Planning the Census.” The Census Bureau also considered a third strategy, dubbed SuperCensus, that was similar to CensusPlus but would begin during the mailout/mailback period, not after the completion of NRFU. Also, regular census data collection would not take place in SuperCensus blocks, and the only available counts would be those that incorporated ICM. Evaluations of regular census operations would not be possible because there was no mailout of census questionnaires. Another problem with SuperCensus was the possibility that ratios of people to housing units would be too variable to permit accurate estimates. As a result of these difficulties, the agency dropped the SuperCensus option. See Steffey and Bradburn, *Counting People in the Information Age*, pp. 109–11.

²⁹ E. Ann Vacca, Mary Mulry, and Ruth Ann Killion, “The 1995 Census Test: A Compilation of Results and Decisions,” 1995 Census Test Results Memorandum No. 46, April 1, 1996.

³⁰ “Issues Briefing—Contingency Planning for Census 2000 with No Sampling,” October 7, 1997, revised version, October 20, 1997.

³¹ The two cases were *Glavin v. Clinton* and *U.S. House of Representatives v. Department of Commerce* (as filed). For more information on these cases, see Chapter 11, “Legal Issues.”

(2) keep the process simple, (3) use technology intelligently, and (4) expand the use of statistical methods. While the first three strategies remained the same, in the January 1999 operational plan the fourth was changed to “use special techniques to improve coverage,” emphasizing the modification of existing address listing and coverage improvement operations rather than the use of statistical methods.

Sampling Decision and Revised Operational Plan Incorporating the A.C.E.

In November 1998, the U.S. Supreme Court heard oral argument concerning the two pending lawsuits. Its ruling, issued on January 25, 1999, states that Section 195 of Title 13, U.S. Code, precludes the use of statistical sampling (including statistical adjustment based on sampling) to produce congressional apportionment numbers.³²

Given the Supreme Court ruling, the Census Bureau could no longer implement ICM to produce statistically adjusted apportionment data. However, on February 23, 1999, the Department of Commerce released “Updated Summary: Census 2000 Operational Plan,” which included a section on Accuracy and Coverage Evaluation (A.C.E.), a coverage measurement survey similar to the 1990 PES, designed to allow the Census Bureau to estimate and statistically adjust for overall and differential net coverage errors in Census 2000 for nonapportionment uses of the data.³³

Coverage Measurement

As in previous censuses, the Census Bureau used two methodologies for assessing net coverage in Census 2000.³⁴ The A.C.E. program compared the results from a coverage measurement survey to the census itself, using a methodology known as dual system estimation (DSE), to estimate net overcounts and undercounts in the census. The other methodology, known as demographic analysis (DA), produces population estimates at the national level using records or estimates of births, deaths, immigration, emigration, and Medicare enrollments as well as the results of the current and previous censuses. These population estimates were used to develop estimates of net coverage in the census and thus also provide a basis for assessing the coverage measurement survey (in this case, the A.C.E.) results for age/sex/race groups at the national level.³⁵

The ESCAP process. The Census Bureau’s Executive Steering Committee for Accuracy and Coverage Evaluation Policy (ESCAP) evaluated the possible use of the statistically adjusted data produced from the A.C.E. program for redistricting and incorporation into sample data products, intercensal estimates, and survey controls.³⁶ In conjunction with its report and recommendation against adjustment of the official redistricting data, ESCAP released estimates of net coverage from the A.C.E. and DA programs.³⁷ The A.C.E. estimate of net national undercount was 1.15 percent for the total resident population. DA produced two sets of estimates, one indicating a net undercount of 0.32 percent, the other a net undercount of negative 0.65 percent or a *net overcount* of 1.8 million persons.³⁸

³² For more information on the Supreme Court decision, see the “Litigation” section of Chapter 11, “Legal Issues.”

³³ For more information on A.C.E. design, see Chapter 10, “Testing, Experimentation, Evaluation, and Coverage Measurement Programs.”

³⁴ For summary discussions of the 1990 PES and 1980 PEP programs, see U.S. Census Bureau, *1990 Census of Population and Housing, History, Part D*, 1990 CPH-R-2D (Washington, DC: Government Printing Office, 1996), pp. 11-19–11-36, and U.S. Census Bureau, *1980 Census of Population and Housing, History, Part E*, PHC 80-R-2E (Washington, DC: Government Printing Office, 1989), pp. 9-6–9-10.

³⁵ The DA and A.C.E. programs and their results are discussed in greater detail in Chapter 10, “Testing, Experimentation, Evaluation, and Coverage Measurement Programs.”

³⁶ The Census Bureau produces annual intercensal population estimates for the nation, states, and counties (and biennial estimates for smaller geographic areas). These estimates are generally used in federal funding allocation formulae in lieu of decennial census figures (except for the year in which the census figures themselves are released), because they reflect ongoing population changes during the decade. For more information on the technical aspects of the ESCAP evaluation process, see the relevant sections of Chapter 10 and “The Debate Over the Use of Sampling” section of Chapter 11.

³⁷ *Federal Register*, Vol. 66, No. 46, March 8, 2001, pp. 14004–46.

³⁸ J. Gregory Robinson, “Accuracy and Coverage Evaluation: Demographic Analysis Results,” DSSD Census 2000 Procedures and Operations Memorandum Series B-4*, March 12, 2001, Table 3, p. 22.

It was largely because of discrepancies between the A.C.E. and DA estimates of net undercount—for both the total population and for various population groups—that ESCAP recommended against adjusting the redistricting data.³⁹ The Secretary agreed and decided that the official redistricting data would not incorporate a statistical adjustment.⁴⁰

Following the Secretary's decision, ESCAP instituted an intensive evaluation program to address its concerns regarding the accuracy of the adjusted data. This assessment found that the A.C.E. did not account for a large number of census erroneous enumerations, including many duplicates, leading to an overstatement of at least 3 million persons in the initial A.C.E. estimate of Census 2000 net undercount. The Census Bureau also produced a revised (September 2001) DA estimate that indicated a net national undercount of 0.12 percent.⁴¹

In his October 16, 2001, decision against the use of the adjusted data for nonredistricting purposes, the Census Bureau's Acting Director stated that extensive additional review would be needed to revise the adjusted data to permit their use for any purpose.⁴² The following day, the acting director announced this decision publicly, adding that the agency would continue its research and attempt to produce final revised estimates. The A.C.E. Revision II effort produced an estimated negative 0.48 percent net undercount of the resident population in Census 2000, or a national net overcount estimate of approximately one-half of 1 percent.⁴³

In addition to national-level revised estimates of percent net undercount for major race/ethnicity, tenure (that is, owner or renter), and age/sex groupings, the Census Bureau also produced and released revised estimates for states, counties, and places as part of the A.C.E. Revision II effort.

Census 2000 was the first census for which the agency estimated a net national overcount. The A.C.E. Revision II estimate of negative 0.48 percent for the total resident population is considered within the range of uncertainty surrounding the September 2001 DA net undercount estimate of 0.12 percent.

While the Census Bureau noted that the A.C.E. Revision II estimates represented the most accurate assessment available of Census 2000 coverage, it also noted technical concerns regarding the limitations of the methodology and the quality of the data. Thus, the agency determined that the intercensal population estimates would not incorporate an adjustment based on the A.C.E. Revision II estimates.⁴⁴

THE TECHNOLOGICAL CONTEXT

The Census Bureau's technical experts claimed a number of technological achievements associated with the 1990 census. These included:

- The introduction of the Topologically Integrated Geographic Encoding and Referencing (TIGER®) system for producing maps and geocoding addresses.
- The use of concurrent data capture and processing.
- Computerized tracking and control of questionnaires.
- A computerized address file.
- The first distribution of census data on CD-ROM.

³⁹ *Federal Register*, March 8, 2001, p. 14005.

⁴⁰ *Federal Register*, Vol. 66, No. 49, March 13, 2001, pp. 14520–21.

⁴¹ J. Gregory Robinson, *ESCAP II: Demographic Analysis Results, Report No. 1*, October 13, 2001, p. 2.

⁴² *Federal Register*, Vol. 66, No. 214, November 5, 2001, p. 56006.

⁴³ U.S. Census Bureau, "Decision on Intercensal Population Estimates," March 12, 2003, p. 6. (PDF version is available at <<http://www.census.gov/dmd/www/ace2.html>>.)

⁴⁴ "Decision on Intercensal Population Estimates," p. 1. For additional information regarding the A.C.E. Revision II research and results, see the "A.C.E." section of Chapter 10, "Testing, Experimentation, Evaluation, and Coverage Measurement Programs."

Despite these successes, concerns arose among census stakeholders in Congress and elsewhere about poor mail response, increased operational costs (particularly for nonresponse follow-up), and an increase in net undercount during the 1990 census. This prompted the Census Bureau to reassess several of its operations and methods for data collection, data capture and processing, and data dissemination.

Data Collection

Most research in data-collection technology prior to the 1990 census focused on address list development, questionnaire format, and alternative response methods. As the 1990 census neared completion, the director of the Census Bureau endorsed the concept of updating a master address file (MAF) throughout the decade rather than reconstructing one a few years before each census. For Census 2000, the agency updated the 1990 address control file by combining:

- The master list of addresses for mail delivery maintained by the U.S. Postal Service, called the delivery sequence file (DSF).
- A field listing operation.
- Input from local governments reviewing the address lists during the Local Update of Census Addresses (LUCA) 1998 and LUCA 1999 programs.⁴⁵

In the early 1990s, census stakeholders expressed concerns that the format and length of the long-form questionnaire adversely affected response rates. Some felt that content should be modified or reduced to include only those questions mandated by legislation or federal regulation. Others argued that the format of the questionnaire used during the 1990 census was difficult to read and discouraged response. To address this concern, the Census Bureau conducted research to develop a more “respondent-friendly” questionnaire with greater visual appeal and concise instructions. The 1996 decision to use optical mark recognition (OMR) combined with optical character recognition (OCR) for data capture simplified the design of such forms.⁴⁶

In addition to developing a new questionnaire format and in an effort to increase response, the Census Bureau explored response methods that were alternatives to mailback or enumerator returns. These alternatives included Telephone Questionnaire Assistance (TQA) and Internet Data Collection (IDC).⁴⁷ TQA provided respondents with information about the census and, for callers who met certain criteria, an option to respond to the census over the phone. IDC allowed respondents who received the short census form the option to complete an online questionnaire using their census ID number. The Census Bureau did not advertise IDC as an alternative response method because of concerns over public relations. While the Census Bureau wanted to issue a press release announcing the Internet response option, Census Bureau staff could not agree on the wording with officials from the U.S. Department of Commerce. The press release was never issued. Nevertheless, the agency received 89,123 initial requests for online forms, and 63,053 households (169,257 persons) responded to the census using the IDC system.⁴⁸ Its limited use notwithstanding, IDC marked the first use of the Internet as a response mode for the census.

Data Capture and Processing

While in past censuses the agency used contracts with private industry to supplement its own in-house expertise or technological resources, Census 2000 was characterized by an unprecedented reliance on contractors for the development and management of the required technology infrastructure. Additionally, the agency attempted to use commercial off-the-shelf (COTS) software products—modified when necessary—for systems development.

⁴⁵ For more information on the address list development and operations see Chapter 8, “Addresses and Questionnaire Printing and Mailing.”

⁴⁶ John H. Thompson to Robert Marx, U.S. Census Bureau, “Recommendation That the Census Bureau Use Imaging Technology to Perform the Data Capture Function for the 2000 Census,” DMD Decision Memorandum No. 1, February 21, 1996 (originally issued as DMD to Director Memorandum No. 96-09); National Research Council, *The 2000 Census: Counting Under Adversity*, (Washington, DC: National Academies Press, 2004), pp. 71–95. For more information on questionnaire design see Chapter 8, “Addresses and Questionnaire Printing and Mailing” and for information on OMR and OCR see Chapter 6, “Data Capture and Processing.”

⁴⁷ For more information on TQA and IDC, see Chapter 5, “Data Collection,” and John Chesnut, “Telephone Questionnaire Assistance” Census 2000 Evaluation No. A.1.a., March 20, 2003, and Erin Whitworth, “Internet Data Collection,” Census 2000 Evaluation No. A.2.b., August 14, 2002.

⁴⁸ Whitworth, “Internet Data Collection, Final Report,” p. iii.

For Census 2000, the Census Bureau outsourced two major components of its data capture program. Lockheed Martin Mission Systems designed, developed, and maintained the Data Capture System 2000 (DCS 2000), which combined OCR and OMR to interpret responses from digital images of over 152 million returned census forms of various types and sizes.⁴⁹ TRW, Incorporated, provided staff and services for data capture, facilities management, office equipment, supplies, and office automation for three of the data capture centers (DCCs).⁵⁰

In past censuses, the Census Bureau used its film optical sensing device for input to computers (FOSDIC), which used OMR to distinguish differences in marks on microfilm page images of the questionnaires and converted the data to machine-readable code. Handwritten responses, which could not be coded in this manner, were sent to workstations where they were keyed manually. In 1990, the Census Bureau's Technical Services Division (TSD) increased the use of automated camera technology for microfilming questionnaires.

During the early 1990s, research conducted in partnership with the National Institute for Standards and Technology (NIST) and the Rochester Institute of Technology Research Corporation (RITRC) evaluated a variety of data capture technologies with particular emphasis on new OCR software. These studies contributed to TSD's development of a prototype digital imaging system combining OMR and OCR, and, where necessary, customized COTS software with agency-developed programs. During the 1995 Census Test this prototype demonstrated the feasibility of using OCR and OMR to capture data from respondent-friendly forms. Evaluations of this test also noted the technical and institutional implications of contracting the data capture program to industry.⁵¹

The successes of the 1995 Census Test, and a benefit-cost analysis favoring a digital imaging option, were behind the Census Bureau's 1996 decision to use digital imaging combined with OCR and OMR for Census 2000 data capture.⁵² It marked the first time the Census Bureau outsourced the development and deployment of this portion of its data capture program. In order to manage this change, the agency established the Decennial Systems and Contracts Management Office (DSCMO) to direct the development of system requirements and the acquisition and implementation of hardware, software, and telecommunications to support the decennial census.

Data Dissemination

Efforts to reengineer federal government operations, combined with budget cutbacks in the early 1990s, prompted the Census Bureau to seek more efficient and cost-effective methods for disseminating census data. Advances in information technology enabled the agency to combine traditional use of print media with a variety of digital media formats and distribution methods to disseminate decennial data products. The Internet provided the Census Bureau with the capability to:

- Quickly and efficiently distribute data products, such as summary files, through file transfer protocol (FTP).
- Publish reports and memoranda as portable document files (PDFs).

⁴⁹ Low-volume forms were deliberately excluded from DCS 2000 and instead keyed from paper as a risk-mitigation strategy.

⁵⁰ A fourth DCC was managed by the National Processing Center (NPC), a permanent Census Bureau facility in Jeffersonville, IN.

⁵¹ Jon Geist, "Evaluation Report for Processing Office #A85: Preparation and Preliminary Scoring of the Evaluation File for the 1995 Census Test of Image-Based Capture Technologies," October 31, 1995, p. 8, in Appendix D of U.S. Census Bureau, "Electronic Imaging and Data Capture System Prototype for the 1995 Census Test," Final Report, February 1996; Recognition Research Incorporated, "1995 Decennial Census Prototype: Final Report" (November 6, 1995) pp. 23–24 in Appendix B of U.S. Census Bureau, "Electronic Imaging and Data Capture System Prototype for the 1995 Census Test," Final Report, February 1996. For more information on the 1995 Census Test, see Chapter 2, "Planning the Census" and Chapter 6, "Data Capture and Processing."

⁵² John H. Thompson to Robert Marx, U.S. Census Bureau, "Recommendation that the Census Bureau Use Imaging Technology to Perform the Data Capture Function for the 2000 Census," DMD Decision Memorandum No. 1, February 21, 1996 (originally issued as DMD to Director Memorandum No. 96-09).

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- Make data products accessible to a host of users, from the casual Internet “surfer” to the most sophisticated “extractors” and “manipulators” of census data.⁵³

In 1997, the Census Bureau commissioned the development of an Internet-enabled information system to provide access to data from Census 2000, economic censuses and surveys, and the American Community Survey. Developed by IBM, the American FactFinder (AFF) system provides users with customizable data products, including briefs, abstracts, area profiles, economic indicators, summary data, geographic files, and maps.⁵⁴

THE LEGAL CONTEXT

Federal censuses have always had the potential to be contentious because their primary purpose is to distribute seats in the U.S. House of Representatives—and thus political power—among the states based on state populations. A series of Supreme Court decisions in the 1960s (the one-person, one-vote cases) extended the use of population censuses to the drawing of congressional district boundaries and state and local legislative districts as well. Since the 1960s, the increasing use of formulas that involve the actual or estimated population size of governmental units to distribute federal and other funds has added another source of contention.

During the first half of the 1990s, the legal context of census affairs consisted of litigation over the 1990 census and legislation to resolve perceived failures pertaining to the 1990 census in preparation for Census 2000. Toward the end of the decade, the focus shifted to litigation over Census 2000.

Resolution of 1990 Census Adjustment Litigation

The U.S. Department of Commerce considered a statistical adjustment of the 1990 census counts, but Secretary of Commerce Robert Mosbacher decided against it on July 15, 1991. Following Mosbacher’s decision, the plaintiffs⁵⁵ in the *City of New York* lawsuit returned to court, seeking an order compelling the department to adjust the census. Almost 5 years later, on March 20, 1996, the Supreme Court unanimously upheld Secretary Mosbacher’s decision not to adjust the 1990 census.⁵⁶ The Court concluded that the Secretary’s decision was “consistent with the constitutional language and the constitutional goal of equal representation”⁵⁷—the standard of review it had established in two earlier constitutional challenges to the conduct of the census.⁵⁸ However, the Supreme Court did not address either the constitutionality or legality of statistical sampling (including statistical adjustment based on sampling) to produce the state population numbers for apportionment of the U.S. House of Representatives.⁵⁹

⁵³ In December 1997, joint application development sessions were held to gather requirements from subject matter experts and potential data users in order to make the system design user-centered rather than data-centered. The interviews conducted during these sessions identified four categories of users: extractors, manipulators, profilers, and surfers. Extractors are expert users who download large amounts of raw data to conduct analyses. They are familiar with Census Bureau terminology and use Census Bureau data to perform their jobs. Manipulators are users of Census Bureau data who conduct searches and customize the output by manipulating data sets and formatting their own charts and tables. They are somewhat familiar with Census Bureau terminology and rely on speedy query functionality to build searches. Profilers are users who seek pre-packaged, easy-to-find information to answer specific questions. They accept information that is readily available and have a basic understanding of Census Bureau terminology. Surfers are casual users who visit the site out of curiosity or for nonprofessional reasons. Ease of use, entertainment, and interactivity appeal to these users. As a rule, they are not as familiar with the Census Bureau as the other users. See Titan Systems Corporation/System Resources Division and Kevin A. Shaw, Project Manager, Planning, Research, and Evaluation Division, “American FactFinder System Requirements Study, Final Report,” Census 2000 Evaluation R.3.b, June 6, 2002, and U.S. Census Bureau, “Program Master Plan: Census 2000 Decennial Dissemination and Inquiry System,” Census 2000 Informational Memorandum No. 25, December 13, 1999.

⁵⁴ For more information on the development of AFF and the dissemination of census data products, see Chapter 9, “Data Products and Dissemination.”

⁵⁵ Plaintiffs included a number of states, counties, cities (including New York), organizations, and individual citizens from participating jurisdictions.

⁵⁶ *Wisconsin v. City of New York*, 517 U.S. 1 (1996).

⁵⁷ *Ibid.*, p. 19.

⁵⁸ See *Department of Commerce v. Montana*, 503 U.S. 442 (1992), and *Franklin v. Massachusetts*, 505 U.S. 788 (1992).

⁵⁹ See the “Litigation” section of Chapter 11, “Legal Issues,” for detailed summaries of this case and the Census 2000 lawsuits.

Legislation That Set the Stage for the Census 2000 Sampling Litigation

The Clinton administration's plan to introduce new statistical sampling techniques in Census 2000 led to a protracted wrangle between the leadership of the Republican-controlled Congress and the Democrat-controlled executive branch. After much discussion, the two sides reached a compromise in P.L. 105-119, the act funding the Department of Commerce for FY 1998, which was enacted into law in November 1997. In addition to funding several executive branch departments, this legislation provided for a civil remedy to any person adversely affected by the use of an allegedly unlawful and/or unconstitutional statistical method in producing the Census 2000 apportionment or redistricting data and specifically authorized the Speaker of the House (or his designee) to bring a civil action on behalf of the House of Representatives to prevent any such use.

As noted earlier, this law established an eight-member Census Monitoring Board (with four members to be appointed by the majority leadership in Congress and four by the administration) to observe and report to Congress on all aspects of the planning for and implementation of Census 2000. The legislation amended Title 13 to allow board members access to confidential information in the course of their duties. P.L. 105-119 formally established the "dual track" planning process by requiring the Census Bureau to ". . . plan, test, and become prepared to implement a 2000 decennial census, without using statistical methods . . ." as an alternative to the original plan.⁶⁰ Finally, the law required the Census Bureau to make publicly available "the number of persons enumerated without using statistical methods" for the apportionment, redistricting, and Summary File 1 data.⁶¹

Census 2000 Litigation

While Census 2000 spawned fewer lawsuits than its two predecessors, many important census issues were litigated, including three cases decided by the Supreme Court. Much of the litigation associated with Census 2000 had to do with the issue of statistical adjustment of the census counts and related matters.

Two lawsuits filed in February 1998 (*Glavin v. Clinton* and *U.S. House of Representatives v. Department of Commerce* [as filed]) challenged the constitutionality and legality of the Census Bureau's plan to use sampling to complete nonresponse follow-up and to use the results of a sample survey (Integrated Coverage Measurement) to statistically adjust the census counts to produce a "one-number census" that corrected for net coverage error. Under the Census Bureau's original plan, these sample-produced data would have been the official data for all uses of census data, including apportionment.

In August and September 1998, district courts in the District of Columbia and Virginia, respectively, held that Section 195 of Title 13 prohibited the use of sampling to produce the apportionment counts and enjoined the Census Bureau from implementing its plan for Census 2000.

The Department of Commerce sought review of these decisions by the U.S. Supreme Court. The Supreme Court agreed to hear the cases and consolidated them for purposes of oral argument, which took place on November 30, 1998. On January 25, 1999, the Supreme Court issued its decision in *U.S. House of Representatives*, concluding that Section 195 of the Census Act (Title 13, U.S. Code) precluded the use of sampling to produce the congressional apportionment counts.⁶² Having determined its use violated Section 195 of Title 13, U.S. Code, the Court did not address the constitutionality of sampling for apportionment purposes. As is discussed in greater detail in Chapter 11, "Legal Issues," the Census Bureau subsequently revised its plan for Census 2000 so that sampling would not be used to produce the apportionment data.

On March 6, 2001, Secretary Donald Evans announced his decision to designate the unadjusted data as the official redistricting data and withhold the adjusted data. Following the Secretary's decision, the city of Los Angeles (and other plaintiffs) amended an earlier complaint, seeking a

⁶⁰ P.L. 105-119, Title II, Section 209(j).

⁶¹ *Ibid.*

⁶² *Department of Commerce v. U.S. House of Representatives*, 119 S.Ct. 765 (1999). Section 195 of Title 13, U.S. Code, reads as follows: "Except for the determination of population for purposes of apportionment of Representatives in Congress among the several States, the Secretary shall, if he considers it feasible, authorize the use of the statistical method known as 'sampling' in carrying out the provisions of this title."

court order releasing the adjusted data as the official redistricting data. The District Court for the Central District of California upheld the Secretary's decision not to adjust the redistricting data.⁶³ The case was ultimately decided by the U.S. Court of Appeals for the Ninth Circuit, which affirmed the district court's decision upholding the Secretary's determination.⁶⁴

Following the Secretary's decision, Accuracy and Coverage Evaluation (A.C.E.) results below the national level were not publicly released. The Census Bureau and the Department of Commerce received numerous Freedom of Information Act (FOIA) requests for the adjusted data (in most cases, at the block-level) from state and local government officials and various print media. All such FOIA requests, and subsequent administrative appeals, were denied, citing the deliberative process privilege in Exemption 5 of the FOIA. The department stated that the adjusted block-level data were "predecisional" and "deliberative" and were related to an intradepartmental recommendation not to statistically adjust the official redistricting data, a recommendation accepted by the Secretary of Commerce.

In connection with one such request, the ensuing FOIA lawsuit reached the U.S. Court of Appeals for the Ninth Circuit.⁶⁵ That court, on October 8, 2002, upheld the decision of the U.S. District Court for the District of Oregon ordering the release of the Census 2000 adjusted block-level data under the FOIA.⁶⁶ The district court had ruled that the adjusted block-level data were not protected under Exemption 5 of the FOIA as predecisional or deliberative.⁶⁷ The district court, in ruling on the case, relied on *Department of Commerce v. Assembly of California*, a FOIA lawsuit dealing with release of the 1990 census adjusted block-level data.⁶⁸ In that case, the Ninth Circuit Court ruled that the 1990 census adjusted data were neither predecisional nor deliberative. Pursuant to the October 8, 2002, Ninth Circuit Court decision, the Census Bureau released the data to the plaintiffs and, anticipating additional requests for the adjusted block-level data (given the Ninth Circuit Court decision), developed a process for providing the data to all requesters.

The State of Utah and other plaintiffs filed two lawsuits relating to Census 2000 operations/methodologies. In the first *Utah v. Evans* (known as *Evans I*, filed on January 10, 2001), Utah challenged the Census Bureau policy of including overseas federal civilian and military employees and their dependents in Census 2000 for apportionment purposes but excluding thousands of missionaries of the Church of Jesus Christ of Latter-day Saints (the LDS Church) who were temporarily serving abroad when Census 2000 was conducted. The State of Utah contended that had the overseas LDS Church missionaries been included in, or the overseas federally affiliated households excluded from, the apportionment counts, the state would have received a fourth seat in the U.S. House of Representatives.

On April 17, 2001, a three-judge panel of the U.S. District Court for the District of Utah (Central Division) upheld the Secretary of Commerce's decision (delegated to the Census Bureau) to include only federally affiliated overseas Americans in the Census 2000 apportionment counts.⁶⁹ Plaintiffs appealed to the Supreme Court, and on November 26, 2001, the Court issued a summary affirmation (that is, without hearing the case) of the judgment of the district court.⁷⁰

Utah and co-plaintiffs filed their second lawsuit—*Utah v. Evans* (*Evans II*)—on April 25, 2001. Plaintiffs alleged that had the Census Bureau not employed the use of "hot-deck" count imputation in producing the Census 2000 apportionment counts, Utah would have received one additional seat for a total of four seats in the U.S. House of Representatives.

⁶³ *City of Los Angeles v. Evans*, 2001 WL 34125617 (C.D.Cal. April 25, 2001).

⁶⁴ *City of Los Angeles v. Evans*, 307 F.3d 859 (9th Cir. 2002).

⁶⁵ The adjusted data were the subject of other lawsuits as well; these cases are discussed in the "Litigation" section of Chapter 11, "Legal Issues."

⁶⁶ *U.S. Department of Commerce v. Carter*, 307 F.3d 1084 (9th Cir. 2002).

⁶⁷ *Carter v. Department of Commerce*, 186 F.Supp.2d 1147 (D.Or. Nov. 20, 2001).

⁶⁸ *Department of Commerce v. Assembly of California*, 968 F.2d 916 (9th Cir. 1992). For a detailed summary of the case, see U.S. Bureau of the Census, *1990 Census of Population and Housing, History, Part D*, 1990 CPH-R-2D (Washington, DC: Government Printing Office, 1996), pp. 12-12-12-13. It is worth noting that the Eleventh Circuit Court of Appeals, in *Department of Commerce v. Florida House of Representatives*, 961 F.2d 941 (11th Cir. 1992), reached the opposite conclusion, holding that the 1990 census adjusted block-level data fell within the scope of the deliberative process privilege in Exemption 5 of the FOIA, and that court therefore upheld the withholding of those data. *Ibid.*, p. 12-13.

⁶⁹ *Utah v. Evans*, 143 F.Supp.2d 1290 (D. Utah April 17, 2001).

⁷⁰ *Utah v. Evans*, *aff'd*, 534 U.S. 1038 (2001).

As in past censuses, the Census Bureau used a statistical method known as imputation to assign occupancy status (existent, residential, occupied or vacant) to addresses and, if imputed to exist, be residential and occupied, the number of occupants, if these, or any of these, could not be determined by field verification. Status, counts, and characteristics were imputed based upon the attributes of neighboring addresses for which enumerators had obtained the relevant information.

Utah claimed that count imputation was a form of statistical sampling, which—based on Section 195 of Title 13, U.S. Code—the U.S. Supreme Court held earlier in *Department of Commerce v. U.S. House of Representatives* (see above) could not be used for generating apportionment counts. Additionally, Utah claimed that the use of count imputation was in violation of the Apportionment Clause of the Constitution as amended by Section 2 of the Fourteenth Amendment.⁷¹ This case was ultimately decided by the Supreme Court, which issued a June 20, 2002, decision concluding that the use of “hot-deck” count imputation is neither contrary to the Constitution nor Section 195 of Title 13, U.S. Code.⁷²

⁷¹ The Apportionment Clause of the Constitution (Article I, Section 2, Clause 3) refers to an “actual Enumeration” to be conducted every 10 years “. . . in such Manner as . . . [Congress] shall by Law direct.”

⁷² *Utah v. Evans*, 536 U.S. 452 (2002).

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Chapter 2: Planning the Census

INTRODUCTION

Over the past several decades it has become increasingly difficult to take the decennial census. The U.S. Census Bureau began planning for Census 2000 by reexamining nearly every aspect of its prior census operations, with the intent of making Census 2000 the most accurate population count ever. One of the most significant conclusions that emerged from the Census Bureau's assessment of the 1990 census was that the agency had pushed traditional enumeration techniques nearly to the limits of their effectiveness. For 2000, the agency sought both to enhance its traditional methods and to develop new, innovative ways to collect, process, and disseminate population and housing data. Furthermore, the 1990 census cost far more than any previous population count, even when the cost per household was adjusted for inflation. As a result, accuracy and cost concerns underlay the Census Bureau's efforts to reengineer the census.¹

The first phase of Census 2000 planning, from 1987 to 1997, was fundamentally similar to the preparations for the 1990 census. The Census Bureau organized a planning team, conducted research into new techniques and technologies, evaluated the results of the most recent census, consulted various data users for their requirements and suggestions, and began to test the new techniques that it hoped to use for the coming census. The second phase, from 1997 to 1999, is unique in census history. During this phase, the Census Bureau pursued two different planning paths (statistical sampling and traditional enumeration planning), not knowing which it would be required to use. Although each track required different methodologies, some operations were common to both. The third phase, final census planning (following the 1999 Supreme Court ruling prohibiting the use of sampling for apportioning seats in the U.S. House of Representatives), marked the period during which the Census Bureau was able to commit to a single planning track. During this phase, the Census Bureau finalized a plan that incorporated elements from both planning tracks (see Chapter 1, "The Context of Census 2000").

THE 1990 CENSUS²

Much of the planning for Census 2000 reflected dissatisfaction with the 1990 census within the Census Bureau, Congress, the data user community, and the public. In searching for ways to conduct a better census, the Census Bureau considered its options for overhauling its enumeration methodologies, promotion and outreach, automation, organization and management, and statistical methodology.

Despite criticism of its results, the 1990 census provided notable successes.³ The most prominent of these included:

- Geographic support system. The creation and implementation of a digitized geographic database called the Topologically Integrated Geographic Encoding and Referencing (TIGER®)⁴ System.
- Increased automation. The expansion of automation into field operations, the early conversion of responses on questionnaires into computer-readable files ("data capture"), and the establishment of electronic linkages between Census Bureau headquarters and more than 400 offices throughout the country.

¹ U.S. Department of Commerce, Economics and Statistics Administration, and Bureau of the Census, "The Plan for Census 2000," (April 5, 1996), p. I-1.

² See U.S. Census Bureau, *1990 Census of Population and Housing: History, Parts A-D*, 1990 CPH-R-2A-D (Washington, DC: Government Printing Office, 1993–96).

³ See Charles D. Jones, "Taking the Census: Lessons from 1990," presented at the 1991 Annual Meeting of the Population Association of America.

⁴ TIGER® is a registered trademark of the U.S. Census Bureau.

- Recruiting. The 1990 census work force peaked at about 300,000 during the spring of 1990 when the enumerators visited approximately 34.2 million addresses to collect census data from nonrespondent households.
- Outreach and promotion. A public-service media campaign and an outreach program built support networks and encouraged local and tribal governments, national and community organizations, schools and religious organizations, and private and nonprofit corporations to inform their members or constituents about the importance of participating in the census. A pro bono advertising campaign included appeals to general audiences, coupled with targeted messages addressed to several minority populations.

Trends in Census Costs

The cost of the decennial census has grown dramatically since 1970 (see Table 2-1). Based on information provided by the Census Bureau and the Government Accountability Office,⁵ the National Academy of Sciences' Panel on Census Requirements⁶ concluded that among the factors contributing to increased census costs were the growth in the number of housing units, a decline in the willingness of respondents to return completed questionnaires, and expanded demand for small-area data.

Table 2-1.
Trends in U.S. Population Size, Census Costs, and Final Response Rates:⁷ 1970 to 2000

Characteristic	Decennial census cycle			
	1970	1980	1990	2000
Full-cycle census cost (in millions of constant 2000 dollars) . . .	\$920	\$2,159	\$3,275	\$6,553
Population (in millions)	203.3	226.5	248.7	281.4
Housing units (in millions)	70.7	90.1	104.0	117.3
Final response rate (in percent)	78	75	65	67
Cost per housing unit (in constant 2000 dollars)	\$13	\$24	\$32	\$56

Source: U.S. General Accounting Office, "2000 Census: Significant Increase in Cost Per Housing Unit Compared to 1990 Census," GAO-02-31, December 2001, Table 1; U.S. Census Bureau, *Statistical Abstract of the United States: 2003* (Washington, DC: Government Printing Office, 2003), Table 1; and Herbert F. Stackhouse and Sarah Brady, Census 2000 Evaluation A.7.a. "Census 2000 Mail Response Rates." Final Report. January 30, 2003. p. 11.

The 1990 Undercount

For the first time since the Census Bureau began using postcensal surveys to evaluate census coverage following the 1950 census, evaluations of the 1990 census indicated that it had been less accurate than its immediate predecessor.⁸ Following the 1990 census, the Census Bureau used two independent methods to evaluate census coverage—demographic analysis⁹ and a post-enumeration survey. In addition to measuring overall the undercount, these studies revealed that the differential undercount for minorities persisted.

⁵ The Government Accountability Office (GAO) is the investigative arm of the Congress that audits and evaluates government programs and activities. Prior to July 7, 2004, this organization was called the General Accounting Office.

⁶ Public Law 105-135, the Decennial Census Improvement Act of 1991, mandated that the National Academy of Sciences (NAS) undertake a study of both the best means to count the nation's populace, and the most promising alternative methods for collecting other demographic and housing data. The goals of this research were to identify ways to reduce both the cost and undercount associated with the 1990 census.

⁷ The final response rate was defined as the number of questionnaires returned by mail divided by the total number of housing units that received questionnaires delivered either by the United States Postal Service or by Census Bureau staff by the end of the census year.

⁸ While the first post-enumeration survey was taken following the 1950 census, the first study of the undercount was conducted following the 1940 census. That study compared the census results to Selective Service registration numbers. See Daniel O. Price, "A Check on Under-Enumeration in the 1940 Census" *American Sociological Review*, Volume 12, Issue 1 (Feb., 1947), pp. 44–49.

⁹ Demographic analysis (DA) uses administrative records on births, deaths, migration, and Medicare to develop an independent estimate of the population. DA is a benchmark to evaluate the national population figure from the decennial census. First developed in 1955, and later improved through continued research at the Census Bureau and elsewhere, DA estimates are considered to be the standard for judging the completeness of the census count.

Demographic Analysis

Demographic analysis compares decennial census population counts with estimated population totals derived from administrative records of births, deaths, immigration, and emigration. (Undocumented immigrants are one of the most difficult demographic analysis components to estimate.) The following table indicates the net national undercount of population for the decennial censuses between 1940 and 1990.¹⁰

Table 2-2.
Demographic Analysis Estimates of the Net National Undercount Between 1940 and 1990

Census	Net national undercount	
	Millions of people	Percentage
1940	7.5	5.4
1950	6.5	4.1
1960	5.7	3.1
1970	5.7	2.7
1980	2.8	1.2
1990	4.2	1.6

The undercount was made more troubling by the continued existence of a differential undercount. “Differential undercount” is a measure of the systematic differences in the undercount rates for identifiable population groups. The net national undercount rate for African Americans in 1990 measured by demographic analysis was more than four times greater than that for all other races (5.7 percent vs. 1.3 percent). While demographic analysis can produce national undercount estimates for groups based on age and sex, it cannot provide detailed estimates for racial or ethnic groups other than African Americans and non-African Americans, nor can it provide reliable sub-national estimates.¹¹

Post-Enumeration Survey

The second method of coverage evaluation—the post-enumeration survey—allowed the Census Bureau to calculate the undercount rates for several racial and ethnic groups.

The 1990 post-enumeration survey consisted of an independent sample of nearly 172,000 housing units clustered in about 7,500 of the nearly 7 million blocks in the 50 states and the District of Columbia. Areas containing American Indian reservations and those with significant Black, Hispanic, or Asian populations were oversampled. Census Bureau field interviewers listed the post-enumeration survey sample units before Census Day (April 1, 1990), and regional census center employees visited them beginning in June 1990 to conduct interviews. Clerks in the processing offices matched the post-enumeration survey records against those from the census. Using a statistical method called “dual system estimation,” Census Bureau statisticians used post-enumeration survey data to estimate the “true” population and net undercounts for the nation and its component geographic areas. The initial post-enumeration survey estimate of undercount was 2.4 percent, but after correcting a processing error, the final post-enumeration survey derived estimates of the net national undercount by race and Hispanic origin for 1990 were as follows:

¹⁰ U.S. Census Bureau, *Report to Congress—The Plan for Census 2000* (revised August 1997), p. 2. The estimated net national undercount rate for 1990 from demographic analysis was reduced from 1.8 percent to 1.6 percent in the process of thoroughly evaluating the estimates derived from the Accuracy and Coverage Evaluation (A.C.E.) Survey, part of the Census 2000 coverage and evaluation program. See, U.S. Bureau of the Census, “Technical Assessment of A.C.E. Revision II,” March 12, 2003. Regarding the use of demographic analysis to determine national net undercount rates, see Robert E. Fay, Jeffrey S. Passel, and J. Gregory Robinson (with assistance from Charles D. Cowan), *1980 Census of Population and Housing. The Coverage of Population in the 1980 Census*. PHC80-E4 (Washington, DC: Government Printing Office, 1988).

¹¹ U.S. Census Monitoring Board, “Issue Briefs: Demographic Analysis,” December 28, 2000.

Table 2-3.
Post-Enumeration Estimates of the Net 1990 National Undercount by Race and Ethnic Group¹²

Racial/ethnic group	Percentage undercount
Total population	1.6
Non-Hispanic Whites	0.7
African Americans	4.4
Hispanics (can be any race)	5.0
Asians/Pacific Islanders	2.4
American Indians/Alaska Natives (on reservations)	12.2

The post-enumeration survey also confirmed that children and young adults were much more likely to be undercounted than older adults, and that renters, particularly those living in rural areas, were more likely to have been missed by the census than were homeowners.

EARLY PLANNING FOR CENSUS 2000¹³

In October 1987, the Census Bureau established the 21st Century Decennial Census Planning Staff. The staff identified many pressing issues that the Census Bureau would have to confront in preparing for Census 2000 and began developing and analyzing options to overcome them. The staff's mission was to:

- Begin early planning of Census 2000 based on the assumptions that a fundamental change in the census design would require substantial research, testing, and evaluation.
- Examine major trends in society, the labor force, technology, and data-user needs that might indicate a need for significant changes in methods or design for Census 2000.
- Develop and evaluate proposals for census designs that would simplify the decennial census, concentrate on constitutional requirements, expand subnational demographic and housing data collected outside of the basic decennial census, and release those data to the public faster and more efficiently.

The staff prepared a number of working papers and research reports, hired organizations such as the National Institutes of Standards and Technology (NIST) and the Oak Ridge National Laboratory to investigate technological issues relating to data collection and capture, presented papers at professional meetings, and conducted a number of off-site conferences of senior Census Bureau staff at which proposals were presented and discussed and directions for future research were decided.

One of the staff's early reports¹⁴ identified alternative census designs that incorporated key components of what became the Census Bureau's initial plan for conducting Census 2000:

- Sampling for nonresponse follow-up.
- Incorporating information contained in a variety of administrative records into the decennial census and related programs.
- Maintaining and updating of a computerized address list throughout the decade.

¹² Howard Hogan, "The 1990 Post-Enumeration Survey: An Overview," *The American Statistician*, 1992, pp. 261–69. Howard Hogan and Gregg Robinson, "What the Census Bureau's Coverage Evaluation Programs Tell Us About Differential Undercount," 1993 Research Conference on Undercounted Ethnic Populations, Richmond, VA, May 5–7, 1993.

¹³ Much of the material in this section is based on Sandra Rowland, "Early Planning—21st Century Decennial Census Planning Staff Research," 2010 Decennial Census Management Memorandum No. 97-5, March 12, 1997.

¹⁴ U.S. Bureau of the Census, "Year Zero Analysis Team Report," unpublished paper, September 23, 1988.

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- Creating and maintaining a continuously updated master address file (MAF), linked to the Census Bureau’s Topologically Integrated Geographic Encoding and Referencing (TIGER®) system, which also served as a sampling frame for Census 2000 and for intercensal surveys.¹⁵

In conjunction with subject-matter specialists, the Census Bureau investigated options for expanding the agency’s intercensal program of collecting, processing, and releasing subnational demographic and housing data.¹⁶ To compare the estimated costs of alternative census designs, the staff commissioned studies of alternative cost-modeling methods, modified the 1990 census cost model (that allowed managers in the field to estimate the cost and personnel implications of changes in staffing plans), and created an early version of what became the Census 2000 cost model.¹⁷ Staff members investigated alternatives to the 1990 method of “capturing” census data. The staff contracted with the NIST to assess the potential of optical mark and character recognition and image processing as a data-capture methodology for Census 2000. The NIST report’s conclusions were sufficiently promising to persuade the Census Bureau to continue to evaluate newer versions of this technology.¹⁸

After reviewing the relevant literature, the 21st Century Staff prepared an analysis of societal trends that might require significant changes in the methods and procedures the Census Bureau would use to conduct decennial censuses in 2000 and beyond.¹⁹ Among the trends the group singled out for continued monitoring and analysis were:

- Declining public cooperation and mail response.
- Labor force constraints.
- Declining federal budgets.
- Demand for improved census coverage.

This review of trends that might affect census taking in the twenty-first century served as the basis for a series of Census Bureau staff meetings in December 1990. These meetings introduced over 100 Census Bureau employees to the research regarding potential designs for Census 2000 and represented an effort to encourage an acceptance of significant changes in major Census Bureau programs on the part of key agency staff.

In November 1990, the Census Bureau received funding for research and development on design changes for Census 2000. This funding allowed the creation of the Year 2000 Research and Development Staff and the formation of a Task Force for Designing the Year 2000 Census and Census Related Activities for 2000–2009 to begin technical and policy work on design changes for the next census.²⁰

Congressional Hearings and Input

In the early 1990s, the Census Bureau heard repeatedly from some in Congress that Census 2000 should be redesigned to improve accuracy and reduce costs. Beginning with the 102nd Congress (1991–1992), the Census Bureau’s oversight and appropriations subcommittees held a number of

¹⁵ See, for example, Memorandum from Robert W. Marx, “Creation and Maintenance of a Census Bureau Master Address List—Issues Summary,” December 7, 1988.

¹⁶ See, for example, Roger Herriot, Bruce Johnson, and Sandra Rowland, “21st Century Decennial Census Planning: A Vision for Meeting Future Needs,” a paper presented at the Joint Advisory Committee meeting of the Census Advisory Committees on Population Statistics and of the American Statistical Association, April 13, 1989. An earlier paper introduced a number of the themes the 21st Century Census Staff explored. See Roger Herriot, David V. Bateman, and William F. McCarthy, “ISAS—Integrated System of Area Statistics—A New Approach for Meeting the Nation’s Needs for Sub-National Data,” March 9, 1988 (draft). Components of the ISAS became the basis for the development of the Continuous Measurement program.

¹⁷ Bruce E. Tonn, Richard Goeltz, and Ho-Ling Hwang, “Alternative Approaches to the Year 2000 Census,” Oak Ridge National Laboratory, December 8, 1988, and Bruce E. Tonn, “Approaches to Estimating Costs for the Year 2000 Census,” Oak Ridge National Laboratory, undated.

¹⁸ Sandra Rowland, “Early Planning—21st Century Decennial Census Planning Staff Research,” 2010 Decennial Census Management Memorandum No. 97-5, March 12, 1997.

¹⁹ U.S. Bureau of the Census, “Deep Currents: The Case for Change in Decennial Censuses,” unpublished paper, May 1990.

²⁰ Susan Miskura, “Forward from 1990: Designing the 2000 Census,” Proceedings of the Survey Research Methods Section, American Statistical Association, 1992, p. 38.

hearings to evaluate the results of the 1990 census and consider various means of improving upon the 1990 methodology to achieve a more accurate census in 2000. The first oversight hearing was held by the House of Representatives' Subcommittee on Census and Population in February 1991. Chairman Tom Sawyer (D-OH) noted concerns about the quality of the 1990 count, referring to the "vulnerabilities of traditional counting methods."²¹

At an August 1, 1991, hearing, Chairman Sawyer stated that the challenge for 2000 ". . . will be to maintain a credible process and to overcome the historic problems that diminished the accuracy of the 1990 census,"²² and recommended legislation authorizing a comprehensive study of census methods by the National Academy of Sciences (NAS).

That legislation was enacted into law (October 1993), and required the Secretary of Commerce to contract with the NAS to study ways for the government both to achieve the most accurate population count possible and to collect other demographic and housing data. Specifically, the law required the NAS to consider: (1) ways to improve the government's enumeration methods; (2) alternative methods for collecting the data needed for a basic population count, including the use of administrative records; and (3) the appropriateness of using sampling methods, in combination with basic data-collection techniques or otherwise, in the acquisition or refinement of population data.

The law also mandated that the NAS issue a final report, within 3 years, that evaluated the relative advantages and disadvantages and provided an analysis of the cost effectiveness, of each alternative.²³

The Government Accountability Office (GAO)²⁴

In June 1992, the GAO released its comprehensive evaluation of the 1990 census, which discussed lessons learned and identified opportunities for fundamental, effective reforms. Among its conclusions, the report determined that the Census Bureau's mailout/mailback methodology, used since the 1970 census, had outgrown its utility. The GAO doubted that mail response rates in 2000 would improve much over those for 1990 and argued that the continued use of this methodology would increase the census' overall and differential net undercounts.

In its review of a draft version of the report, the Census Bureau commented that:

[The] report focuses largely on cost minimization as the criterion for the Census 2000 design. While we agree that cost is a major factor to consider, we believe the Administration and Congress need to balance costs with other goals in designing the next census. Other goals to consider include (but are not limited to) completeness of the counts, differential coverage rates, data needs, . . . public burden, operational feasibility, and timeliness.²⁵

The GAO responded by stating that the cost of the census is not measured solely in terms of dollars spent. Furthermore, reduced data quality (including the failure to make reductions in the overall and differential net undercounts), "also is a cost of the current approach to taking the census . . . Thus, a less costly census would be one that saves money and improves data quality."²⁶

²¹ U.S. House of Representatives, Subcommittee on Census and Population, House Committee on Post Office and Civil Service, February 21, 1991, Hearing, opening written statement of Rep. Sawyer.

²² U.S. House of Representatives, Subcommittee on Census and Population, Committee on Post Office and Civil Service, August 1, 1991, "Hearing to Review Major Alternatives for the Census in the Year 2000," opening written statement of Rep. Sawyer.

²³ See the section titled "Public Laws Concerning Census 2000" in Chapter 11, "Legal Issues" for a more detailed discussion of the legislation authorizing the National Academy of Sciences study.

²⁴ On July 7, 2004, the name of this organization changed from the General Accounting Office to the Government Accountability Office. Throughout the text of this publication, the latter name will be used. However, citations of publications, papers, and other sources will use whatever organizational name was in use at the time the source was created.

²⁵ May 14, 1992, letter from Barbara E. Bryant, Director, Bureau of the Census, to Richard L. Fogel, Assistant Comptroller General, General Accounting Office.

²⁶ U.S. General Accounting Office, "Decennial Census: 1990 Results Show Need for Fundamental Reform," GGD 9294, June 9, 1992, p. 62.

The report contained detailed cost and data-quality information and demonstrated that as the mail response rate decreased, the number of persons missed or erroneously included in the census increased. The GAO concluded that:

the results from 1990 demonstrate that adding more resources is unlikely to allow the Bureau to enumerate that last remaining segment of the population. Furthermore, the series of field operations that attempt to count the last portion of the population are among the most costly components of the census in terms of both resources expended and errors introduced into the count.²⁷

The GAO recommended that the Census Bureau “rigorously explore” using statistical sampling for some portion—or even all—of the nonresponse workload to “reduce dependence on costly field follow-up operations in order to improve the next census.”²⁸

National Academy of Sciences Panels

Public Law 102-135, the Decennial Census Improvement Act of 1991, mandated that the National Academy of Sciences (NAS) undertake a study of both the best means to count the nation’s population, and the most promising alternative methods for collecting other demographic and housing data. The goals of this research were to identify ways to reduce both the cost and undercount associated with the 1990 census.

To conduct the research, the Committee on National Statistics of the National Research Council established two panels.²⁹ The Panel on Census Requirements in the Year 2000 and Beyond was responsible for studying the cost structure of the census, ways to achieve the most accurate population count, and requirements for census content. The panel issued an interim report in May 1993 and a later report in November 1993. Its final report, *Modernizing the U.S. Census*, was published in 1995.³⁰ The Panel to Evaluate Alternative Census Methods focused on technical issues regarding implementation and evaluation of promising methodologies. Its research was to complement that of the Panel on Census Requirements in the Year 2000 and Beyond. The Panel to Evaluate Alternative Census methods released its final report, *Counting People in the Information Age*, in 1994.³¹

Panel on Census Requirements in the Year 2000 and Beyond. The panel worked closely with Census Bureau staff to understand the cost structure of the census and the reasons for cost escalation since 1970. It also modeled the likely cost implications of several proposed changes to census methodology, including radical changes, such as conducting a sample census and basing the census entirely on administrative records. The panel met with a wide range of data-user groups to understand their requirements and uses of census data, conducted two case studies of census data use (one for transportation research and planning and the other for housing research and planning), investigated the legal requirements for reapportionment and redistricting data, and studied data needs of federal agencies.

This panel reached four general conclusions, from which most of its more specific recommendations were derived:³²

- It was fruitless to try to count every person with traditional census methods of physical enumeration. Simply spending more money to extend use of traditional methods would not improve coverage or data quality.

²⁷ Ibid., p. 49.

²⁸ Ibid., p. 50.

²⁹ The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the National Academy of Sciences’ purposes of furthering knowledge and advising the federal government. The National Research Council members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The National Academy of Sciences has a Congressional mandate granted to it in 1863 that requires it to advise the federal government on scientific and technical matters.

³⁰ Barry Edmonston and Charles Schultze (eds.), *Modernizing the U.S. Census* (Washington, DC: National Academy Press, 1995). See also, *Planning the Decennial Census: Interim Report* (Washington, DC: National Academy Press, 1993).

³¹ Duane L. Steffey and Norman M. Bradburn (eds.), *Counting People in the Information Age* (Washington, DC: National Academy Press, 1994).

³² See Edmonston and Schultze (eds.), *Modernizing the U.S. Census*.

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- It was possible to improve the accuracy of the census count with statistical estimates of the number and characteristics of those not directly enumerated.
 - A thorough review and reengineering of census procedures and operations could achieve substantial cost savings in the next census, even as accuracy was being improved.
 - Continuous measurement deserved serious consideration as a means of providing more frequent small-area data; however, the necessary research and evaluation could not be completed in time for Census 2000. Therefore, Census 2000 should include the long-form questionnaire.

Panel to Evaluate Alternative Census Methods. Unlike the Panel on Census Requirements in the Year 2000 and Beyond, the Panel to Evaluate Alternative Census Methods focused on how the census should be taken. The panel included members with expertise in statistics, survey methods and design, decennial census operations, field organization of large-scale data collection, demography, geography, marketing research, administrative records and record linkage, small-area statistics, and respondent behavior.

The panel conducted much of its work through four working groups that were formed to consider different aspects of alternative census design. The first group examined response and coverage issues and reviewed research on methods to improve census response while reducing differential under-coverage. Topics studied by the group included questionnaire design and implementation, census rostering, and residence rules. The second group examined how sampling and statistical estimation methods might improve coverage and reduce differential under-coverage. The third working group studied current and potential uses of administrative records in censuses and considered related factors such as cost and public reaction to new uses of administrative records. The fourth group studied continuous measurement and matrix sampling, two alternative methods for collecting the detailed socioeconomic data that have been gathered on the decennial census' long-form questionnaire.

In September 1993, the panel presented an interim report outlining its findings and conclusions to date, many of which concerned plans for the 1995 Census Test.³³ Its overarching concern was that the design alternatives to be tested for Census 2000 should consider the “cost, yield, and gross error” of each method in order to determine the cost-benefit balance of each. The panel praised the Census Bureau's post-1990 census research, especially its efforts to improve response and coverage, and the agency's intention to expand its use of sampling and estimation.

In 1994, the panel's final report made 41 recommendations covering 5 basic concerns—census design, response and coverage, sampling and statistical estimation, administrative records, and alternatives for collecting long-form questionnaire data.³⁴ The Census Bureau adopted many of the recommendations, including map improvement efforts, address-list sharing among agencies, studies of administrative records as vehicles to collect census data, and expanded use of foreign language materials. The panel also endorsed the Census Bureau's efforts to pursue continuous measurement and to find alternatives to collecting long-form questionnaire data.

In terms of redesigning the census, the most significant recommendation that both NAS panels made was to encourage the Census Bureau to expand its use of statistical sampling so as to improve coverage and reduce costs. This recommendation meshed well with what the Census Bureau was hearing from many of those who criticized the results of the 1990 census and wanted a less costly and more accurate census in 2000. With pressure from Congress and the GAO to redesign the census, and with the support of its own staff, the NAS, and much of the statistical community, the Census Bureau set about designing a census that could be adjusted based on modern statistical sampling.

³³ *A Census That Mirrors America: Interim Report* (Washington, DC: National Academy Press, 1993).

³⁴For a comprehensive list of the recommendations and the rationale for them, see Steffey and Bradburn (eds.), *Counting People in the Information Age*.

TASK FORCE FOR DESIGNING CENSUS 2000³⁵

In November 1990, the Census Bureau and its parent agency, the Department of Commerce, formed the Task Force for Planning the Year 2000 Census and Census-Related Activities for 2000–2009. The task force was directed to consider lessons learned from the 1990 census, technical and policy issues, constitutional and statutory mandates, changes in U.S. society since earlier decennial censuses, and the most current knowledge of statistical and social measurement. These considerations were then to be applied to census-related activities for the period 2000 through 2009.³⁶ The task force also had the authority to contract with the National Academy of Sciences and others, as appropriate, for additional expertise and insights. The task force was required to make its final recommendations by January 1, 1995, and disband following submission of the report.

The task force was divided into three committees: the Technical Committee, the Policy Committee, and the 2000 Census Advisory Committee. The Technical and Policy Committees reported to both the Census Bureau and the Department of Commerce. The 2000 Census Advisory Committee was charged with identifying and communicating to the Secretary of Commerce the concerns of federal and nonfederal government, and nongovernment stakeholders regarding the Census 2000 design.

The task force committees held numerous policy and technical discussions that allowed members to debate and question alternative ways to design a modern census that took into account recent changes in society while fulfilling the Census Bureau's constitutional duties. The task force committees were asked to study a number of issues, including the use of administrative records, statutory requirements for data, methods to improve public participation, new partnerships with governments at all levels, mechanisms to spread data collection over longer periods, ways to tailor data collection efforts for different groups, and improved cost control and estimation methods. To aid the task force in accomplishing these goals, the Census Bureau provided it with information on the research and experimentation program of the 1990 census, the experience of the 1990 census itself, and trends identified by the Census Bureau's Year 2000 Research and Development staff.

The Technical Committee, drawn from senior technical staff from the Census Bureau and other federal statistical agencies, was responsible for evaluating the technical feasibility of design alternatives.³⁷ The committee identified key research questions, formulated test objectives, and evaluated research findings. It was chaired by the associate director for statistical design, methodology, and standards at the Census Bureau and supported by the Year 2000 Research and Development Staff. Responsibility for designing Census 2000, conducting related activities for the subsequent decade, and the research and experimentation program efforts, was placed under the direct supervision of the Technical Committee of the task force.

The Technical Committee developed 14 different alternative decennial census designs in an effort to improve the response rate and reduce the differential undercount.³⁸ Stakeholders were consulted about the merits of each of these designs. Though no single alternative could, by itself, solve these two problems, the designs identified useful methodologies that could be tested for use in Census 2000.

The Policy Committee was drawn from Census Bureau staff, other federal agencies with significant decennial census data needs, the Department of Commerce's Office of Administration and Office of Legislative and Intergovernmental Affairs, and the Office of Management and Budget (OMB). It was chaired by the U.S. Department of Commerce deputy assistant secretary for statistical affairs of the Economics and Statistics Administration.

³⁵ *Ibid.*, pp. 38–39.

³⁶ U.S. General Accounting Office, "Lessons Learned for Planning a More Cost-Effective 2010 Census," GAO 03-40, October 2002. p. 5.

³⁷ These agencies included the National Institute of Standards and Technology, the Bureau of Labor Statistics, the Internal Revenue Service, and the National Center for Health Statistics. See U.S. Census Bureau, "Reinventing the Census: Global Report of the Task Force for Planning the Year 2000 Census," April 1995.

³⁸ See U.S. Census Bureau, Year 2000 Research and Development Staff, "2000 Census Research and Development Alternative Designs Program," June 1992.

The Policy Committee's primary responsibilities were the content development and data collection processes. It examined the questions that the Census Bureau was compelled to ask by statute, and explored whether some of those data (particularly small-area economic and housing data) could be gathered in some other manner, such as continuous measurement, matrix sampling, and/or administrative records.

The Advisory Committee (later rechartered and renamed the Census 2000 Advisory Committee)³⁹ was responsible for communicating to the Secretary of Commerce the concerns of various stakeholders, such as private citizens, other levels of government, national and community-based organizations, academia, and private industry. It was composed of representatives from various organizations with an interest in decennial census accuracy and small-area data, as well as representatives of the U.S. Postal Service and both houses of Congress. The committee was chaired by the executive director of the Council of Professional Associations on Federal Statistics. (After the committee's creation, the Secretary of Commerce renewed its charter in 1995 and again in 1997. The Policy and Technical Committees disbanded when their charter ended on July 15, 1995.)

During its tenure, the Advisory Committee moved beyond the evaluation of the Census Bureau's statistical methods to consider nonstatistical issues such as outreach and promotion, and cooperative ventures with state, local, and tribal governments (this later was renamed the Partnership Program). In March 1995, the Advisory Committee submitted its final recommendations to the Secretary of Commerce. The committee's recommendations were based on its inquiries into decennial census methodologies and how they might be refined and revised. The committee members concluded that the Census Bureau should:

- Increase outreach and promotion efforts to stimulate participation and reduce the differential undercount, rather than simply raise awareness.
- Involve tribal, state, and local governments in census planning, development, implementation, and evaluation by forming partnerships with them.
- Test sampling and estimation techniques for nonresponding households to determine if these could help the Census Bureau contain costs and reduce the differential undercount.
- Maintain the long-form questionnaire as a method to collect small-area demographic, social, and economic data. Also, test 1990 questionnaire content to determine what changes, if any, should be made to the 2000 questionnaire. The Census Bureau also should consider nonfederal data needs.
- Ensure that census tests are scheduled early enough to take advantage of their findings in the final census design for 2000. Other research, particularly that from the 1990 census, also should be used to help create the final design.

CONSULTATIONS WITH DATA USERS

Census Advisory Committee of Professional Associations

As the nation's largest data-collection agency, the Census Bureau continued to seek advice from outside sources on census and survey planning. The main purpose for establishing and maintaining advisory committees was to obtain the expert advice of private sector representatives from the academic, business, and statistical communities on the full range of Census Bureau programs and activities. In 1994, the Secretary of Commerce, with the concurrence of the General Services Administration, established the Census Advisory Committee of Professional Associations pursuant to the Federal Advisory Committee Act. This committee consisted of members of the four separate, preexisting Census Bureau advisory committees: (1) The Census Advisory Committee of the

³⁹ The Department of Commerce granted the Advisory Committee's request that its charter be extended beyond the original January 1995 deadline. Following Census 2000, its charter was changed to allow the committee to help the Census Bureau prepare for the 2010 Census and the American Community Survey. It was renamed to reflect its status as an ongoing committee, becoming "The Decennial Census Advisory Committee."

American Statistical Association (ASA); (2) The Census Advisory Committee of the American Marketing Association (AMA); (3) The Census Advisory Committee of the American Economic Association (AEA); and (4) The Census Advisory Committee of the Population Association of America (PAA).

This advisory committee consisted of 36 members—nine members from each of the four organizations mentioned above. Members served 3-year terms and could be reappointed to second terms. The committee met twice a year, usually in the spring and fall.⁴⁰

Census Advisory Committees on the African American; American Indian and Alaska Native; Asian and Pacific Islander; and Hispanic Populations

The Census Advisory Committees on the African American; American Indian and Alaska Native; Asian and Pacific Islander; and Hispanic Populations were established in 1985 for the 1990 decennial census.⁴¹ The charters for the committees expired in 1992; however in February 1994, the Secretary of Commerce reestablished the committees for Census 2000.⁴² The Census Bureau requested membership nominations from its stakeholders, Congress, Census Bureau employees, and others. Committee members were usually community leaders, academicians, social science researchers, planners and developers, entrepreneurs, educators, and other private sector data users from national, regional, and local organizations. The committees reported to the Director of the Census Bureau and met at least once a year.

The primary objective of the committees was to seek advice and recommendations on special methods of enumeration and the race and ethnicity questions during the design, planning, and implementation phases of Census 2000, and promoting and obtaining cooperation and participation in Census 2000. Some of the issues that the committees addressed included whether to include a multiracial question on the long form, whether to use administrative records to collect census data, and how to disseminate the data to racial and ethnic populations. The committees held their first meeting in December 1994.⁴³

Survey of Nonfederal Data Users

As part of the content development process for Census 2000, the Census Bureau assessed the needs of nonfederal data users by conducting the “Survey of Census Needs of Non-Federal Data Users” (NFDU). The NFDU survey, mailed to approximately 18,000 participants between November 1994 and March 1995, collected information on the subject needs, uses of specific items (including the statutory citation where applicable), and the level of geographic detail that nonfederal data users needed for the 43 topics that appeared on the 1990 census questionnaires.

Survey respondents were asked whether they used each of the required or programmatic topics for any of the following six uses:

- Compliance with federal statute
- Application for federal funds and/or grants
- Meeting requirements of state or local legislation
- Program and/or policy development
- Analysis and/or program/policy evaluation
- Other (court rulings/orders, marketing, etc.)

⁴⁰ For a comprehensive review of the committee’s discussions and recommendations and the Census Bureau’s responses, see *Minutes and Report of Committee Recommendations*, published after each meeting.

⁴¹ Also known as the Race and Ethnic Advisory Committees (REAC).

⁴² In July 1999, the Native Hawaiian and Other Pacific Islander (NHOPI) subcommittee of the Asian and Pacific Islander Committee was created. The following February, the NHOPI subcommittee was chartered as a separate committee and the Asian and Pacific Islander Committee was renamed the Asian Committee.

⁴³ For a comprehensive review of the committees’ discussions and recommendations, see *Minutes and Report of Committee Recommendations*, published after each meeting.

From the approximately 9,000 completed questionnaires that NFDU survey participants returned during the solicitation period, the Census Bureau concluded that:

- All the topics collected on the 1990 questionnaires were needed.
- The largest single user for each topic was local governments, which also was the largest single group of survey respondents.
- There was widespread interest in small-area data (census tract level or below) for all topics, demonstrating one of the most essential uses of decennial census data.
- The census sample was the only source of complete social, economic, and housing information for these small areas, towns, and ZIP Code tabulation areas (for 2000).
- Program and policy development and evaluation were the top two uses for every topic. The data suggested that program planning and evaluation often were carried out to comply with federal or state statutes or to apply for federal funds.
- Data needs could not be met from alternative sources (administrative records, surveys, etc.) at the lowest geographic level and with the cross-tabulations needed.

The findings of the NFDU survey were incorporated into the Census Bureau's discussion on Census 2000 testing and ultimately the census' questionnaire content.⁴⁴ (See Chapter 3, "Population and Housing Questions.")

ALTERNATIVE DESIGNS PROGRAM FOR CENSUS 2000

The first major goal of the Census Bureau's Research and Development Program for Census 2000 was to identify and describe a full range of design alternatives to accomplish the major features of a census. The Census Bureau's Task Force for Planning the Year 2000 Census was responsible for overseeing the development of alternative designs. In order to determine which of the several research options for alternative designs to pursue, Census Bureau officials sought advice from the decennial census' many stakeholders. Between February and November 1991, the Year 2000 Research and Development Staff (Y2K Staff) and the Task Force for Planning the Year 2000 Census held a series of focus group meetings with stakeholders representing hundreds of organizations to begin exploring the idea of fundamental change in the census of population and housing. Each of the groups was asked to imagine the economic, technological, and social environment that likely would exist in 2000 (for example, increasing racial, ethnic, and language diversity of the population and increasing reluctance to comply with government requests for information). Given the environment described, each group was then asked to consider what fundamental changes to the census would be necessary to accommodate that environment.

The Y2K Staff defined which "building blocks" were necessary for taking a census. For each, the Y2K Staff considered how the Census Bureau had done each of these operations in the past and how they might be done differently in the future. Using these building blocks, the Technical Committee of the task force created 14 alternative decennial census designs. The Technical Committee was intimately involved in helping the Y2K Staff to establish a research and development agenda; the Technical Committee helped design and evaluate numerous projects, while the Y2K Staff managed and documented them.⁴⁵ The Technical Committee discussed each option with its stakeholders and developed research questions related to each design. It organized a series of more than 25 meetings with groups of stakeholders, called "Alternative Design Assessment Meetings" (ADAMs), and met between February and June 1992. In November 1992, the Y2K Staff issued "Criteria for Evaluating Alternative Census Designs," which documented the results of the ADAMs workshops to rank or weight the criteria to be used in deciding among the alternative designs.

⁴⁴ U.S. Census Bureau, "Surveying Non-Federal Data Users for Census 2000 Needs," 1995.

⁴⁵ See U.S. Census Bureau Research and Development Staff, "Alternative Designs Program," June 1992, especially Appendix 2, "Designs Analysis and Cooperative Ventures."

Six of the fourteen alternative designs for Census 2000 that the Census Bureau submitted to the OMB for review were variations on the 1990 census:

- Multiple response options. Added response options such as telephone, computer, fax, and interactive cable television to the mailout/mailback method that required respondents to complete and return paper questionnaires.
- High tech. Combined multiple response options with the use of administrative records and statistical estimation.
- Expanded content. Would collect additional data by using a variety of long-form questionnaires.
- Truncated/more estimation. Limited nonresponse follow-up (NRFU) among nonrespondents to the initial census questionnaire, allowing for substantial cost savings and requiring sampling and estimation to complete NRFU.
- Sample census. Would expand the use of statistical sampling to the entire mailout universe; all census counts would be sample-based estimates.
- Target enumeration barriers. Census-taking methods primarily designed for hard-to-reach populations.

Two of the proposed Census 2000 designs replaced traditional census-taking methods with reliance on administrative records as the only or primary source of data:

- Administrative records only. The census would be taken using administrative records⁴⁶ only. No direct enumeration would take place and no census questionnaire would be used.
- Administrative records with enumeration support. The census would be based on the data in administrative records, supplemented by enumeration and follow-up with respondents for whom few or no other records existed.

Four designs involved the collection of minimal data on each inhabitant of the United States:

- Voting rights data only. Similar to the methods using administrative records, but involving only the collection of data required by the Voting Rights Act (i.e., number of persons by age, race, and Hispanic origin at the block level).
- Reapportionment and redistricting counts only. Would collect only reapportionment and redistricting data—a basic headcount for each block. This design would collect less data than previous censuses, but would include statistical “adjustment” for over and undercounts.
- Redistricting counts only/no estimation. This basic headcount would collect and publish block-level population counts to meet redistricting requirements; it would incorporate neither coverage-improvement operations nor statistical “adjustment” of the counts.
- Reapportionment only/no estimation. This “bare bones” headcount would tabulate and publish population counts for states only and would not include procedures for coverage-improvement or statistical adjustment.

Two designs envisioned data collection taking place at two or more separate times during the collection period:

- Two-stage. One-hundred percent (short-form) data collected on Census Day. Sample data would be collected later in the year.
- Continuous measurement. Ongoing data collection throughout the decade. Minimal data would be collected in 2000.

⁴⁶ Administrative records are collected as a result of legal or regulatory requirements or transactions; are a result of program operations rather than intentional data collection; and are typically collected without regard to their analytic use.

The ADAMs helped to determine which research questions from the 14 design alternatives to pursue and how to test them. The subsequent research aided the Y2K Staff in developing its Design Alternative Recommendations (DARs). Though none of the 14 alternatives alone addressed all concerns, many of them did contain important elements that warranted further study. The research projects leading up to the creation of the DARs examined such topics as response rate improvement, potential uses of administrative records, methods for dealing with special populations, and new uses of technology.

The DARs were released initially in May 1993 and later reworked and re-released in July 1993 following public comment. At that point, the Census Bureau published a *Federal Register* notice containing the final design assessment criteria—six mandatory and ten desirable.⁴⁷ The six mandatory criteria stipulated that the final census plan would:

- Not require a constitutional amendment.
- Meet data requirements for reapportionment.
- Provide data defined by law and past practice for state redistricting.
- Provide age and race/ethnic data needed to enforce the Voting Rights Act.
- Protect the confidentiality of respondents.
- Include provisions to reduce the differential undercount.

The task force's research and development program ended in 1995. The task force believed that in order to have enough time to refine its suggestions into a concrete plan, the research for any significant change for Census 2000 needed to be complete and ready for examination in the 1995 Census Test. The results of its investigations into alternative methods for taking a census led the task force to endorse several means for improving the results of Census 2000. It supported:

- New avenues for greater involvement of stakeholders, such as building partnerships.
- New procedures to reduce the differential undercount, such as simpler forms.
- New uses of technology to capture the data more efficiently.
- Increasing the use of statistical methods to reduce the differential undercount.
- Using new methods for collecting long-form data.

The key question, however, was how effective these changes would be in meeting the Census Bureau's goals for Census 2000—increasing response rates, reducing the differential undercount, and containing costs.

In February 1994, the Y2K Staff issued the “1995 Census Test Design Plan.” The Y2K Staff used the five new proposed methods for improving census results to create 15 specific proposals that could be tested and evaluated in the 1995 Census Test.⁴⁸

The Alternative Designs Program guided the Census Bureau's early research and development agenda. It had primary responsibility for directing the selection, design, and evaluation of the research efforts that were used to determine what form the census redesign should take. The purpose of the 1995 Census Test was to determine how best to implement these designs so that they would work together as part of an integrated, functioning decennial census design.

⁴⁷ *Federal Register* notice from July 20, 1993. Many of these were based on the response to a *Federal Register* notice from March 1993, which had solicited public input about the designs and criteria for assessing them.

⁴⁸ See also Task Force for Designing the Year 2000 Census and Census-Related Activities for 2001–2009, “Reinventing the Census: Global Report of the Task Force for Planning the Year 2000 Census,” April 1995.

Table 2-4.
Fundamental Changes and the 1995 Census Test⁴⁹

Fundamental changes from 1990	Major goals	
	Reduce differential undercount	Reduce cost
New Uses of Sampling and Estimation		
Use sampling and estimation procedures to reduce the differential undercount and the cost of the census.	X	X
New Procedures to Count the Undercounted		
Use an easy-to-fill-out questionnaire with multiple mail contacts to improve response.		X
Use new coverage questions to ensure a complete listing of household members.	X	
Mail Spanish-language questionnaires to areas with large concentrations of Spanish-speaking households.	X	X
Make census questionnaires available at convenient locations for those who did not receive a questionnaire or believe they were not counted.	X	
Use special targeted methods to count historically undercounted populations and geographic areas.	X	
For counting people with no usual residence, use a method that counts people at the facilities where homeless people obtain services.	X	
Study various ways that administrative records can be used to identify people who otherwise would be missed in the census.		X
New Avenues for Greater Involvement		
Develop cooperative ventures with other federal agencies; state, local, American Indian tribal, and Alaska Native village governments; and private and nonprofit organizations to form partnerships in taking the census.	X	X
Evaluate initial efforts to complete and maintain an address list and geographic files in cooperation with the U.S. Postal Service and state, local, American Indian tribal, and Alaska Native village governments.	X	X
The U.S. Postal Service will identify vacant housing units or mistakes on the address list. ...		X
New Uses of Technology		
Develop a new data capture system using electronic imaging.		X
Use fully-automated matching to improve census coverage.	X	
New Method for Collecting Long-Form Data		
Experiment with collecting sample (long-form) data using multiple sample forms.		X

THE PLAN FOR CENSUS 2000

On February 28, 1996, at a ceremony in the main hall of the Department of Commerce's Hoover Building, key stakeholders and Commerce and Census Bureau officials released, "The Plan for Census 2000."⁵⁰ Special guests invited to present and discuss each of the four main strategies underlying the plan included Commerce Secretary Ron Brown, Office of Management and Budget Director Alice Rivlin, Commerce Under Secretary for Economic Affairs Everett Ehrlich, and Census Bureau Director Martha Farnsworth Riche. To generate interest in, knowledge about, and discussion of plans for Census 2000, ten roll-out presentations were made in the cities throughout the United States in the following months.⁵¹

Content of the Plan

"The Plan for Census 2000," as originally presented in 1996, laid out the key objectives and strategies for taking the census. The key objectives were to:

- Make every effort to include every person.
- Implement an open process.

⁴⁹ "Summary of Objectives for the 1995 Census Test," prepared by Y2K, March 1994.

⁵⁰ Bureau of the Census, "The Plan for Census 2000," a revised version incorporating some suggestions from several sources was released on April 5, 1996.

⁵¹ From April through September 1996, roll-out presentations of the plan were held in Chicago, Los Angeles, Atlanta, Boston, New York, Seattle, San Francisco, Sacramento, Denver, and Kansas City.

-
- Eliminate the differential undercount.
 - Produce a “one-number census.”⁵²

This plan was guided by four key strategies for taking Census 2000: (1) build partnerships at every stage of the process, (2) keep it simple, (3) use technology intelligently, and (4) use statistical methods. The use of statistical methods, particularly the increased use of statistical sampling, generated the most interest and was the most controversial of the four strategies.⁵³ These four strategies guided the Census Bureau’s development of its plans to conduct Census 2000 and helped to establish which elements of the plan needed to be further tested.

The first strategy, partnership building at each stage of the process, was an attempt by the Census Bureau both to increase awareness of the census and to reach population groups that had been undercounted in prior years. The agency hoped that an effective partnership program would help reduce the number of missed households and avoid needless duplication of efforts to find people. The Census Bureau sought to build partnerships with governmental entities at all levels and community groups, as most of these would have better knowledge of their area’s population groups. Representatives from these governments and community groups could recommend corrections to the maps and address lists the Census Bureau produced,⁵⁴ suggest the best locations for placing forms, and advise on how to advertise to each area’s subpopulations. The Census Bureau also partnered (as a result of legislation, P.L. 30-430) with the U.S. Postal Service in order to take advantage of that agency’s address lists; such a partnership would help the Census Bureau avoid duplicating the postal service’s work and also avoid the costs associated with such duplication. Finally, the Census Bureau hoped to use contracts with private sector partners to secure such services as facilities management, advertising and promotion, and human resources.

The second strategy, keeping the census simple for respondents, was intended to increase the accuracy and reduce the cost of the census by increasing voluntary participation and mailback response rates. The Census Bureau sought to make its forms easy to read, attractive, and easy to fill out. To create these new “user-friendly” forms, the Census Bureau believed that it should hire private marketing experts. Another strategy to make answering the census easier was to initiate multiple contacts with respondents by sending a notification letter, the census questionnaire, and a reminder letter. Finally, the Census Bureau proposed increasing the number of ways that people could respond by making forms available at stores, malls, schools, civic and community centers, and other places. People also would be able to dial a toll-free number in order to have an additional questionnaire mailed to them.

The third strategy, using technology intelligently, was intended to make the census faster to process, less costly, and more accurate through technological innovation. Technology would reduce manual data entry errors and prevent double-counting, while also reducing the demand for labor and decreasing publication costs (by relying on electronic data dissemination). The Census Bureau would use digital technology to “capture” the data from the completed paper forms, rather than rely on microfilming and keypunching. Scanning data directly into a computer database, including handwritten data which would be captured by “intelligent character recognition” software, would speed the data capture process. In addition, using “matching” software to detect duplicate forms from the same address would reduce the incidence of double counting. The third main technological innovation, “point and click” tabulation, would improve data retrieval and dissemination for users.

⁵² The “one-number census” planned for Census 2000 would have been an official count of the population that integrated results of the conventional counting techniques with results from probability sampling techniques.

⁵³ The commitment to use statistical methods was modified following the Supreme Court’s January 1999 decision that ruled that Section 195 of Title 13 (the statutory authority for the census) precluded the use of statistical sampling to produce the apportionment counts.

⁵⁴ This process, known as Local Update of Census Addresses (LUCA) program (or the Address List Review Program), was a partnership program that allowed the Census Bureau to benefit from local knowledge in developing its master address file (MAF). The LUCA program was made possible by the Census Address List Improvement Act of 1994 (Public Law 103-430), which authorizes designated representatives of local and tribal governments to review the MAF and allows the local participants to appeal final Census Bureau decisions.

The fourth strategy, using statistical methods, promised to solve the problem of the differential undercount while reducing the enumeration costs associated with efforts to find the most resistant respondents. Reliance on statistical methods would allow the Census Bureau to reduce the number of temporary offices and cut the number of enumerators needed for return visits while producing a “one-number census.” Statistical methods had been used to collect data for several decades (for example, the long form, and census accuracy checks), but the Census Bureau had not generated official population figures based on statistical adjustment. While the Census Bureau’s Director believed that the 1990 census should have been statistically adjusted, the Secretary of Commerce decided against adjustment.⁵⁵ As a result of a better understanding of the 1990 population data, better planning for Census 2000, the Census Bureau again urged the use of statistical adjustment in 2000. By conducting a census using traditional methods and comparing those figures with sample-based estimates, the Census Bureau could then calculate statistically corrected population totals for each state and for the nation as a whole.⁵⁶

Cost of the Plan

At the time the plan was announced, the Census Bureau estimated its cost to be \$3.9 billion—nearly \$1 billion less than if the 1990 census procedures and methodologies were repeated (\$4.8 billion) and if it did not include any planned improvements or sampling.⁵⁷ The Census Bureau also projected that the effort to conduct Census 2000 using statistical methods would reduce the number of “staff years” to 63,718, from a projected 103,034 if 1990 methods were repeated.⁵⁸

Reaction to the Plan

Reaction to the plan among technical advisors and the professional statistical community and media reports covering the regional roll-outs was generally positive. However, there were significant criticisms of the plan, particularly from Congress. The central issue concerning the Congress was the Census Bureau’s proposed use of statistical sampling, including its intention to reduce the level of nonresponse follow-up. These concerns about sampling ran the gamut from those who opposed all sampling to those who opposed the specific sampling operations that the Census Bureau intended to use.

Opposition to Sampling

Some members of Congress believed that the Census Bureau’s plan to use statistical sampling, as contained in “The Plan For Census 2000,” violated the Constitution and/or the agency’s operating statute, Title 13, U.S. Code, and opposed any use of sampling to determine the population figures for apportionment or redistricting.

The day after “The Plan for Census 2000” was presented to the House Government Reform and Oversight Committee (February 29, 1996), Chairman William Clinger (R-PA) and Representative Bill Zeliff (R-NH), who chaired the Subcommittee on National Security, International Affairs, and Criminal Justice (which had jurisdiction over the census), expressed reservations about the use of sampling. Several witnesses spoke out against the plan to use sampling, including three members of the Wisconsin delegation—Senator Herbert Kohl (D) and Representatives Thomas Barrett (D) and Thomas Petri (R). Wisconsin would have lost a seat in Congress had the 1990 census been adjusted. Governor Thomas Ridge (R-PA) registered his opposition to sampling (in written testimony), claiming that as a result of a computing error, his state also would have lost a seat if the 1990 census had been adjusted. Former Census Bureau Director Bruce Chapman, who headed the agency from 1981 to 1983, also spoke against sampling.

⁵⁵ Bryant, *Moving Power and Money*, pp.156–59.

⁵⁶ In January 1999, the Supreme Court determined that existing laws did not allow for the Census Bureau to adjust the population figures for apportionment. For more on how this altered the Census Bureau’s plans to use statistical sampling in Census 2000, see below and Chapter 11, “Legal Issues.”

⁵⁷ By April 1997, the estimated cost of the census had increased very slightly to \$4.0 billion. This increase came from the fall 1996 decision to control sampling at the census tract level rather than the county level.

⁵⁸ “The Plan for Census 2000,” p. IV–1.

Sampling plans were defended by Drs. Charles Schultze and James Trussell, chair and member, respectively, of the NAS Panel on Census Requirements in the Year 2000 and Beyond. Both had contributed to the panel's report, *Modernizing the U.S. Census*, which had been instrumental in encouraging the Census Bureau to use sampling methodologies to complete data collection and adjust the census.

Following this hearing, sampling opponents sought to bar the Census Bureau from pursuing its plan to use statistical sampling to adjust the census. In June 1996, legislation was introduced that would have amended Section 141 of Title 13, U.S. Code, to prohibit the use of sampling or other statistical procedures in determining the state population totals for the purpose of apportionment;⁵⁹ however, no action was taken on the bill.

In August 1996, the Senate Appropriations Committee filed a report on the FY 1997 Commerce Department appropriations bill that contained a recommendation to curtail the Census Bureau's sampling activities. It stated that the "increase provided here is for activities which will position the Census Bureau to be ready to move forward with a plan for Census 2000 once one is approved by Congress. Until then, the committee directs that activities be limited to those which are critical to this effort, and that no funds be spent on preparation for a plan using statistical sampling."⁶⁰ The full Senate never acted on the Commerce Department's original appropriations bill, so this language was not approved by the full Senate. Similar language was not included in the conference report for the omnibus funding bill that eventually included the FY 1997 appropriation for the Commerce Department.

On September 18, 1996, the newly reorganized House Committee on Government Reform and Oversight adopted, on a 22 to 12 vote, largely along party lines, a freestanding (not associated with any piece of legislation) report that opposed the Census Bureau's plans to use sampling in Census 2000 for purposes of determining the apportionment counts. Concerns raised about sampling in the report, bitterly divided along partisan lines, included the apparent subjectivity of decisions about the methodology, legal uncertainties, undermining of public confidence, accuracy of small-area data, and the complexity of sampling techniques. The report also included views of the minority that strongly supported sampling. The minority views stated that "the outright rejection of sampling and adjustment, without any proposal for achieving the dual charge of Congress of a more accurate and less expensive census, is untenable."⁶¹

Concerns about specific sampling proposals for nonresponse follow-up. The Census Bureau's plan, announced in February 1996, called for making energetic efforts to count everyone by mail or telephone. If the mail and telephone enumeration attempts did not reach a 90 percent completion rate for a county, then census enumerators would conduct personal visits to housing units until the targeted 90 percent level was reached. After reaching the target, the remaining 10 percent of the housing units and their inhabitants would be enumerated on a sample basis. A 1-in-10 sample of the remaining housing units would be canvassed, and the results would be used to estimate the number of nonrespondents and their characteristics.

As early as May 1995, concerns had been expressed by members of the Census Bureau's Race and Ethnic Advisory Committees (particularly members of the African American Advisory Committee) that targeting 90 percent completion at the county level would mean that some hard-to-enumerate areas with large minority populations within counties would reach substantially less than the 90 percent level. The Census Advisory Committee on the African American Population recommended that the 90 percent target be set for cities, at least for predominantly African American communities.⁶² Discussions between the Census Bureau and the advisory committees on this topic continued at the meetings in the fall of 1995.

⁵⁹ H.R. 3589, "Census, Title 13 U.S.C., Amendment."

⁶⁰ Senate Report 104-353, which accompanied H.R. 3814, "1997 Appropriations for the Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies" was filed by the Senate Committee on Appropriations on August 27, 1996.

⁶¹ House Report 104-821, "Sampling and Statistical Adjustment in the Decennial Census: Fundamental Flaws," was issued by the committee on September 24, 1996.

⁶² Bureau of the Census, *Minutes and Report of Committee Recommendations*, Census Advisory Committees on the African American, American Indian and Alaska Native, Asian and Pacific Islander, and Hispanic Populations, May 11–12, 1995, p. 92.

In September 1996, having completed discussions with its advisory committees, the Census Bureau announced that it would change its plan to target 90 percent completion at the census tract level, and estimated that this would add about \$100 million to the estimated cost of the census (from \$3.9 billion to \$4.0 billion).

In May 1996, legislation supporting the census tract-level sampling control was introduced. (See Chapter 11, “Legal Issues,” for a discussion.)

PRECENSUS 2000 TESTING⁶³

The Census Bureau routinely carried out precensus tests of operations and procedures and of questionnaire content and format. Prompted by concern about the decline in mail response between the 1970 and 1990 censuses, the Census Bureau began its testing activities for Census 2000 much earlier in the decade than for previous censuses. Earlier testing was needed to allow time to study major reforms in census questionnaire and mailout design, especially on ways to increase the willingness and ability of households to respond to the decennial census (see Table 2-5).

Table 2-5.
Tests for Census 2000

Test	Test topic	Date
1992 National Census Test I: Simplified Questionnaire Test	Mail response rates	April 1, 1992
1992 National Census Test II: Implementation Test	Mail response rates	October 1, 1992
1993 National Census Test I: Mail and Telephone Mode Test	Impact on participation rate of adding a telephone response option	April 3, 1993
1993 Living Situation Survey	Within-household coverage	May 1–August 6, 1993
1993 National Census Test II: Appeals and Long-Form Experiment	Mail response rates	July 17, 1993
1993 Administrative Records Follow-on Survey	Use of Administrative Records for follow-up activities	February and May 1993
1993 National Census Test III: Spanish Forms Availability Test	Impact on mail response of mailing Spanish-language forms to housing units in targeted areas	October 23, 1993
1994 Survey of American Indian and Alaska Native Government Administrative Records	Use of American Indian and Alaska Native administrative records for coverage improvement	1994
1994 National Census Test I: Coverage Test	Within-household coverage	January 29, 1994
1994 National Census Test II	Telephone nonresponse follow-up test	March 1994
1994 Address System Information Survey	Proportion of non-city-style addresses in U.S. and likelihood of change before 2000	September 1994

⁶³ Additional surveys concerning privacy, administrative records, etc., were conducted by third parties (colleges, universities, and other data users). These surveys are not discussed in this history, though the Census Bureau may have consulted the results during its Census 2000 planning.

Table 2-5.
Tests for Census 2000—Con.

Test	Test topic	Date
1995 Census Test	New uses of sampling and estimation; new procedures to reduce the undercount; new avenues for greater cooperation; new uses of technology; and new methods for collecting long-form data	Many components throughout 1995
1996 National Content Survey	Tested response to race and ethnicity questions conforming to proposed changes to Directive No. 15 (including multiracial category)	March–May, 1996
1996 Race and Ethnic Targeted Test	Reporting of more than one race; sequencing of race and Hispanic-origin questions; effects of collecting race, Hispanic origin, and ancestry information in a combined, two-part question; and use of alternative terminology, classifications, and formats in the race question	June 1996
1996 Community Census	Tested the simplified enumerator questionnaire (proposed for Census 2000 nonresponse follow-up operations) and the use of American Indian administrative records to augment the Integrated Coverage Measurement (ICM) procedures	October 1996
1997 National Census Test	Effect of icons and benefit messages on response; questionnaire binding (fold-out and booklet short-form); removal of roster on long-form questionnaire; use of an official and a marketing envelope	Cancelled July 1997
Census 2000 Dress Rehearsal	Tested all operations planned for Census 2000	April–July, 1998

1992 National Census Test I⁶⁴

The Census 2000 testing cycle began in April 1992 with the National Census Test I (also referred to as the Simplified Questionnaire Test)—the first in a series of four tests⁶⁵ in the Questionnaire Simplification Research Program designed to explore ways to improve mail response rates. By design, these experiments were linked conceptually to one another so that some of their results could be cumulated across experiments.

The Simplified Questionnaire Test was conducted to determine if form length, respondent-friendly form construction, a multiple mailing strategy, or requesting social security number would influence mail response. This test was a mailout/mailback survey consisting of a national sample of 17,000 housing units. The sample was divided equally into two strata: a hard-to-enumerate stratum, consisting of the reporting areas of the 67 district offices with the lowest mail-response rates in 1990, and a stratum of the rest of the United States with higher response rates. Each stratum had five panels, reflecting the four treatments plus one control panel (the 1990 short-form questionnaire). There was no field follow-up of nonresponding households.

The Simplified Questionnaire Test included multiple mail contacts with respondents, an approach that had been shown in previous research to boost response. In addition to the mailout questionnaire, all households received an advance notice letter a few days before the mailout advising them that their census form would be sent soon, followed by the questionnaire, and then a thank you/reminder postcard a few days later which thanked respondents for returning their census form and reminded those who had not returned the form to do so. Three weeks after the initial questionnaire mailout, nonresponding households were sent a replacement questionnaire.

⁶⁴ Susan Miskura, “The 1992 National Census Test (SQT) Project Overview,” December 10, 1991.

⁶⁵ The four tests were the Simplified Questionnaire Test (spring 1992), the Implementation Test (fall 1992), the Mail and Telephone Mode Test (spring 1993), and the Appeals and Long-Form Experiment (summer 1993).

There were five short-form questionnaires—one control form (the 1990 census form updated to 1992) and four experimental forms of various lengths. The experimental questionnaires all incorporated respondent-friendly design features, including a larger, easier-to-read font (compared with the 1990 census forms); strong visual contrast (using color and shading) between the questions and answer boxes to make it easier to identify the correct space in which to write the answer; a clear set of instructions printed directly on the form instead of in a separate guide; and a questionnaire that grouped all questions for one person together in one space instead of in the row-column format that had been used in many previous censuses.

The mail completion rate was used in this study to measure mail response. This term is defined as the number of questionnaires returned by mail divided by the number of questionnaires mailed out minus the postmaster returns for undeliverable questionnaires. The completion rate does not imply anything about the number of questions answered or left blank on the form. This test found that:

- Asking fewer questions improved mail completion rates nationally and in areas that had higher response rates in 1990, but did not improve rates for areas that experienced low response in 1990.
- Using a respondent-friendly form improved completion rates nationally and for low response areas, but had no significant effect on the rates for higher response areas.
- The combination of fewer questions and a respondent-friendly form improved completion rates for all areas.
- The form that asked respondents for their social security number had a lower completion rate than the similar form without the question at the national level and in low response areas.
- Sending a replacement questionnaire raised completion rates for all areas and for all form versions.

The 1992 Simplified Questionnaire Test results suggested that response rates could be improved by using a coordinated mail treatment strategy that increased the number of mail contacts with respondents. Since the same contacts were used for all Simplified Questionnaire Test treatments, the effects of the individual factors could not be evaluated.

1992 National Census Test II⁶⁶

The 1992 National Census Test II, or Implementation Test, was conducted in fall 1992 to assess the relative contributions to mail-response rates of components of a mail implementation strategy. This test was designed to assess the effects on mail response of two mail components—an advance notice letter and a thank you/reminder postcard. Also included in the test design was a test for the effect of including a stamped return envelope (versus a business reply) with the mail-out questionnaire. The performance of these three variables on mail response would be measured singly and in combination.

The Implementation Test was a mailout/mailback national sample survey of 50,000 housing units. As had been done during the Simplified Questionnaire Test, the sample was divided evenly between two strata consisting of low response and high response areas in the 1990 census. Within each stratum, the sample was allocated equally to eight panels reflecting all possible combinations of the three test components: none (control), advance notice letter only, stamped return envelope only, reminder postcard only, letter plus stamped return, stamped return plus reminder, letter plus reminder, and letter plus stamped return plus reminder. No nonresponse follow-up operation was conducted for this test.

The Implementation Test used a respondent-friendly short-form questionnaire that had been used in the Simplified Questionnaire Test. The same questionnaire was used in each of the eight mailing options. No replacement questionnaire was used in this test so that its effects could be compared

⁶⁶ John H. Thompson, U.S. Census Bureau, “Evaluation Plan of the Implementation Test (IT),” September 14, 1992.

with the results from the Simplified Questionnaire Test, which did have the replacement (as well as the notification letter and reminder postcard). This procedure allowed the Census Bureau to isolate the effects that a replacement questionnaire would have on completion rates.

Conclusions drawn from the Implementation Test included:

- Both the advance notice letter and reminder postcard used individually improved mail completion rates at the national level as well as in the 1990 high and low response areas. No significant improvements were noted for the stamped return envelope at either the national or stratum level.
- Respondents receiving the advance notice letter and reminder postcard displayed higher completion rates than those receiving only the letter or the reminder.
- The replacement questionnaire improved completion rates nationally and in both the high and low response areas. Completion rates for the Implementation Test panel that used the same questionnaire version and mail components (excepting the replacement questionnaire) were significantly lower than those for the Simplified Questionnaire Test.

1993 National Census Test I⁶⁷

The 1993 National Census Test I, or Mail and Telephone Mode Test, was conducted in the spring to determine whether response rates could be increased by offering the telephone as a response option in addition to the traditional mail questionnaire. This test was prompted by the decline in census response rates, the increasing costs of conducting personal interviews for nonresponse follow-up, and the desire to be responsive to the growing interest in alternative methods for responding to the census. This test had three primary objectives: (1) to assess the public's preference for responding to a national census test by mail or telephone, (2) to determine whether overall response rates could be improved by offering a telephone option as a response mode, and (3) to measure the effect on the quality of responses when submitted by telephone.

The test was a national sample survey of 21,500 housing units. As with the Simplified Questionnaire Test and the Implementation Test, the Mail and Telephone Mode Test sample was divided into two strata: one consisting of households from low mail-response areas to the 1990 census and the second consisting of households from higher response areas. The two strata were allocated evenly among five treatment groups. A user-friendly short-form questionnaire (with the same content as the 1990 census short-form) used in the Simplified Questionnaire Test was used for all five panels. Each of the groups also received an advance notice letter, an initial questionnaire, and a reminder postcard. Three groups also received a targeted replacement questionnaire for nonresponding households. Panel 1 served as the control and was not offered the telephone response option. Panel 2 was invited to respond by telephone on one mail component (the reminder card); panel 3 had the option to use the telephone on two components; panel 4 had the option on three components; and panel 5 had the option for all four mailing components. The test did not have a nonresponse follow-up operation. A mailout/mailback or telephone-response methodology was used to collect the data. Telephone responses via a toll-free number were handled at the Census Bureau's Tucson, AZ, Telephone Center, with census interviewers using computer-assisted telephone interviewing (CATI) technology.

The main conclusions of this study were:

- Offering the option to respond by telephone did not improve response rates. It appeared that people who would have responded by mail simply substituted the telephone as a response mode.
- Although overall response was not increased, people who chose to respond by telephone had a lower item-nonresponse rate on average than those who responded by mail, possibly because of the interaction with a trained interviewer who could provide assistance in completing the

⁶⁷ Kirsten West, U.S. Census Bureau, "1993 National Census Test: Mail and Telephone Mode Response Evaluation Final Report," July 21, 1993.

questionnaire. However, questions on monthly rent and value of home had higher item-nonresponse rates, possibly because some respondents may have been hesitant to provide information perceived as sensitive in a telephone interview.

- When offered the choice of responding by mail or by telephone, most respondents preferred mail.

1993 Living Situation Survey⁶⁸

The 1993 Living Situation Survey was conducted between May and August as part of a larger program to investigate within-household coverage gains that might be obtained by simplifying the census residence rules and redesigning the household roster. The decennial census enumerated individuals at their usual residence, which was defined as the place where they lived and slept most of the time. To help respondents determine where they should be counted, especially those who lived in unusual living arrangements, the Census Bureau developed a set of residence rules. Guidelines based on the residence rules were placed on the census questionnaire to aid respondents in completing the household roster. The Living Situation Survey was designed to help the Census Bureau develop better household roster and screener questions and to help detect people who otherwise would be missed due to respondent confusion over whom to include in the household. The results were intended to help the Census Bureau improve coverage of undercounted populations, particularly minorities and renters.

The survey contained 13 additional roster questions and was designed to identify as many individuals connected to an address as possible. Respondents were asked to list individuals who stayed in the household the previous night, lived there but did not stay the previous night, and lived or stayed there during the 3- to 4-month reference period but had moved out. They also were asked to list people who ate there frequently, had a key, contributed money to the household, received mail or telephone messages, and so forth (even if such people did not stay at the household overnight during the reference period). Household respondents also were asked whether people on the roster were “usual residents” or “not usual residents.”

The Living Situation Survey was designed to examine the extent to which people lived at more than one residence, had no permanent residence, or experienced temporary mobility into and out of a residence, and to detect other situations that might result in complex and irregular household structures. Unusual living situations, such as these, have led respondents to make errors when trying to apply the residence rules. As a result, people have been associated with the wrong address or missed completely, leading to enumeration errors and undercoverage.

The Living Situation Survey was conducted for the Census Bureau by the Research Triangle Institute. The survey used a national sample of 1,000 households, with oversampling of minority populations and renters. Data were collected at both the household and individual levels through personal and telephone interviews. At the household level, respondents answered 13 questions to provide an inclusive roster of persons who were present at the address during the reference period (varying between 2 and 3 months). Individual interviews were conducted with all persons in 10 percent of the households in the survey. In addition, selected individuals in other households were interviewed to determine their status. These extra interviews targeted people identified as having a greater-than-casual attachment to the household but who stayed away for 8 or more nights during the reference period, college students, and those without a usual residence. In all, about 1,200 individual interviews were completed.

Three related questionnaires were developed for the Living Situation Survey; two for households and one for individuals. One household questionnaire contained the 13 roster questions and several others designed to determine a household respondent's personal definition of usual residence, household membership, and permanent address. The second household questionnaire included questions about an individual's connection with other residences, names and types of

⁶⁸ Elizabeth M. Sweet, U.S. Census Bureau, “Roster Research from the Living Situation Survey,” March 1994.

places stayed overnight, and reasons for leaving. The individual-level questionnaire asked respondents for their place(s) of residence for the previous 3 months and their assessment of which place, if any, they considered to be their primary place of attachment.

The primary findings of the Living Situation Survey were:

- The first two roster questions, “Who stayed here last night?” and “Who lives here but didn’t stay here last night?” identified nearly all of the usual residents. However, these queries also identified persons who were not usual residents. To use these questions for their maximum benefit the Census Bureau would need to add a “screener” question to prevent respondents from including persons on the roster in violation of census residence rules.
- The other 11 supplemental questions identified a very small proportion of usual residents but did find a large number of persons who were not usual residents.
- Analysis of verbatim responses from individual interviews indicated that people associated the term “live” with the words “permanent” and “home,” while they associated the word “stay” with the words “temporary” and “not home.” The terms “usual residence” and “household” were not used naturally by respondents even when these terms were defined repeatedly throughout the interview.
- If census residence terms and categories are not changed, the Census Bureau will have to find a way to bridge the gap between the Census Bureau’s terms and categories and those used naturally by respondents.

1993 National Census Test II⁶⁹

The 1993 National Census Test II, or the Appeals and Long-Form Experiment, was conducted in July and was the culminating experiment in the series of four tests to study ways to improve mail response. The experiment was divided into two parts to study two different issues. The first component, which used a short-form questionnaire, tested the effectiveness of two types of motivational appeals that urged respondents to participate. The second component, which used the long-form questionnaire, tested alternative respondent-friendly designs.

The 1993 National Census Test II was a mailout/mailback survey of a sample of 45,000 housing units nationwide. As in the previous three tests, the sample was divided evenly between two strata consisting of low response areas and high response areas from the 1990 census. There was no field follow-up for nonresponse. Each stratum was divided into nine treatment groups, six for the appeals portion of the test, and three for the long-form portion. All treatment groups received the full mail implementation strategy—an advance notice letter, initial questionnaire, reminder postcard, and a replacement questionnaire for nonrespondents to the initial form.

The appeals portion of the test, like the previous three tests, studied ways to increase the response rate by using variations of the short form. The test’s objective was to compare the response rates elicited by two different appeals. The first emphasized the mandatory nature of the census, while the second emphasized the benefits of the census and its confidentiality. This short-form appeals component of the test consisted of one control and five experimental treatment groups. The questionnaires used the two basic appeals (mandatory versus benefits), both singularly and in combination, and employed two different confidentiality assurances (regular versus strong). The mandatory appeal emphasized the statutory requirement for completing and returning the questionnaire, while the benefits appeal described the important uses of the census. The confidentiality statement comparisons included the standard version and a longer, more emphatic version. The various messages were placed either on the outgoing envelope of the questionnaire mailing package or as a separate insert within the mailing package. The control had no mandatory message on the envelope and did not include an insert. All six panels, including the control, used a version of the respondent-friendly short form tested in the Simplified Questionnaire Test.

⁶⁹ James B. Treat, U.S. Census Bureau, “1993 National Census Test Appeals and Long-Form Experiment Appeals or Short-Form Component: Final Report,” October 1993.

The long-form component of the test was designed to study the relative response rates for two different structural options—a separate, individual space answer format versus a row-column answer format. This test used three response groups, one control and two experimental, each of which received a different questionnaire. The first experimental questionnaire grouped all questions for each household member in one space, which had been found effective for past short forms. The other experimental design enhanced the traditional “row-column” answer format by placing the questions vertically down the left hand side of the page and the names of household members horizontally across the top.

All treatment groups in the long-form component shared the same 1990 census content; however, the control group used the 1990 census design, while the experimental questionnaires incorporated various respondent-friendly design/layout features that had improved response in earlier tests using short forms.

The Appeals and Long-Form Experiment found that:

- Placing the message, “Your Response is Required By Law” on the outgoing envelope improved completion rates at the national level and in both the 1990 census high and low response areas.
- In contrast, neither the full benefits message nor varying the confidentiality emphasis showed any measurable improvement in completion rates.
- Using the individual space design resulted in significant improvement in completion rates overall and in the 1990 higher response areas. However, the forms with this design had a greater incidence of nonresponse to the housing items located in the back section of the questionnaire that were to be answered once per household. Over 10 percent of the individual space long forms had no entries in the housing section, compared with only 1 percent for the control long form.

1993 Administrative Records Follow-On Survey⁷⁰

The 1993 Administrative Records Follow-On Survey was conducted in Godfrey, IL, in February 1993, and South Tucson, AZ, in May 1993 following special censuses taken at each location. This test was designed to assess the feasibility of using administrative records files in conjunction with enumeration records to measure overlaps and improve coverage. The test also provided Census Bureau personnel with the experience they would need had the agency decided to use administrative records on a national scale.

For the first test in Godfrey, IL, the Census Bureau used voter registration records, school records, and (on a limited basis) the town’s tax assessment records.⁷¹ The later South Tucson, AZ, test added the U.S. West Marketing Resource Database, the Arizona Aging and Adult Administration Home and Community Database file, and the Southwest Gas Company customer account file.⁷²

Following completion of each special census, the Census Bureau matched administrative records to census returns to determine if coverage and content gain could be achieved using the administrative records files. Questionnaires from the two special censuses were computer-matched, pairing administrative records to a returned questionnaire.

In Godfrey, IL, computer matching was able to pair 15,764 of the 16,271 questionnaires to administrative records. In South Tucson, AZ, 5,127 of the 5,702 returned questionnaires were matched to administrative records. Entries within the administrative records that could not be matched by

⁷⁰ Robert D. Tortora, U.S. Census Bureau, “Special Census/Administrative Records Test for Godfrey, Illinois,” August 7, 1992.

⁷¹ The Census Bureau initially planned to use food stamp recipient records following deliberations with the Food and Nutritional Service. Although privacy issues were resolved, the Census Bureau did not receive permission to use the records in time for the Godfrey, IL, test.

⁷² For the South Tucson, AZ, test, two types of administrative records were used. “Person-based” records (i.e., the voter registration, Tucson Unified School District enrollment, and U.S. West Marketing Resource files) specifically named a resident within the administrative records. The remaining records (i.e., the Southwest Gas Company customer account, U.S. West Marketing Resource Database, and the Pima County tax assessment list) provided addresses within South Tucson’s city limits to determine if housing units were absent from the Census Bureau’s own address list.

computer were reviewed manually by clerks. Entries from the administrative records that could not be matched to a questionnaire by machine or by manual review were deemed as candidates for potential coverage gain, for which a sample was chosen for follow-up evaluation.

Follow-up evaluation did not necessarily result in increased coverage; however, additions that were substantiated by personal visits indicated that the potential for a substantial coverage gain could be achieved (as demonstrated in Godfrey and South Tucson) if replicated on a national scale.

Despite the potential for increasing coverage, several stumbling blocks were identified following the survey. Use of administrative records may increase coverage of hard-to-count populations, but their use may also overcount census participants with more than one personal identifier (i.e., John Doe and J. Doe). Nationally this problem would be compounded—the undercount of some populations would decrease, but other populations would be overcounted, especially among census participants owning property at more than one address.

The Administrative Records Follow-On Survey also demonstrated that administrative records did not always account for all additions and deletions to the population and number of housing units. During personal follow-up visits in South Tucson, field staff found additional housing units and individuals who were missing from both the census address list and the administrative records. In such instances, administrative records would not directly improve census coverage, but might assist in targeting areas that need special attention by field staff during follow-up operations.

1993 National Census Test III⁷³

Language was identified as a major barrier to enumeration in the 1990 census for a number of population groups. The 1993 National Census Test III, also called the Spanish Forms Availability Test, was conducted in October to study ways to improve census mailback response by targeting areas with a significant concentration of non-English speaking Hispanics. (In the 1980 and 1990 censuses, Spanish-language questionnaires were available to respondents who called and requested them and at Questionnaire Assistance Centers, but they had never been included as part of the initial mailout.)

The Spanish Forms Availability Test was a mailout/mailback survey of 24,000 housing units and the sample was divided into two strata. The first stratum consisted of areas of the country in which 15 to 30 percent of the households were linguistically isolated and Spanish-speaking.⁷⁴ The second stratum consisted of areas in which more than 30 percent of the housing units were linguistically isolated and Spanish-speaking.

Each stratum was divided into three treatment groups: a control (respondents were mailed an English-language questionnaire only), dual (respondents were mailed both an English-language questionnaire and a Spanish-language questionnaire), and bilingual (respondents were mailed one questionnaire with Spanish and English back-to-back). All groups received an advance notice letter, initial questionnaire package, reminder postcard, and a replacement questionnaire to nonresponding households.

A telephone debriefing interview was conducted with a sample of persons who returned a form to assess the reaction of Hispanics and non-Hispanics to receiving a Spanish-language form. In all, 3,402 interviews were completed between October and December 1993.

The Spanish Forms Availability Test mailout survey found that:

- Mailing a Spanish-language questionnaire (whether as a separate or a bilingual form) significantly improved mail completion rates to the targeted areas in which 30 percent or more of the housing units were classified as linguistically isolated, Spanish-speaking. There was no evidence that inclusion of the Spanish-language questionnaire improved mail response in the other test areas.

⁷³ Manuel de la Puente and Peter Wobus, U.S. Census Bureau, "Final Report of Results from Item Nonresponse Analysis for the Spanish Language Forms Availability Test," February 1995.

⁷⁴ For this test, a linguistically isolated household was defined from 1990 census records as one in which Spanish was spoken and none of the residents age 14 or over spoke only English or spoke English very well.

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- Neither of the two Spanish-language experimental treatments—the bilingual form or the dual form—significantly outperformed the other in improving mail response.

The telephone debriefing interview found that about 48 percent of Hispanic interviewees said that receiving a Spanish-language form was a “good idea” or said that they “did not think anything of it,” versus 38 percent of non-Hispanic interviewees. However, 12 percent of non-Hispanics said that it was a “bad idea,” compared with 1.3 percent of Hispanics.

1994 Survey of American Indian and Alaska Native Government Administrative Records

The 1994 Survey of American Indian and Alaska Native Government Administrative Records was developed to determine if use of the records maintained by the American Indian and Alaska Native governments could increase coverage in Census 2000.

A pretest was conducted prior to this survey in May 1994. The Census Bureau chose a number of tribal governments to participate in the pretest, based on the size of their American Indian/Alaska Native populations, geographic location, known use of computerized record keeping, and the type of government body (traditional government or Alaska Native Regional Corporations). The pretest was undertaken to:

- Determine if the questionnaire was clear.
- Determine if any of the questions placed an undue burden on respondents.
- Estimate item refusal rates.
- Determine the length of time required to complete and mail back the questionnaire booklet.

Following the pretest, 569 survey of American Indian and Alaska Native questionnaire packets were mailed on September 26, 1994. These packets included the questionnaire, a personalized cover letter addressed to each tribal leader, and an enclosure providing answers to questions concerning the study.

A follow-up of nonrespondent governments was made November 1, 1994. Follow-up mailings were sent both to tribal leaders and enrollment offices. The Census Bureau selected governments to receive follow-up mailings based upon each tribe’s interest in having its administrative records used for improving census coverage, the regional location of the tribal governments, and the number of members represented by the tribe’s government. Governments that had not responded to the initial mailout or follow-up by November 18, 1994, received a telephone call.

In all, 234 questionnaires (40.4 percent) were returned. The response rate for the lower 48 states (49.8 percent) was higher than that for Alaska (27.6 percent). Response rates increased according to the size of the tribe’s enrollment. American Indian and Alaska Native governments representing 5,000 or more members had an average response rate of 83.8 percent. Governments representing 500 members or less had an average response rate of 44.4 percent. Responses from Alaska Native governments averaged 57.1 percent for the largest governments and 24.2 percent for the smallest.

Of the 234 returned questionnaires, 226 tribal governments (97 percent) maintained some form of tribal enrollment record. Approximately three-quarters of these records were stored within computer-based record-keeping systems. The survey found that 85 percent of the tribal governments included both member residents and member nonresidents on their tribal rolls; less than 5 percent limited their recording to resident members.

The majority of tribal governments reported that they had updated their tribal enrollment records. Seventy-five percent stated that updates were made when changes were reported. A small number reported that their records were updated on a monthly or annual basis, while others updated their records at some other frequency.

The Census Bureau determined that the addresses contained in the computerized tribal enrollment records of the American Indian and Alaska Native governments could increase census coverage for Census 2000. However, the lack of computerized records for 40 percent of the American

Indian and Alaska Native populations living on reservations or trust lands could prove to be a serious drawback. Although respondents reported that some effort was made to update tribal records, the findings lacked an evaluation of the completeness, accuracy, or timeliness of the data. If the records were determined to be useful for increasing Census 2000 coverage, the Census Bureau would need to obtain the cooperation of the tribal governments. In the past, such arrangements with tribal governments have proven both costly and time-consuming.

Because the use of tribal records was viewed as a valuable tool for more accurately counting American Indian and Alaska Native populations, the Census Bureau proposed several actions to determine the usefulness of these records for Census 2000. These proposals (many of which were tested in the 1996 Community Census) included:

- Selecting one or more of the larger tribes that did not have computerized records to discuss the feasibility of computerization.
- Visiting a sample of tribes to help learn what they meant by “updating” and develop some understanding of the difficulties involved in collecting tribal-roll data.
- Investigating the desirability and feasibility of a program through which the Census Bureau would set a deadline for each participating tribal group to commit to updating its tribal rolls. This investigation would include determining the resources and funding necessary for updating and assessing the extent to which the Census Bureau would participate in the project.
- Exploring the quality of the information on the tribal rolls.
- Exploring the desirability and feasibility of providing the properly sorted tribal records to the census processing sites for use in matching once the questionnaires were received from local offices.
- Enlisting the tribal officials and others who were responsible for completion of the survey questionnaire as a “body of experts.” This group could be asked to react to proposals, provide insights on proposed activities, and in the process, develop a working relationship with Census Bureau staff.
- Considering conducting a test census involving a limited number of tribes that would utilize tribal records to improve coverage.

1994 National Census Test I⁷⁵

The 1994 National Census Test I, or Coverage Test, was conducted in January 1994 to identify a household rostering method that would maximize within-household coverage and minimize enumeration error. It focused on inadvertent respondent roster errors that stem from the respondents’ misunderstanding the residence rules and thus erroneously including or excluding some household members.

The Coverage Test was a mailout/mailback national sample survey of 44,000 housing units. Like the Simplified Questionnaire Test, Implementation Test, Mail and Telephone Mode Test, and Appeals and Long-Form Experiment, the Coverage Test sample was divided evenly between two strata consisting of low-response areas and high-response areas in the 1990 census. Within each stratum, the sample was allocated equally to two panels, reflecting the two experimental treatments. All housing units received an advance notice letter, initial questionnaire, and reminder postcard; nonrespondents to the initial form also received a replacement questionnaire.

A subset of 18,200 responding housing units received a telephone follow-up reinterview, which identified respondent roster errors and facilitated the comparison between panels of gross coverage error (that is, the sum of people erroneously included in and those erroneously excluded from the household).

⁷⁵ U.S. Census Bureau, “1994 National Census Test Overview,” October 1993.

Two experimental forms were developed for the Coverage Test, one for each panel. The first form used the 1990 census rostering approach with minor content and format modifications. The second form tested an extended roster method by expanding the boundaries of who should be included. To identify people counted at the residence because of the less restrictive rostering approach, four screener questions were added to determine who should not be counted, rather than allowing the respondent to make this determination.

The Coverage Test found that:

- Both forms had small gross error rates, indicating that both were effective in producing an accurate roster.
- There was no significant difference between the two panels in gross error rates, average household size, and the average number of residents obtained from the initial roster question.
- Both the coverage questions on the modified 1990 form and the roster probes on the extended roster form produced high rates of misclassification of residence status and would need revision if they were to be tested further.

1994 National Census Test II⁷⁶

The 1994 National Census Test II⁷⁷ was conducted in March to study telephone enumeration of nonrespondent households. Telephone interviews were conducted with a sample of nonrespondents to the 1994 National Census Test I (Coverage Test) mail questionnaire. Nonrespondents' addresses from the Coverage Test were submitted to a vendor to obtain telephone numbers, and the inhabitants of a sample of these housing units were given a telephone interview.

During the 1990 census, data collection from nonrespondents was conducted primarily by personal visit—a costly and labor intensive operation that presented challenges in hiring, training, and control. The 1994 National Census Test II sought to determine if telephone enumeration was effective, thus allowing more flexibility in the nonresponse follow-up implementation strategy.

The results of the 1994 National Census Test II were as follows:

- An estimated 48 percent of nonresponse cases for which a telephone number was obtained completed a questionnaire by telephone interview.
- The sample for the test was allocated among two strata—high and low coverage areas. There was not a significant difference in the percentage of completed interviews between strata; however, there was a significant difference in the percentage of refusals, disconnected telephone numbers, and language problems. The high coverage strata had a higher refusal rate, but the low coverage strata had a higher percentage of disconnected telephone numbers and language problems.
- A telephone number was obtained for 18.4 percent of the nonresponse addresses from the 1994 National Census Test I (Coverage Test). For the high coverage and low coverage strata, a telephone number was obtained for 26.6 percent and 17.6 percent of nonresponse addresses, respectively.
- The refusal rate (calculated using refusals plus completed interviews as the base) was estimated at 31.2 percent in the high coverage strata and 24.6 percent in the low coverage strata.

⁷⁶ Kent Wurdeman, U.S. Census Bureau, "National Census Test II Final Evaluation Report," June 1994.

⁷⁷ The test originally was considered phase two of the Telephone Matching Study. Phase one addressed the issues of availability and accuracy of the telephone numbers in vendors' files. For phase one, 135,000 addresses were sent to a commercial vendor (MetroNet) to obtain telephone numbers for the addresses that matched to their file. The addresses represented a sample of housing units on the 1990 census address file that were included in previous national census tests (the Simplified Questionnaire Test, the Implementation Test, the Appeals and Long-Form Experiment, and the Mail and Telephone Mode Test). A subsample of addresses with telephone numbers was selected and a brief telephone interview was conducted to verify the accuracy of the telephone number provided for the address. For more information, see Kent Wurdeman, U.S. Census Bureau, "Telephone Matching Study: Final Evaluation Report," DSSD 2000 Census Memorandum Series, #E-83, May 2, 1994.

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- The item nonresponse rate was negligible for all items except the “tenure question” in the low coverage strata. About 4 percent of the respondents in the low coverage strata were unable to answer this question.

1994 Address System Information Survey

The 1994 Address System Information Survey was conducted in September 1994, to determine the prevalence of non-city-style addresses throughout the nation and the likelihood that these addresses might be converted to city-style addresses prior to Census 2000.⁷⁸ Current information on the extent of non-city-style addresses and the timing of their expected conversion was needed to determine how to handle these addresses in the Census 2000 master address file. Non-city-style addresses presented problems in past censuses as many of them were difficult to locate and required more time for follow-up operations. (Since the 1990 census, many areas converted to city-style addresses to support local Enhanced 911 emergency programs and to facilitate mail delivery.)

The Address System Information Survey was a telephone survey of government personnel in counties—and minor civil divisions (MCDs) in the New England states, Pennsylvania, and Michigan—in which fewer than 95 percent of residential addresses were city-style addresses. The universe encompassed approximately 4,300 counties and MCDs. For purposes of analysis, the MCDs were combined into their county entities.

The telephone survey form was a single page that asked for information about the extent of city-style addresses in the government’s jurisdiction. If the government official indicated that some or all of the jurisdiction contained non-city-style addresses, he/she was asked if there were any conversion plans to city-style addresses and the time frame for establishing such a system.

The Address System Information Survey revealed that:

- In September 1993, 41 percent of all counties in the survey universe had city-style addresses for at least 95 percent of their residential addresses.
- Countywide city-style addresses were expected to be in place in 73 percent of all counties in 1997 and 78 percent of all counties in 1999.

1995 CENSUS TEST

While the tests that the Census Bureau conducted between 1992 and 1994 were used to understand the effects of individual changes to the census questionnaires, the agency still needed to determine how each of the changes would work in aggregate. The 1995 Census Test allowed the Census Bureau to integrate its plans to introduce: (1) new uses of sampling and estimation; (2) new procedures to reduce the undercount; (3) new avenues for greater cooperation; (4) new uses of technology; and (5) new methods for collecting long-form data (see Table 2-4).

These five categories of change were based on the Census Bureau’s basic strategies for conducting Census 2000. These strategies (building partnerships, simplifying forms and response procedures, using technology intelligently, and increasing the use of statistical methods) were at the center of its efforts to redesign the census.

Four sites (three urban and one rural) were initially proposed for the 1995 Census Test. Of these four, three were chosen:⁷⁹ Oakland, CA; Patterson, NJ; and a grouping of six parishes—De Soto, Red River, Bienville, Jackson, Natchitoches, and Winn—in northwest Louisiana.

These sites were chosen based on the goals of the test, budgetary considerations, and site-specific criteria including the mixture of minority groups in the area and the type of mail delivery (city-style delivery versus non-city-style). These and other characteristics were associated with the differential undercount. All sites shared the common thread of having poor mail response rates in

⁷⁸ Non-city-style addresses are those with no house number or street name, such as rural route/box number, post office box number, and general delivery addresses.

⁷⁹ New Haven, CT, was proposed as a third urban site, but dropped due to budgetary constraints before the test began.

the 1990 Census. Table 2-6 summarizes several of the significant characteristics of the sites selected for the 1995 Census Test.

Table 2-6.
Values of Selected Variables Used to Choose Urban and Rural Sites for the 1995 Census Test

Criteria	Urban sites	Rural sites
Total housing units	50,000 (Oakland, CA) 175,000 (Patterson, NJ)	50,000
Racial/Ethnic population:		
Black	15% or more	6% or more
Hispanic	12% or more	3% or more
Asian/Pacific Islander	4% or more	1% or more
American Indian/Alaska Native*	—	—
Multi-unit structures (with a predominance of structures with 2–9 housing units)	37% or more	7% or more
Poverty status	13.1% or more	13.1% or more
Response rate	63% or less	63% or less
Rental units	38% or more	16% or more

* No criteria are shown for the American Indian/Alaska Native populations because the Census Bureau planned to refine the design of the Census 2000 plan for these populations after the 1995 Census Test.

New Sampling and Estimation Procedures

The 1995 Census Test studied the use of sampling and estimation procedures to reduce the differential undercount and the cost of the census. The test compared housing unit and block samples using statistical techniques and administrative records to reduce the differential undercount. It also estimated the number and types of persons missed by the enumeration at the time census operations were underway, enabling the Census Bureau to identify methods for increasing coverage and reducing costs.

The Census Bureau also evaluated two alternative sampling methods for enumerating the nonresponse universe, “truncation” and “direct” sampling. Truncation was a procedure by which the Census Bureau chose a minimum response threshold that it would reach through a combination of mail returns and (if necessary) follow-up operations. Once the threshold level was met, a sample would be taken from the universe of the remaining nonrespondents and would be used to establish an estimate of the number of nonresponding households. For the 1995 Test, the Census Bureau established a threshold of 90 percent, and sampled the remaining nonrespondents at a rate of 1-in-10.

For direct sampling, on the other hand, the Census Bureau allowed respondents a specific amount of time to respond. After the cut-off date for the mailout/mailback phase, a sample of the nonresponding universe was selected for enumerator follow-up. The Census Bureau selected enough units in each county to reach a 90 percent response rate.

Analysis of the test results supported the use of a housing-unit sample (rather than a block sample) design for nonresponse follow-up (with oversampling of long forms to ensure content quality) for the following reasons:

- There was no evident difference in coverage or the quality of estimates between the two methods.
- At lower levels of geography, the use of the block as the sampling unit resulted in a sampling error rate that was three times greater than that for the housing unit design.
- There was no projected cost difference between the truncated and direct sampling designs.
- For the direct sampling design, the cost of using a housing unit sample was about 6 percent more than a comparable block unit sample.
- The housing unit design resulted in a lower sampling error rate at lower levels of aggregation.

The 1995 Census Test results suggested that direct sampling would be preferable to the truncation method for enumerating the nonresponse universe (with oversampling of long forms to protect content data quality) because:

- Field data collection costs were significantly higher for truncation with a 90 percent threshold than for other methods. Costs for a 70 percent truncation, direct sampling with no long-form oversampling, and direct sampling with long-form oversampling were all relatively comparable.
- Direct sampling and truncation methods yielded comparably reliable measures, both at the tract and site levels.
- Field data collection management can be more easily controlled and implemented using direct sampling. Truncation is more difficult to manage since it splits nonresponse follow-up into two separate operations.

Sampling and estimation to correct for net-coverage error. The Census Bureau has used coverage measurement surveys to evaluate the accuracy of population figures since the 1950 census. However, integrating data from the coverage evaluation program into the calculation of census population counts was first accomplished during the 1995 Census Test. Agency officials were concerned about integrating coverage measurement into Census 2000, because it was not clear it could be completed by the December 31 deadline for delivering apportionment counts to the President. This test included the implementation and evaluation of the Census Bureau's Integrated Coverage Measurement (ICM) process.⁸⁰

The 1995 Census Test compared two basic estimation methods for integrated coverage measurement, CensusPlus and dual system estimation (DSE).⁸¹ Obtaining a valid estimate requires that the raw data flowing into the final estimation are correct. Once the data have been collected, one of the most important requirements for estimation was measuring and correcting the differential undercount. The 1995 Census Test evaluated the assumptions of both estimation methods to be sure that each used reliable data to generate its final figures and evaluated how well each corrected for the differential undercount.

CensusPlus and DSE both used data collected on census questionnaires and in the ICM survey to generate their estimates. The ICM required creating an independent list of the housing units in the sample blocks to be developed before the census. By comparing this independent list with the master address file and reconciling the differences, the Census Bureau was able to create an enhanced housing list that could be used during the ICM interviewing, which began at the end of nonresponse follow-up. The interviews used computer-assisted personal interviewing (CAPI)⁸² to develop household rosters for the ICM that were independent of the rosters gathered during the census. Once an independent roster had been generated, the CAPI system compared it to the one from the census, and the interviewer was instructed to reconcile any discrepancies between the two. The resolved rosters were reviewed and subjected to "unduplication" at the National Processing Center in Jeffersonville, IN.

On August 17, 1995, the data generated to this point were used as the basis for the CensusPlus estimator. For DSE, on the other hand, the Census Bureau had to complete further office processing and field work. For the DSE, the Census Bureau used the independent rosters from the ICM as

⁸⁰ Integrated Coverage Measurement combines estimates of missed persons with enumeration results before producing a single set of official census results. The program (and the use of this technique) was cancelled following the 1999 Supreme Court ruling that the Census Act prohibits the use of sampling to apportion seats in the U.S. House of Representatives.

⁸¹ Comparison of CensusPlus and DSE focuses on the fact that they have different underlying assumptions. CensusPlus estimation is based on the assumption that the ICM finds the "truth" in the sample blocks, the truth being the resolved rosters from the field reconciliation. The DSE assumes the independent roster collected during the independent part of the ICM interview is another independent list, but not necessarily the "truth." The DSE estimates people on neither list while CensusPlus finds them through the reconciliation process during the interview. The two estimates of the additional people are the basis of comparison between the two methodologies. For more information, see Mary H. Mulry and Rajendra P. Singh, "New Applications of Sampling and Estimation in the 1995 Census Test," *Proceedings of the Survey Research Methods Section, Exploring Fundamental Change: The 1995 Census Test*, Vol. XXIII, American Statistical Association, 1994, pp. 742–47.

⁸² Computer-assisted personal interviewing (CAPI) involved an enumerator completing a personal enumeration of a household using an electronic survey (and laptop computer) that collected the same information as that requested by the paper questionnaire.

the population sample (P sample) and the rosters from the census questionnaires as the enumeration sample (E sample). After computer and clerical matching of these two rosters, Census Bureau employees followed up unresolved cases in the field. These additional operations provided the rosters to be used for the DSE. Data for the DSE were ready by October 5, 1995.

The ICM evaluation revealed that DSE performed better than CensusPlus, because it resulted in increased estimated counts for some traditionally undercounted groups, primarily Blacks and renters, while CensusPlus did not. Both DSE and CensusPlus produced increased estimates of Hispanics, but only the former resulted in increased estimated counts for Asians and Pacific Islanders. The poor performance of CensusPlus appeared to be related to the accuracy of the regular census rosters and to problems with the design of the computerized questionnaire the ICM enumerators used. Dual system estimation also was superior for the following reasons:

- The CensusPlus adjustment factor for the post nonresponse follow-up estimate was less than 1.0 for all but 3 of the 14 post-strata for Blacks in Oakland, CA, and for all but one of the Black post-strata in Patterson, NJ, while the DSE adjustment factor for all these post-strata was greater than 1.0.
- CensusPlus added only 6.1 percent of the number of people added by DSE after nonresponse in Oakland, CA, and only 25 percent of those added by DSE for Patterson, NJ.
- The relative pattern in the differential rates of additions for the 1995 DSE across race/ethnic subgroups coincided with the 1990 differential undercount rates, while the pattern produced by CensusPlus was discordant with the 1990 differential undercount rates.
- The relative pattern of additions of persons to block clusters by DSE matched the Census Bureau's indicators (taken from the 1990 post-enumeration survey) for the difficult to enumerate, while CensusPlus did not.

While DSE generally was superior to CensusPlus, the key to achieving the best DSE results was a low noninterview rate. The lower the noninterview rate, the higher the accuracy of the estimate. A large noninterview rate (14 percent) caused a downward bias in the 1995 Census Test results. The Census Bureau found that methods that compensated for noninterviews did not work as well for a high noninterview rate as they did for a low noninterview rate, ideally less than 2 percent.

New Procedures to Reduce the Undercount

The 1995 Census Test provided an opportunity to try key operational components of the Census 2000 plan, several of which were designed to reduce the differential undercount:

- Simplified questionnaire and multiple mail contacts
- Improved rosters and coverage questions
- Initial mailout of Spanish-language questionnaires
- Increased availability of census questionnaires
- Targeted enumeration methods
- Counting the homeless population through service-based enumeration and special place enumeration
- Administrative records

Simplified questionnaires and multiple mail contacts. The 1995 Census Test provided the first opportunity to test a new mailing procedure in the census environment—mailing questionnaires to housing units in 4 stages. In preparation for the test's March 4, 1995 Census Day, prenotices were sent on February 27 to inform the households that the census questionnaire was coming. Two days later, on March 1, the questionnaires were mailed. On March 6, reminder notices that also served as a thank-you note were sent. Finally, a second questionnaire was mailed between March 20 and March 27 to all households for which a completed questionnaire had not been received.

March 29 was selected as the cutoff day for initial response for Oakland, CA. (March 27 was used in Patterson, NJ.) The Census Bureau chose the cutoff date by determining when response from the replacement questionnaire began. Mail response rates increased in both Oakland and Patterson as a result of mailing the replacement questionnaire. In Oakland, the rate increased by approximately 10.4 percent and in Patterson the increase amounted to 9.9 percent. (Response rate increase was calculated by subtracting the initial mail response rate from the final mail response rate.) Though the Census Bureau feared that incorrectly delivered questionnaires from multiunit structures might lead to significant duplication, the duplication rates were 1.7 percent for Patterson and 0.7 percent for Oakland.

In addition to multiple mail contacts, the Census Bureau used an easy-to-complete questionnaire. Previous tests had shown that the mail response increased substantially when questionnaires were easier to understand and complete. An increase also occurred when notifications were sent to alert and remind respondents to complete and return the questionnaire.

Improved rosters and coverage questions. The Census Bureau used revised questions to ensure a complete listing (or “roster”) of household members. The questionnaire used in the 1995 test included a roster question and coverage questions designed to include the correct members of the household and to let the respondent “correct” any mistakes he/she may have made. A new “usual home elsewhere” question allowed respondents to identify individuals and entire households who usually resided at another address.

Coverage edits, which included a clerical review and a telephone follow-up (if necessary), revealed that at least 1 of every 10 questionnaires failed the review. An evaluation revealed numerous problems associated with the coverage questions. The main problem appeared to be that respondents misunderstood either the “usual home elsewhere” question, or the instructions, or both.

Initial mailout of Spanish-language questionnaires. The Census Bureau mailed Spanish-language questionnaires (in addition to English-language questionnaires) to blocks with a high concentration of Spanish-speaking households. This test indicated that there were no significant operational difficulties associated with mailing a Spanish-language questionnaire to households in targeted areas. In addition, the quality of data on the Spanish-language questionnaires was comparable to the quality of those completed in English. In the areas in both Patterson, NJ, and Oakland, CA, that received Spanish-language questionnaires, approximately 60 percent of respondents returned the Spanish version. This trend held true across varying levels of linguistic isolation.⁸³ The results suggested that linguistic isolation alone was not a reliable predictor of where Spanish-language questionnaires would be used most extensively.

Increased availability of census questionnaires. The “Be Counted” Campaign made unaddressed and ungeocoded questionnaires available to people who (1) did not receive an addressed census questionnaire; (2) believed they were not counted; and/or (3) had traditionally been undercounted. Be Counted questionnaire displays were set up at a variety of convenient, easily accessible locations that were divided into three basic categories:

- Generic locations, such as U.S. Post Offices, departments of motor vehicles, libraries, and city halls. The toll-free Telephone Questionnaire Assistance number was included as a Be Counted site because it was so widely publicized.
- Businesses, facilities, and easily accessible spaces frequented by population groups less likely to have received an addressed questionnaire. These “targeted locations” included grocery/convenience stores, laundromats, restaurants/carry-outs, clinics, arcades, and churches.
- Other locations, such as Questionnaire Assistance Centers and service-based enumeration locations such as food pantries, clothing distribution sites, and health care facilities for persons without a usual residence.

⁸³ A linguistically isolated household is a household in which all members 14 years old and over speak a non-English language and also speak English less than “very well” (have difficulty with English). All the members of a linguistically isolated household are tabulated as linguistically isolated, including members under 14 years old who may speak only English.

The Be Counted package consisted of an outer envelope imprinted with a site specific message, the Be Counted questionnaire, and a return mailing envelope addressed to the Census Bureau's National Processing Center (NPC) in Jeffersonville, Indiana.

A total of 4,596 people were enumerated on Be Counted forms for all three test sites. A majority of the Be Counted forms that were returned from targeted and other distribution sites represented, on average, larger households than those received from generic sites. These households also were larger than the average that was reflected in the 1990 census at these sites. The people included in this total resided in 1,696 housing units; 57.1 percent were renters and nearly half lived in multiunit structures. As a result of the Be Counted campaign, 176 housing units were added to the master address file for the three test sites. The toll-free number was particularly effective in collecting Be Counted information at the urban sites as more than 42 percent of the people enumerated on Be Counted forms initiated the interview by telephone. The 1995 Coverage Study demonstrated that 96.4 percent of households in a sample of Be Counted questionnaires had been correctly enumerated.

Targeted enumeration methods. Special methods were tested to target geographic areas and populations that were historically undercounted. The 1995 Census Test studied the following enumeration techniques where there were barriers to enumeration, such as unusual housing situations, mobile populations, or linguistically isolated groups:

- “Blitz” enumeration, which used a group of enumerators to canvass a particular area or location simultaneously to reduce the amount of time needed to complete the enumeration, was found to be very effective.
- Paired enumeration used two enumerators to visit households in areas where there were safety concerns. The evaluation concluded that although paired enumeration alleviated concerns about safety, it was also associated with a reduction of productivity (when compared to two enumerators working separately) and the refusal of some enumerators to work alone.
- Use of local facilitators (local residents or other knowledgeable people who helped census takers canvass and enumerate households) was effective when problems arose.
- No advantage over mail enumeration was found when urban update enumerate was used at the Oakland, CA, site. This operation was used in areas of Oakland where the Census Bureau thought the U.S. Postal Service might have problems delivering the questionnaires and where low mail response rates were expected. The enumerator updated the address list and enumerated the households in the same visit.
- Placement of Questionnaire Assistance Centers in multiunit structures and community-based organizations.
- Gender diverse promotional materials directed at specific population groups were not as effective as those targeting specific neighborhoods.

Service-based and special place enumeration. The 1995 Census Test tried a new approach to enumerating people with no usual residence—counting them at the places where they used services, such as at shelters and soup kitchens. Relying on many sources (e.g., local governments, the Federal Emergency Management Agency [FEMA], state homeless coordinators, and state representatives from private coalitions), the Census Bureau developed a list of service providers for each test site.

The initial service-based enumeration began at shelters on the evening of March 6, 1995, and used regular group quarters enumeration procedures. “Usual home elsewhere” information was collected for evaluation purposes. Enumerators conducted a complete enumeration of soup kitchens on March 7, 1995. Respondents at these locations were counted in the block where the services were located, unless an address for a usual home elsewhere was provided. While the Census Bureau planned for two follow-up enumeration visits, budget constraints allowed for only one,

conducted on March 8 for shelters and March 9 for soup kitchens. The data collected during the follow-up visits were not included in the count for the 1995 Census Test.⁸⁴

Service-based enumeration methods proved to be promising. In Oakland, CA, 937 people were tabulated, 72.7 percent of whom were enumerated in soup kitchens. In Patterson, NJ, 263 people were tabulated (73.3 percent in shelters). In northwest Louisiana, 2 people were counted at shelters and 9 at soup kitchens.

In addition to testing new methods for counting the homeless population, the 1995 Census Test provided an opportunity to assess alternative methods for conducting extensive field operations associated with special places. The Facility/Transient Locations Questionnaire Operations were successfully implemented and evaluated during this test. These two telephone operations replaced the 1990 census special place prelist program, an expensive, labor-intensive field operation that resulted in major quality problems. During the initial facility questionnaire operation, staff at Census Bureau headquarters telephoned approximately 832 special places to collect administrative information, update existing data, identify group quarters and housing units, and assign group quarters type codes. Even though the questionnaires were difficult to understand, this operation was a success.

Administrative records. The 1995 Census Test allowed the Census Bureau to study whether an administrative records database would improve census results. The Census Bureau believed that this database could potentially be used to improve the census address list, obtain information on nonrespondents, and improve coverage measurement methodologies. One possible benefit was that such a database might include information about people who were not counted in the census. Obtaining files that included population groups that the census tended to undercount might provide some of the supplemental data necessary to reduce the differential undercount. This test also studied the kinds of pitfalls involved in using these records.

The 1995 Census Test Administrative Records Database contained both geographic and demographic data for the three test sites. The database incorporated information from sources such as the federal government, state and local governments, and commercial vendors. A match of the database to various 1995 Census Test files allowed for an initial evaluation of this approach.

Of the three sites, administrative records from Oakland, CA, produced the most successful match to census address (64.3 percent). The match rates in Patterson and Louisiana were 29.2 percent and 24.3 percent, respectively. Addresses of people found on two or more administrative files had better match rates to census files than those found on only one file. Multiple source administrative addresses matched at a rate of 61.3 percent to the decennial master address file, compared with 22.7 percent of the single source addresses.

The 1995 Census Test Administrative Records Database provided mixed quality results. Even though it showed promise in improving census results, its weaknesses confirmed that much work was required before administrative records could be used to improve coverage or fill in missing characteristics of individuals in a census environment. While the 1995 Census Test Administrative Records Database successfully provided information that would reduce the undercount for Blacks, it did little to reduce the undercount for Hispanics. Difficulties also were encountered when using the database to determine race, sex, age, and Hispanic origin.

New Avenues for Greater Cooperation

The 1995 Census Test provided an opportunity for the Census Bureau to evaluate basic facets of its partnership program. The Census Bureau planned to develop cooperative ventures and form partnerships to take the census with other federal agencies, state, local, American Indian tribal, and Alaska Native village governments, and with private and nonprofit organizations. The agency also assessed the initial efforts to construct and maintain a master address file and update the automated geographic file in cooperation with the U.S. Postal Service and state, local, American Indian tribal, and Alaska Native village governments.

⁸⁴ For a complete account of why these data were not included in the count for the 1995 Census Test, see David L. Ferraro, "Estimation in the 1995 Census Test Service Based Enumeration," *Proceedings of the Survey Research Methods Section*, American Statistical Association, 1996.

Developing Cooperative Ventures

The Census Bureau planned to use partnerships with governmental and nongovernmental organizations to educate the public about the census. “Partner” organizations collaborated with the Census Bureau to plan enumeration activities, develop and review the address list, recruit people to work on the census, and design and implement outreach and promotional activities.

The goal of the partnerships program in the 1995 Census Test was to develop the best approach and procedures for including local governments in the Local Update of Census Addresses (LUCA) program,⁸⁵ administrative record acquisition, and outreach and promotion.

The partnership program yielded four significant positive results. First, it led to improvements in the data in the master address file. Second, it provided an opportunity for the Census Bureau to procure, use, and process a variety of federal, state, and local administrative records. These files demonstrated a need for improved standards for machine-readable file structures and for address sources. Third, the agency built cooperative relationships with the local citizens who distributed promotional posters and flyers and used their familiarity with the local area to promote census awareness and participation. Finally, partnership participants secured cooperation and assistance from local officials that otherwise might not have been attained.

While the successes of the partnership program were encouraging, several aspects needed further improvement. In general, the Census Bureau needed to:

- Find better ways to reach, communicate with, and support local governments.
- Pay greater attention to educating local governments and organizations about the Census Bureau and its purpose.
- Provide better instruction, training, and reference materials.
- Develop better standards on file structure and address sources when collecting administrative records.
- Provide local officials with compatible file formats and better maps to enable them to more effectively participate in the LUCA program.
- Ensure that critical work was completed on time and supported the regional offices in their efforts (such as collecting administrative records) which required processing a large number of diverse files.

Development of a master address file (MAF). The Census Bureau created a permanent national address list that was updated continually and was used by several Census Bureau programs, including the decennial census. The 1995 Census Test provided an opportunity for further research on compiling and maintaining the master address file (MAF) and updating the TIGER® System in cooperation with the U.S. Postal Service (USPS) and state, local, and tribal governments. The MAF was developed using the USPS’s delivery sequence file (DSF) and the 1990 census address list. The 1995 Census Test included three operations to improve the completeness of the MAF:

1. Precanvass, in which enumerators went into the field and verified or updated the addresses listed in the precensus MAF and verified/corrected block assignments (i.e., geocoding).
2. Local Update of Census Addresses (LUCA) invited local officials to review and update the precensus MAF for their areas.
3. Census Address Check, in which USPS letter carriers reviewed and corrected the precensus address list.

⁸⁵ The addresses provided by the Census Bureau are confidential according to Title 13 of the U.S. Code. The Census Bureau offered an Address List Review Opportunity as part of the Local Update of Census Addresses (LUCA) program in response to Public Law 103-430, the Census Address Improvement Act of 1994. For more information, see Chapter 11, “Legal Issues.”

Both the prec canvass operation and LUCA improved the completeness of the MAF at urban sites. The updating operations revealed that a majority of the housing units on the precensus MAF were unchanged by the prec canvass. The operations deleted more addresses than they added, indicating that the precensus address file included too many addresses. This finding was expected since all the test areas had experienced limited growth.

U.S. Postal Service identification of vacant housing units. The 1995 Census Test provided an opportunity to evaluate how well USPS vacant and nonvacant returns identified vacant housing units. The evaluation compared the USPS classification of these addresses to the results from non-response follow-up and the Integrated Coverage Measurement program in the urban test sites. The evaluation revealed that the USPS did not identify a large number of vacant units at both sites and that many addresses identified as vacant were occupied. A small percentage (between 2.0 and 5.2 percent) of questionnaires that came back as vacant postmaster returns were from addresses that were classified as vacant on the USPS delivery sequence file. The low percentage was the result of a USPS rule that an address must be vacant for 90 days or more to be classified as vacant. The analysis of nonvacant postmaster returns in Oakland resulted in 38 percent being classified as occupied and 30 percent as vacant during nonresponse follow-up. The remaining 32 percent were classified either as deletes or had no status assigned by nonresponse follow-up enumerators. The results of this test showed the necessity of conducting a vacant postmaster return follow-up.

New Uses of Technology

Advanced technologies to contact persons or to allow them to contact census offices.

The 1995 Census Test became the vehicle for testing various computer-assisted survey information collection technologies for use in the census. Integrated Coverage Measurement interviewers used computer-assisted personal interviewing (CAPI) to conduct their interviews. In addition to responding by mail to the census, respondents could call and give their census information to a computer-assisted telephone interviewing (CATI) operator. The CATI instrument was designed in English and Spanish; bilingual interviewers handled calls from English, Spanish and Asian language speakers and a telephone device for the deaf was offered.

As a result of the test, the Census Bureau decided that it needed to find additional sources for telephone numbers and that CATI should be considered the primary method for contacting nonrespondents during nonresponse follow-up; personal visits would be reserved for households that could not be reached by telephone. To improve productivity, nonresponse follow-up calls should be concentrated on weekend days. In addition, there should be one uniform version of Telephone Questionnaire Assistance for both rural and urban areas. The Census Bureau also needed to find ways to encourage respondents, particularly those requesting forms, to use an interactive voice recognition (IVR) system, rather than speaking to an operator. However, because no IVR was available for testing during the 1995 Census Test, the agency recommended further study.

Innovative data-capture methodologies and processing systems. In past censuses, the agency relied on a data capture system that required photographing census questionnaires, processing film, and keying written responses by hand. The new system (evaluated during the 1995 Census Test) produced digital images of every questionnaire and used optical mark and character recognition software to capture the information on completed questionnaires. Keying from image also was used when the recognition technology was unable to interpret entries on the questionnaires.

One focus of the 1995 test was to determine the quality of these alternative data capture modes and to identify parts of the process that needed improvement. The optical character recognition system interpreted all write-in entries and provided a confidence index for each. The results showed that 42 percent of the write-in responses had acceptable confidence levels. However, 5.2 percent were read incorrectly by the optical character recognition system. The optical mark recognition system read 95 percent of the data with an acceptable confidence level, while 1.5 percent were read incorrectly. Five percent of the data were read at an unacceptable confidence level. The

overall error rate for the optical mark recognition system was 4.2 percent. Nearly half (45.3 percent) of the errors that were read as acceptable by the optical mark recognition system were cases in which a respondent scratched out one response and marked another box.

The test also evaluated the success of the keying operation. Of the questionnaires that the data capture system could not interpret, some were keyed from the paper questionnaire and some from the scanned image. The results indicated that the paper keying provided generally better quality results than keying from the image (1.3 percent field error rate for paper keying versus 1.9 percent for image keying). However, the quality of the scanned images was excellent and the difference in error rate may have been due to operational, staffing, and procedural factors.

Fully automated matching. The Census Bureau planned to automate the matching operation for Census 2000. The 1995 Census Test provided an opportunity to test how well the geographic coding software identified duplicate responses from the same address. While only two variables were used for matching (age and sex), the results of the 1995 Census Test suggested that more variables should be used to make the matching operation more discriminating.

For Census 2000, the Census Bureau planned to assign geographic codes, or geocodes, to addresses; this process involved linking addresses to geographic units. For geocodes to be assigned accurately, the Census Bureau needed to create a unique reference to each address geographically or spatially using the Topologically Integrated Geographic Encoding and Referencing (TIGER®) system. One component of automated geocoding was automated matching.

The automated matching and geocoding worked very well—94 percent of the computer-assigned geocodes agreed with an enhanced address list produced independently for evaluation purposes. After reviewing the 6 percent of cases that did not match and removing cases that resulted from systemic errors, such as deficiencies in the TIGER® database, the geocoding software successfully matched at least 99.7 percent of the addresses. The most significant problems with automated matching software were how to handle missing data, how to define matching parameters, and how to determine cutoff weights for classifying addresses as matched or not matched.

New methods for collecting long-form questionnaire data. The Census Bureau experimented with collecting long-form (sample) data using multiple data-collection forms during the 1995 Census Test. This test used three versions of the sample form: an abbreviated version with 16 questions, a 37-question version, and a comprehensive 53-question version. Results from the test showed that total response rates decreased significantly as the length of the form increased. However, the rate decrease leveled off between the medium length and the longest version. The reduction in the overall response rate appeared to depend on the number of questions added, the overall number of questions, the number of pages the questionnaire contained, and the increase in the weight of the form.

The 1995 Census Test also tested the placement of the housing questions and the 100 percent and sample person questions on the form. The results showed that placement of the housing unit questions with Person 1 and combining the 100 percent and sample person questions did not affect the person data differently among the forms. Therefore, the redesigned questionnaire could be used without the loss of person data and without an increase in the number of questionnaires requiring either edit follow-up or imputation.

1995 Census Test Results and Summary

The 1995 Census Test provided information the agency needed to make decisions for Census 2000. Analysis of the test data also suggested promising directions for future research. Among the key findings and conclusions were:

- The new techniques being used to create the census address list were substantially better than past attempts. Census Bureau staff learned to work with local officials to develop address lists, identified some areas that needed further refinement, and highlighted operations that could be dropped without reducing the quality of the master address file.

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- Confirmation of the importance of developing partnerships, especially at the local level. The challenge was to build these partnerships without placing an undue burden on the Census Bureau.
 - The agency continued to refine the full mail treatment consisting of a prenotice, questionnaire, reminder/thank you card, and a second questionnaire. Because questions remained about the feasibility of mailing the second questionnaire to all nonresponding housing units, the Census Bureau planned to explore the possibility of mailing a second questionnaire to every address regardless of initial response rates in targeted areas.
 - Service-based enumeration showed great promise for counting the population without a usual residence.
 - The Facility/Transient Locations questionnaire operations successfully replaced the labor-intensive and costly special place prelist operation. These operations were converted to a computer-assisted telephone interview for use in the Census 2000 Dress Rehearsal and were further refined for Census 2000.
 - The Be Counted program was successful, although the Census Bureau received fewer forms than anticipated.
 - The results of using the U.S. Postal Service to report the status of postmaster returns indicated that the Census Bureau must follow up on at least a sample of the vacant units in Census 2000.
 - The 1995 Census Test allowed only a preliminary evaluation of the benefits of using administrative records, but it established potential for using these records to reduce the differential undercount.
 - The Census Bureau decided to use a housing-unit sample for nonresponse follow-up with a sampling fraction of 1 in 10 and a truncation level of 90 percent.
 - CensusPlus results were below expectations. A refined version was tested in the 1996 Community Census.

1996 CENSUS TESTS

The Office of Management and Budget's Statistical Policy Directive No. 15

In response to legislative, programmatic, and administrative needs, the Office of Management and Budget (OMB) issued in 1977 the "Race and Ethnic Standards for Federal Statistics and Administrative Reporting." These standards were established in OMB's Statistical Policy Directive No. 15. This directive established four racial categories (American Indian or Alaska Native; Asian or Pacific Islander; Black; and White) and two ethnic categories (of Hispanic origin; and Not of Hispanic origin) that were used throughout the federal government for nearly two decades.

Modernizing Race and Ethnicity Categories

By the early 1990s, the OMB's Statistical Policy Directive No. 15 was drawing increasing criticism from individuals and groups who argued that the categories were no longer adequate for capturing and reporting the growing racial and ethnic diversity of the Nation's population. Responding to such concerns, the OMB solicited comments and testified at hearings on Statistical Policy Directive No. 15 during the summer of 1994. OMB also established an Interagency Committee for the Review of Racial and Ethnic Standards, drawing members from over 30 agencies, in order to assess federal needs for racial and ethnic data. This committee drafted several recommendations aimed at improving the government's ability to collect sufficiently detailed data to provide a more accurate picture of the nation's growing racial and ethnic diversity. The committee advocated expanding the number of race categories from four to five, and allowing respondents to mark more than one racial category.⁸⁶

⁸⁶ *Federal Register* notice, July 9, 1997. This notice announcing proposed revisions to Statistical Policy Directive No. 15 was placed by the Office of Management and Budget.

The Census Bureau, through its research for Census 2000, played a significant role in helping to evaluate how best to gather race and ethnicity data while complying with several of the proposed changes to Directive No. 15.⁸⁷ The two tests conducted by the Census Bureau in 1996 helped the agency prepare for Census 2000 and provided OMB and its Interagency Committee with research results that helped them in their review of Statistical Policy Directive No. 15. While the 1996 National Content Survey (NCS) was a vehicle for testing and evaluating the full subject content for Census 2000, including specific question wording, format, and item sequence, one major focus was testing alternative versions of the race and Hispanic origin questions. The two key issues studied by the National Content Survey were: (1) whether adding a “multiracial” category to the race question would affect how people reported race and Hispanic origin and (2) whether placing the Hispanic origin question before the race question affected how respondents reported race and Hispanic origin. The 1996 Race and Ethnic Targeted Test (RAETT; also known as the 1996 Census Survey) also addressed these two issues, but drew its sample from targeted race and ethnic populations, and thus provided findings for small population groups. The RAETT was the principal test of questions on race and ethnicity and focused exclusively on testing and evaluating possible changes to the questions on race and ethnicity for Census 2000.⁸⁸

1996 National Content Survey (NCS)⁸⁹

The 1996 National Content Survey (NCS), also known as “The 2000 Census Test,” was the major vehicle for testing subject content and specific question wording, format, and sequencing of items for Census 2000.

One of the main goals of the NCS was to increase the Census Bureau’s understanding of how respondents would report when asked race and ethnicity questions that conformed with the proposed changes to Directive No. 15. In particular, the test provided respondents with a “multiracial” category in the race question and it tested which sequence of the race and ethnicity questions provided the better response rate. Since the survey tested the entire content for Census 2000, it also was used to measure the effect on response rates of such factors as subject content, specific question wording, format, item sequence, and package design.

Research conducted prior to the NCS had shown that there were several methods to improve mail response rates for mail surveys. Although these techniques were not the focus of the test, the following were included:

- Respondent-friendly questionnaire design.
- Use of advance letters to legitimize the survey request and communicate its importance.
- Emphasis on the government sponsorship of the survey.
- Mailing of a reminder postcard.
- Mailing of a replacement questionnaire to nonrespondents.
- Inclusion of a mandatory message, such as “Your Response is Required by Law,” on the outgoing envelope.

Stratified sampling was used to select a national sample of 94,500 housing units for the NCS. The NCS sample households were allocated among 13 experimental panels, 7 of which received the 100 percent (short) questionnaire and 6 of which received the sample (long) questionnaire. Each of the 13 panels was drawn from two strata based on race, Hispanic origin, and tenure (i.e., owner or renter) variables at the census tract level. One stratum, the low coverage area (LCA),

⁸⁷ The Census Bureau also conducted a test in connection with the Current Population Survey. The findings are available in a 1996 report “Testing Methods of Collecting Racial and Ethnic Information: Results of the Current Population Survey Supplement on Race and Ethnicity.”

⁸⁸ U.S. Census Bureau, “Findings on Questions on Race and Hispanic Origin Tested in the 1996 National Content Survey,” December 1996; “1996 National Content Survey,” DSSD Memorandum No. 2, November 12, 1996; “Results of the 1996 Race and Ethnic Targeted Test,” May 1997.

⁸⁹ Much of this section is based on “1996 National Content Survey,” DSSD Memorandum No. 2, November 13, 1996; and Population Division, “Findings on Questions on Race and Hispanic Origin Tested in the 1996 National Content Survey,” December 1996.

contained a high proportion of minority persons and renters. The other was termed the high coverage area (HCA) and contained the remainder of the addresses. The seven short-form (100 percent) questionnaire panels contained a sample of 2,400 housing units from the HCA and 3,600 housing units from the LCA stratum. The six sample-questionnaire panels contained a sample of 3,500 housing units drawn from the HCA, and 5,250 housing units from the LCA stratum.

On February 23, 1996, the Census Bureau mailed participants an advance letter informing them that they had been chosen for this survey. Questionnaires were mailed February 28, 1996, in time for the U.S. Postal Service to deliver the packages to households on or before “Census Day,” March 3, 1996. Reminder cards were mailed to all questionnaire recipients on March 4, 1996. A replacement questionnaire and reminder letter were mailed to nonrespondents on March 20, 1996. Although a deadline was not indicated on the survey forms, the Census Bureau stopped checking in forms on May 15, 1996.

Two of the NCS questionnaires replicated the short- and long-forms used during the 1990 census. The remaining forms included variations of the experimental forms designed by contractors (Two Twelve Associates, Inc. and Dr. Don Dillman of Washington State University). The long-form questionnaires varied in the number of questions asked, but ranged from 33 to 51 items per questionnaire.

Following check-in, Census Bureau staff conducted approximately 37,800 computer-assisted telephone re-interviews during May and June 1996 to assess the reliability of information collected. Most entries were computer coded using a master file built from the 1990 census. Entries that could not be coded by computer were coded by clerks. The national response rate to the short-form questionnaire for the 1996 NCS was 72.45 percent. Response ranged from 46.40 percent to 80.47 percent depending upon the area and the questionnaire. The national response rate to the long-form questionnaire was 64.75 percent. Response rates ranged from 41.15 percent to 72.57 percent.

The data received from the NCS were used to determine response rates and the accuracy of data following the additions and/or changes to the short- and long-form questionnaires. The following were some of the specific items tested and their results:

- Adding a “Multiracial or biracial” response category for the race question—The survey found that approximately 1 percent of persons reported as multiracial when a “Multiracial or biracial” response was an option to the race question. Further, adding a “Multiracial or biracial” category had no statistically significant effect on the number of individuals reporting as White, Black, American Indian or Alaska Native, and Asian or Pacific Islander. Finally, a “Multiracial or biracial” category followed by the Hispanic origin question reduced the percentage of people reporting in the “Other race” category of the race question.
- Changing the sequencing of the Hispanic origin question (placing it immediately before the race question)—The 1996 National Content Survey tested whether placing the Hispanic origin question before the race question would signify to Hispanics that they should choose one of the race categories and identify themselves as Hispanic in the Hispanic origin question. Past research had shown that a number of Hispanics viewed themselves as racially Hispanic and/or expected to see “Hispanic” as a response option for the race question. Because “Hispanic” was not an option, respondents identifying as racially Hispanic did not respond to the question or marked the “Other race” category. Survey results showed that placing the Hispanic origin question before the race question significantly reduced nonresponse to the Hispanic origin question. Second, changing the sequence of the race and Hispanic origin questions had no impact on response for those identifying as White, Black, American Indian or Alaska Native, and Asian or Pacific Islander. Finally, placing the Hispanic origin question before a race question that did not include the “Multiracial or biracial” category: (1) reduced the percentage of persons reporting in the “Other race” category of the race question and (2) increased the number of Hispanics reporting in the “White” category of the race question.
- Removing the household roster—Three experimental forms simplified or eliminated the household roster, simplified the existing roster’s instructions, or replaced the roster with a numeric household count. The test roster included space for respondents to report up to five people living within the household. Additional occupants (in households with more than five occupants)

were accounted for by the numeric count of total occupants. Two of the experimental forms included space for the names of these additional occupants; however, individual data on more than five people within a household were not recorded. Census enumerators visited households reporting more than five occupants to confirm the accuracy of the questionnaire. The survey indicated that there was a significant difference in response rates at the national level when the roster was eliminated and replaced with a simple numerically entered household count. Eliminating the questionnaire roster appeared to improve response rates for high coverage areas, though there was no significant improvement in response rates for the low coverage area stratum.

- Adjusting questionnaire length (to determine its effect on response rates)—The NCS studied the impact of the questionnaire’s length on response and tried to determine if response rates could be increased by designing questionnaires to be more visually appealing and user-friendly. Past research suggested the length of the census questionnaire may have an impact upon response rate. The survey data found that questionnaire length did not appear to impact response rate so long as the questionnaire employed a user-friendly design, carried a mandatory response message,⁹⁰ and was supplemented by additional mailings, including a pre-census notification letter, reminder card, and duplicate questionnaire for nonrespondents.
- Adding a household income question—The addition of a household income question was studied to determine if asking for data on such a sensitive subject had an impact on response rates. Survey results indicated that there was no significant difference in response on the national level or for the high coverage area stratum. There was a slight reduction in response rates to this question in the low coverage area stratum.
- Testing two questionnaire package designs: (1) the Official Government Approach and (2) the Public Information Design Approach—The NCS compared the response rates for two different questionnaire designs, the “Official Government Approach” and the “Public Information Design.” The Official Government Approach questionnaire and envelope, designed by the Census Bureau, incorporated visual and content features that were consistent with the public’s expectations of a government-sponsored survey. The green questionnaire and white, inexpensive-looking envelope were designed to have an “official” appearance. The envelope included an additional statement informing the recipient of the government’s sponsorship of the survey and the public’s legal responsibility to participate. Such statements had been found to improve response rates. The Public Information Design Approach, tested using two of the short-form questionnaires, was designed to be user-friendly and appealing while still promoting a sense of urgency. The questionnaire packages used color (predominantly gold with blue designs), informational icons (in the place of words), and graphics to attract and hold a recipient’s attention. Survey results indicated that on the national level, the Official Government Approach, which included the mandatory statement regarding the respondent’s obligation, had a higher response rate than the Public Information Approach. This was attributed to its more “official” appearance, compared with the brightly colored envelopes developed for the Public Information Design Approach.

1996 Race and Ethnic Targeted Test (RAETT)⁹¹

The 1996 Race and Ethnic Targeted Test (RAETT), like the National Content Survey, performed a dual function; the test served as part of the research program to evaluate proposed changes to OMB’s Statistical Policy Directive No. 15 and it allowed the Census Bureau to test the instructions and wording of the race and ethnicity questions for Census 2000. The agency wanted to be sure that its specific questions for Census 2000 would comply with the proposed changes to OMB’s Directive No. 15.

The RAETT had four research goals. First, it was designed to determine the effects of allowing respondents to report more than one race; second, to determine the effects of placing the

⁹⁰ The mandatory response message informed respondents that federal law (Title 13) legally obligated them to complete and return the census questionnaire.

⁹¹ U.S. Census Bureau, Population and Decennial Statistical Studies Divisions, “Results of the Race and Ethnic Targeted Test: Population Division Working Paper No. 18,” May 1997.

Hispanic origin question immediately before the race question; third, to determine the effects of collecting race, Hispanic origin, and ancestry information in a combined, two-part question; and finally, to test alternative terminologies, classifications, and formats in the race question.

The RAETT was a mail-out/mail-back survey of households; questionnaires were mailed to a sample of approximately 112,100 households from selected census tracts, American Indian reservations, and Alaska Native villages (see Table 2-7). Recipients of the survey were chosen from 1990 census data showing census tracts with a high proportion (relative to the nation as a whole) of households in 1 of 6 specified racial or ethnic groups: Black, American Indian, Alaska Native, Asian and Pacific Islander, Hispanic origin, or White.

While the National Content Survey drew a sample that was close to being nationally representative, the RAETT sample was targeted to include a larger concentration from targeted population groups in order to permit a more meaningful assessment of the effects of different questions on race and ethnicity for relatively small population groups. The particularly important groups were American Indians, Alaska Natives, and detailed groups within the Asian and Pacific Islander and the Hispanic populations. Because the RAETT drew a targeted sample, its results could be generalized only to the portions of the specified population groups residing in areas with relatively high concentrations of the targeted groups, which represented only a small proportion of each specified population group.

Table 2-7.
RAETT Survey Sample Size and Response Rate

Target population	Mail response rate (percent)	Sample size
White	71.3	17,500
Black	47.4	26,550
Hispanic	44.1	26,550
American Indian	53.1	15,850
Asian and Pacific Islander	55.2	23,700
Alaska Native	34.0	1,950
Total	52.6	112,100

Census Day for this survey was June 22, 1996. On June 14, 1996, an advance letter was mailed to survey participants detailing the importance of their participation in the survey and their legal obligation to return a completed questionnaire. The initial questionnaire was mailed June 18, 1996. It was followed by a reminder postcard (mailed June 26, 1996) and finally a replacement questionnaire, sent only to households that had not returned the initial questionnaire, with a letter for nonrespondents (mailed July 16, 1996). Hispanic households⁹² were sent two questionnaires, one in English and one translated into Spanish; respondents in these households were asked to complete and return only one. Almost 38 percent of Hispanic households returned the Spanish-language questionnaire.

⁹² The RAETT sample of 112,100 households was drawn from census tracts, American Indian reservations, and Alaska Native villages that the 1990 census showed to have high proportions (relative to the nation as a whole) of households in 1 of 6 specified racial or ethnic groups: Black, American Indian, Alaska Native, Asian and Pacific Islander, Hispanic origin, or White. For each of these specified population groups, the census tracts that satisfied the “high proportion” criterion became a sampling frame from which a sample of households was selected.

The RAETT survey included eight different panels with eight different questionnaires, labeled “A” through “H.” There were seven experimental panels and one control (see Table 2-8).

Table 2-8.
Race and Hispanic Origin Question Design Features by Panel⁹³

Separate race and Hispanic-origin questions				Combined race, Hispanic-origin, and ancestry questions		Separate race and Hispanic-origin questions	
Panel A	Panel B	Panel C	Panel D	Panel E	Panel F	Panel G	Panel H
Modified 1990 Census Race Question	“Multiracial or biracial” category	“Mark one or more races” instruction	“Multiracial or biracial” category	“Multiracial or biracial” category	“Mark one or more boxes” instruction	“Multiracial or biracial” category	“Mark all that apply” instruction
Separate categories: “Indian (Amer) Eskimo Aleut”	Combined category, “Indian (Amer.) or Alaska Native”	Combined category “Indian (Amer.) or Alaska Native”	Combined category, “Indian (Amer.) or Alaska Native”	Combined category, “Indian (Amer.) or Alaska Native”	Combined category, “Indian (Amer.) or Alaska Native”	Combined category and spell out “American Indian or Alaska Native”	Combined category, “Indian (Amer.) or Alaska Native”
“Hawaiian”; “Guamanian” categories	“Hawaiian”; “Guamanian” categories	“Hawaiian”; “Guamanian” categories	“Native Hawaiian”; “Guamanian or Chamorro” categories	Combined category “Asian or Pacific Islander”	Combined category “Asian or Pacific Islander”	“Native Hawaiian”; “Guamanian or Chamorro” categories	“Hawaiian”; “Guamanian” categories
No alphabetization	No alphabetization	No alphabetization	No alphabetization	No alphabetization	No alphabetization	Alphabetize Asian and Pacific Islander groups	No alphabetization
Modified 1990 census Hispanic-origin question	Modified 1990 census Hispanic-origin question	Modified 1990 census Hispanic-origin question	Modified 1990 census Hispanic-origin question	Combined question	Combined question	Modified 1990 census Hispanic-origin question	Modified 1990 census Hispanic-origin question
1995 Test Census sequence: Hispanic origin followed by race	Hispanic origin followed by race	Hispanic origin followed by race	Race followed by Hispanic origin	Combined question	Combined question	Hispanic origin followed by race	Hispanic origin followed by race

RAETT Results

Approximately 53 percent of the survey’s questionnaires were returned. Responses from the survey were used by the Census Bureau to develop race and ethnicity questions for Census 2000 that conformed with OMB Statistical Policy Directive No. 15.

During previous censuses, respondents had been able to self-identify with only one race because Directive No. 15 did not have a provision for collecting and tabulating multiple responses to the race question. Because Directive No. 15 was in the process of being modified to allow reporting of multiracial data, the Census Bureau tested several approaches to asking respondents to provide an accurate depiction of their racial identification. The RAETT tested three different variations of the race question; some panels were provided a “multiracial” category with write-in lines, a second set was asked to “mark one or more,” and the third set was instructed to “mark all that apply.” The control panel, using the race question from the 1990 census, was instructed to mark only one box. The data gathered by the control panel were used to compare the historical racial series with those data gathered by the new race questions that allowed for multiracial reporting.

⁹³ U.S. Census Bureau, Population Division and Decennial Statistical Studies Division, “Survey Design and Methodology” January 18, 2001.

In general, neither the multiracial category nor the multiple response option had a statistically significant effect on the percent of people who identified themselves solely as White, Black, or American Indian. When a multiracial category was added to the race question, the percent that reported solely as Asian or Pacific Islander decreased; however, much of this was attributed to the drop in those reporting as Hawaiian. In addition, the percentage of those reporting solely as American Indian or Alaska Native was lower for the Alaska Native targeted sample but virtually unchanged for the American Indian targeted sample. When respondents were allowed to identify with more than one race by marking “all that apply” there was a drop in the percentage of people reporting solely as Asian and Pacific Islander. In contrast, there was little effect on the reporting rate for Asians and Pacific Islanders when they were instructed to “mark one or more.” The Census Bureau concluded that the “mark one or more” category would best preserve the historical continuity of data on race and ethnicity.

For the Hispanic-targeted sample, nonresponse to the race question increased among those whose test included the “multiracial” category. Neither of the multiple race response options increased response to the race question among Hispanics and none of the options for reporting more than one race affected the total percentage of responses of Hispanic to the Hispanic-origin question.

When the race and Hispanic-origin questions were combined, a high percentage of responses included both Hispanic origin and 1 of the 4 major race categories allowed under Directive No. 15. The write-in responses to the race question were more detailed from the panels who were instructed to “mark one or more” than those from panels who were told to “mark all that apply.” However, both versions of the instructions provided acceptable responses.

The test also demonstrated that in panels that were asked to mark only one box, some respondents provided unrequested multiple responses; this was true in panels with and without a “multiracial” category. This tendency was most prevalent in the Alaska Native and Asian and Pacific Islander samples.

The second purpose of the RAETT was to determine the effects of placing the Hispanic Origin question immediately before the race question. This was intended to increase response to the Hispanic-origin question.⁹⁴ The change in sequencing reduced, but did not eliminate, nonresponse to the Hispanic-origin question and reporting in the “Other race” category by Hispanics.

The third goal of the RAETT was to determine the effects of collecting race and Hispanic Origin in a combined two-part question. Census Bureau studies have shown that some respondents, especially Hispanics, view Hispanic origin as a racial designation rather than an indicator of ethnicity, and expect to see it as a response option to the race question. As a result, a number of Hispanics reported as “Other” in the 1980 census and as “Other race” in the 1990 census. Research conducted since 1987 has suggested that placing a Hispanic origin category in the race question and adding a write-in line for ancestry may reduce the problem of nonresponse to the Hispanic-origin and ancestry questions. To verify this research, the RAETT included a combined, two-part, question on race, Hispanic origin, and ancestry.

The RAETT tested two versions of a combined question. Both provided response boxes for the current OMB race groups, for Hispanic origin, and for “Some other race.” Both also included a write-in line for American Indian and Alaska Native tribe. Part A had two variants; the first version included a multiracial category while the second included an instruction to respondents to “mark one or more.” Part B of the question asked respondents to report their “ancestry or ethnic group” in write-in lines. The objective of Part B was to determine how detailed Asian and Pacific Islander and Hispanic-origin groups would be reported. Additionally, the test sought to determine if respondents choosing the “Multiracial/biracial” category would provide additional information about their racial identification in the write-in lines. Among the key findings of the RAETT were:

- In every targeted sample, the nonresponse rate was lower for each of the combined questions than for the corresponding separate Hispanic-origin and race questions.

⁹⁴ In the 1990 census, 40 percent of the Hispanic respondents reported in the “Other race” category because many viewed themselves racially as Hispanic and did not identify with 1 of the 4 race categories.

- The combined race and Hispanic-origin questions elicited high levels of multiple response in the Hispanic targeted sample. On the version that asked respondents to “mark one or more” races, more than 90 percent of the multiple responses involved Hispanic origin and a race group.
- When all responses of Hispanic (either Hispanic alone or Hispanic in combination with any other response) were added together, there was no statistically significant difference in the percent reporting Hispanic between a combined question and separate questions on Hispanic origin and race.
- The ancestry write-in lines on the two-part question with the “multiracial” category did not provide percentages of either the detailed Asian or Pacific Islander groups or of the detailed Hispanic groups in the respective targeted samples. In contrast, the write-ins to the ancestry component of the combined question with the “mark one or more” instruction provided a detailed distribution of Asian and Pacific Islander groups in the Asian and Pacific Islander targeted sample that was statistically similar to that on the corresponding separate race question.

The fourth purpose of the RAETT was to test alternative terminologies, classifications, and formats in the race question. This portion of the test examined four issues and concluded that:

- Spelling out “American” (instead of using “Amer.”) in the “American Indian or Alaska Native” category did not affect reporting.
- Substituting “Native Hawaiian” for “Hawaiian” and listing this category immediately after the “American Indian and Alaska Native” category increased reporting as “Hawaiian.”
- Alphabetizing the Asian and Pacific Islander groups after “Native Hawaiian” had no effect on the total percentage reporting as Asian and Pacific Islander in that targeted sample.
- Allowing respondents to identify as “Guamanian or Chamorro” rather than as “Guamanian” yielded results for which there were no significant statistical differences.

1996 COMMUNITY CENSUS

The 1996 Community Census took place in seven tracts in Chicago, IL, and in the American Indian reservations of Acoma, NM, and Fort Hall, ID. The community census tested the simplified enumerator questionnaire (SEQ), a questionnaire proposed for Census 2000 nonresponse follow-up operations. Additionally, the community census used administrative records to augment the Integrated Coverage Measurement (ICM) procedures.

The Chicago test site was the largest of the three with a mailout of 9,824 questionnaires. The Fort Hall and Acoma Reservations had 1,903 and 935 questionnaires delivered, respectively. Two questionnaire types, DT-1A (rosterless) and DT-1B (extended roster) were included in the test. Replacement questionnaires were not mailed.

Test site mail return rates for occupied housing units varied from a low of 39.0 percent in Acoma, to a high of 47.7 percent in Fort Hall. The Chicago test site had a mail return rate of 41.9 percent.⁹⁵

Simplified Enumerator Questionnaire⁹⁶

An interdivisional team at the Census Bureau developed the SEQ by making changes to the enumerator questionnaire used in the 1995 Census Test. These changes included:

- No longer requiring enumerators to fill sex in a separate column.
- Incorporating a household screener question for origin.
- Revising the way the race question was asked.

⁹⁵ Kenneth E. Merritt, U.S. Census Bureau, Decennial Statistical Studies Division, “1996 Community Census Results: Mail Response Rates for the 1996 Community Census,” Memorandum No. 21, April 6, 1998.

⁹⁶ Michael Tenebaum, U.S. Census Bureau, Decennial Statistical Studies Division, “1996 Community Census Results: Evaluation of the Simplified Enumerator Questionnaire Based on Debriefings and Focus Group Results,” Memorandum No. 1, June 2, 1997.

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- Rewording the coverage questions.
 - Revising the continuation sheet for households with more than five household members.

Enumerators using the SEQ during the community census found that despite some minor problems, the questionnaire was easy to use and worked well. The overall format, which involved a topic-based approach, was well received and most of the enumerators were comfortable using the questionnaire. Enumerators with 1990 census experience noted that the SEQ was a substantial improvement over the questionnaire used during the 1990 census nonresponse follow-up operations.

Use of American Indian Administrative Records⁹⁷

The 1996 Community Census tested the use of administrative records to augment the Integrated Coverage Measurement (ICM) procedures. Building on experience gained in the 1995 Census Test, the 1996 Community Census attempted to acquire, generally, only national files. Since American Indian reservations were not included in the 1995 Census Test, Fort Hall and Acoma were chosen so that ICM procedures could be tested on reservations along with testing tribal rolls as an administrative list to be used in the census.

The use of administrative records in the 1996 test differed slightly from their use in the 1995 Census Test (see above section, “1995 Census Test”). As in 1995, all administrative lists were combined and unduplicated to create one database of administrative records persons for each census site. In 1995, the Census Bureau conducted the ICM interview comparing the new ICM roster to the census and then compared the final roster to the administrative records database. For 1996, unduplicated administrative records persons⁹⁸ who could be assigned to a census housing unit were included in the computer-assisted personal interviewing (CAPI) instrument. By doing this, the Census Bureau expected to obtain the most complete household roster possible during the ICM interview.

Generally, the Census Bureau expected that the acquisition of tribal rolls would be beneficial in a number of ways, the most notable being the possible reduction of the undercount in the two American Indian sites involved in the community census. The Census Bureau also used the test as an opportunity to match tribal rolls to other administrative lists, including Internal Revenue Service and Medicare files, to determine what, if any, additional coverage benefit the tribal rolls could provide when compared to these national files.

Although the Census Bureau anticipated learning much about the benefits of tribal records for administrative list building, the outcome of the 1996 Community Census was entirely different. The Census Bureau found that negotiations with tribal governments were quite lengthy despite some willingness to cooperate. On the Fort Hall Reservation, the negotiations did not produce an agreement. As a result, the Census Bureau was unable to acquire the tribal rolls or any other administrative lists from the Shoshone-Bannock Tribes of the Fort Hall Reservation. After lengthy negotiations, the Census Bureau did gain access to the tribal enrollment record for the Pueblo of Acoma; however, it arrived too late to be included in the ICM use of administrative records in the census test. Access to the Food Stamp or Food Distribution Program records on Indian reservations was not allowed.⁹⁹

⁹⁷ Sandra Lucas, U.S. Census Bureau, “1996 Community Census Results: Acquisition of Tribal Rolls for Census Use in the 1996 Community Census in American Indian Site,” Memorandum No. 3, Administrative Records Research Staff, June 2, 1997. See also, Elizabeth M. Sweet, “Using Administrative Record Persons in the 1996 Community Census,” *Proceedings of the Survey Research Methods Section*, American Statistical Association, 2000, pp. 416–21.

⁹⁸ The administrative records persons were not a source of direct person adds to the census counts.

⁹⁹ Both tribal governments appeared to carefully consider the request to acquire their tribal rolls and other administrative lists. The Census Bureau requested a response from each tribal government of approximately 1 month from the date of the original request. It was more than 2 months before the first definitive response. Both tribal governments expressed concern about the privacy of their records in Census Bureau hands. Furthermore, they expressed doubt that their records would be useable by the agency. As a result, the Shoshone-Bannock Tribes (Fort Hall) denied access. Although the Pueblo of Acoma Tribe eventually consented to the use

As a result of its experience trying to access American Indian tribal records during the 1996 Community Census, the Census Bureau concluded that changes must be made when dealing with the nation's autonomous American Indian and Alaska Native governments. The lessons learned (which would later be integrated into the Census 2000 Dress Rehearsal and Census 2000 programs) included:

- Allowing a longer lead time to negotiate for tribal rolls and other tribal records.
- Preparing a letter from the Census Bureau's Director to the tribal governments' highest elected official requesting cooperation and the use of tribal records.
- Preparing materials specifically for American Indian and Alaska Native sites that clearly explained the use of and need for tribal records in the census, and emphasized the privacy protections the Census Bureau would provide for tribal records.
- Preparing a draft memorandum of understanding to be used by the Census Bureau's regional offices when negotiating with tribal governments for their membership rolls and other tribal records.
- Conducting presentations by Census Bureau staff to tribal government officials and tribal liaisons that provide an overall view of census programs and operations and clearly show the integration of the different Census Bureau programs and operations.

1997 NATIONAL CENSUS TEST

As a result of fiscal year 1997 budget constraints, the Census Bureau's Management Integration Team¹⁰⁰ recommended halting the 1997 test. Survey operations were ordered to begin an "orderly shut-down" on July 3, 1997.

Plans for the 1997 National Census Test (NCT) included the mailout of eight versions of the census questionnaire to about 40,000 households. Five of these forms were scheduled to be versions of the short-form and the remaining three were versions of the long-form questionnaire. During the 1997 test, the Census Bureau planned to: (1) assess the effect of icons and benefit messages on response; (2) compare differences in response rates when using a booklet version and a fold-out short-form questionnaire; (3) determine if the absence of the roster on the long-form questionnaire would have an effect on response rates; and (4) assess the effect an "official" and a "marketing" envelope would have upon response rates.

The Management Integration Team authorized the transfer of the 1997 NCT budget to higher priority projects, including the Lockheed Martin Data Capture System 2000 contract and equipment and telecommunications expenses for the regional census centers.

DUAL-TRACK CENSUS PLANNING

The Census Bureau's plans and tests for Census 2000, through 1996, all assumed that the agency would use statistical sampling to supplement the returns from the census. By 1997, opposition to statistical sampling by the congressional majority was steadily mounting, and there was a push to require the Census Bureau to develop a plan that relied solely on traditional enumeration techniques.

In the fall of 1997, with the threat of a stalemate between Congress and the administration in the debate over the use of statistical sampling in the census, a compromise was reached in the fiscal year 1998 Department of Commerce appropriations bill that President Clinton signed into law.¹⁰¹

of their records, the delay precluded their use during the 1996 Community Census Test. Despite the delay in receiving the records from the Pueblo of Acoma, they were later used for further research into the type of information contained on the list and its coverage.

¹⁰⁰ The Management Integration Team (MIT), an assembly of the division chiefs involved with census planning.

¹⁰¹ Public Law 105-119, 105th Cong., 1st Sess. (1997), Departments of Commerce, Justice, and State, the Judiciary and Related Agencies Appropriations Act of 1998.

The legislation allowed the Census Bureau to continue to plan for the use of sampling, but it also required the agency to plan for a census without statistical sampling. Thus, the Census Bureau was required to undertake dual-track planning.¹⁰²

The law also sought to provide an opportunity for expedited judicial review of the legality and/or constitutionality of using sampling methods to produce population figures for apportionment or redistricting purposes. Additionally, the statute established the U.S. Census Monitoring Board¹⁰³ to oversee the planning and conduct of Census 2000. Also as part of the compromise, but not contained in the text of the enacted legislation, the agency had to modify its plans for the Census 2000 Dress Rehearsal (conducted in 1998) to include one site that would test methods that would be used in a nonsampling census.¹⁰⁴

THE CENSUS 2000 DRESS REHEARSAL

The purpose of the dress rehearsal program was to test all of the various operations planned for Census 2000 to ensure that they would work properly in a full-scale enumeration. The agency regarded a good dress rehearsal as crucial to the success of Census 2000 and sought to make sure that the dress rehearsal was as much like the actual census as possible. Toward that end, the dress rehearsal included operational testing of the headquarters, regional census center, local census office, and data capture center procedures and systems. Census Day for the dress rehearsal was April 18, 1998.

While the Census Bureau did as much as it could to simulate all of the procedures involved in a full-scale census, there were some differences. For instance, the dress rehearsal did not have a 100 percent block canvass of the address list as was conducted during Census 2000. Despite such limitations, the dress rehearsal did help the Census Bureau evaluate its plans for Census 2000.¹⁰⁵

The Census Bureau chose three test sites—Columbia, South Carolina and 11 surrounding counties; Menominee County in northeastern Wisconsin, and Sacramento, California—that it believed provided a good operational demonstration of Census 2000 procedures and systems.

The first site, Columbia, SC, and eleven surrounding counties (Chester, Chesterfield, Darlington, Fairfield, Kershaw, Lancaster, Lee, Marlboro, Newberry, Richland, and Union), represented an area that had a mix of house number and street name, rural route, and box number address types. This site had a relatively large proportion of African Americans. While the Census Bureau originally planned to use statistical sampling in this area to test how well these procedures reduced the differential undercount, the agency chose to use this site to test traditional enumeration methods to comply with the agreement reached with the congressional leadership.¹⁰⁶ This area had a 1990 population of 655,066, and a housing count of 253,285.

The second site, Menominee County, WI, was selected because it contained the Menominee American Indian Reservation and had been suggested for inclusion in the test by the Census Advisory Committee on the American Indian and Alaska Native Populations. It was chosen by the Census

¹⁰² In late November 1997, Congress passed H.R. 2267, the Commerce, Justice, State Appropriations Act and it was signed by President Clinton. The President originally vetoed H.R. 2267; however, he agreed to sign it after a compromise regarding the issue of Census 2000 was worked out between the administration and the House of Representatives.

In the compromise language of H.R. 2267, the House created the right to bring a lawsuit in Federal District Court (to be heard by a three-judge panel, at least one of whom was a circuit judge) by the two Houses of Congress, Representatives, Senators, and any resident of a state whose congressional representation could be changed as a result of the use of a statistical method. In addition, it allowed for a particular lawsuit to be filed by the Speaker, "on behalf of the House of Representatives," with the Office of the General Counsel of the House of Representatives to represent the House in such civil action. Therefore, the House was funding the Speaker's lawsuit. Furthermore, H.R. 2267 allowed for any party to such a lawsuit to appeal the Federal District Court ruling directly to the Supreme Court, bypassing the U.S. Court of Appeals.

¹⁰³ The U.S. Census Monitoring Board was composed of appointees from the administration and the House and Senate majority leadership.

¹⁰⁴ For a more detailed summary of the provisions of P.L. 105-119 representing the compromise on the sampling issue and the outcome of the court cases regarding sampling, see Chapter 11, "Legal Issues."

¹⁰⁵ Bureau of the Census, "Census 2000 Dress Rehearsal Report Card: Evaluation of the Standards for Success," February 1999.

¹⁰⁶ See earlier discussion on dual-track planning.

Bureau to test how well sampling reduced the differential undercount on American Indian reservations; these areas had a 12 percent net undercount rate in the 1990 Census. The 1990 population for this area was 3,890, and the housing count was 1,742.

The third site, Sacramento, CA, was chosen for its population diversity. The site offered the opportunity to apply sampling techniques that were designed to reduce the differential undercount and to test how well the agency's enumeration plan for Census 2000 would capture all components of the population. Another reason that the Census Bureau chose Sacramento was that it was a primary media market, which allowed the agency to analyze the advertising campaign. The city's population in 1990 was 369,365, with a housing count of 153,362.

The Census Bureau began preparing for the dress rehearsal during the summer of 1996. The agency started to work with local officials and community-based organizations in each of the three sites and began to plan and build the various infrastructures needed for the dress rehearsal. These activities included refining the geographic database, building and refining the address list, and working with community and tribal organizations to plan outreach and promotion efforts.

Master Address File (MAF)

A master address file (MAF) was created that included the address or geographic location for every housing unit and group quarters in the Census 2000 Dress Rehearsal sites. The foundation for the MAF was the 1990 Census address list—the 1990 Address Control File (ACF). The ACF was merged with the delivery sequence file (DSF) of the U.S. Postal Service (USPS), and the combined address file was supplemented by information provided by local officials and by address listing operations.¹⁰⁷ In 1997, the MAF building process was modified to rectify several problems. However, many of these modifications were not in place by the dress rehearsal (for more on the MAF development, see Chapter 8). Hence, the MAF building process developed for the dress rehearsal was not the same as the one used in Census 2000. The main operations that were added to the MAF building process for Census 2000 were a 100 percent block canvass for city-style address areas and a quality assurance review in non-city-style areas. In block canvassing, listers checked the addresses in their assigned areas against those on the MAF, making additions and deletions as necessary.

In addition to the 1990 address control file (ACF) and the Postal Service's delivery sequence file (DSF), the pre-census MAF development drew on data from several other operations. These included Targeted Multiunit Check, Targeted Canvassing, Local Update of Census Addresses, Postal Validation Check, and Address Listing, among others.

The Targeted Multiunit Check compared discrepancies between the 1990 ACF and the DSF. Enumerators visited the street addresses at these multiunit dwellings to ensure that the agency had the correct number of units. The operation identified fewer than 300 new housing units out of 31,681 housing units that enumerators canvassed at both the Sacramento and South Carolina sites.

The Targeted Canvassing operation relied on the expertise of local officials to identify blocks that were likely to have hidden housing units. Field staff walked these blocks in Sacramento and added 756 housing units as a result of canvassing 19,477; in South Carolina, this operation added 111 units after canvassing 5,803. Since there was a 100 percent block canvass for the MAF used in Census 2000, the Targeted Canvassing operation was dropped.

One of the major programs in the MAF building process was the Local Update of Census Addresses (LUCA) review, which took place between August 31 and September 17, 1997. In South Carolina, 31 of the 60 governmental entities, representing 98 percent of the area's 1990 housing units, participated. The city of Sacramento recommended additions and corrections to existing addresses and so did Menominee's tribal governments. In South Carolina, the LUCA operation accepted 43.2 percent of the 12,414 deletions, 56.3 percent of the 26,983 corrections, and

¹⁰⁷ U.S. Census Bureau, "Census 2000 Dress Rehearsal Evaluation Summary," August 1999, p. 2.

12.6 percent of the 30,942 additions that were submitted. In Sacramento, the agency accepted 86.5 percent of the 4,528 corrections and 5.3 percent of the 2,918 additions submitted. In Menominee, the agency accepted 60.7 percent of the deletions, 97.6 percent of the 289 corrections, and 100 percent of the additions submitted.

The dress rehearsal produced useful information about how to run the LUCA program. Inadequate instructions and procedures in the dress rehearsal LUCA resulted in large numbers of locally proposed address adds, corrections, and deletes that did not meet the agency's requirements. Submissions from the local governments included errors such as incomplete address information and out-of-jurisdiction changes.

One serious problem was the confusion experienced by local officials in non-city-style areas as they tried to review and verify the address descriptions provided by the Census Bureau. For example, "Rt. 2, Box 19" was difficult to match with "white house with green shutters and picket fence." This led the Census Bureau to revise its LUCA procedures for areas where non-city-style addresses occur. Another problem was that the Census Bureau provided local officials with addresses from surrounding jurisdictions in expectation that this would help local officials ensure all addresses were covered. Instead, this operation led to substantial confusion on the part of the local officials and they tried to delete the units outside of their jurisdictions.

Several changes were applied to the LUCA process through a second round of updates from local and tribal governments. In this second round of updates, time constraints kept the field staff from doing a thorough review and the Census Bureau generally accepted everything submitted. This was problematic because it led to an erroneous number of addresses in the MAF, which were costly in dollars, staff resources, and census errors. Changes were made to the LUCA program for Census 2000 to incorporate the information from the dress rehearsal. The Census Bureau changed the approach to LUCA for areas with non-city-style addresses by allowing LUCA reviewers only to challenge block counts rather than add, delete, and correct individual addresses in blocks with non-city-styles. These areas did, however, continue to be provided the individual addresses, regardless of their being non-city-style, for review.¹⁰⁸

One challenge that the agency faced during the dress rehearsal was whether it would be able to process and add new city-style addresses from the Postal Service's Postal Validation Check prior to questionnaire mailout. For this operation, the USPS returned information about addresses that the MAF was missing, addresses that needed corrections, and addresses that did not exist. Only information about missing addresses was used. The operation led to a significant number of deletions: in Sacramento, 75.7 percent of the 12,551 addresses were deletions, while 67.3 percent of South Carolina's 4,856 addresses covered by the operation were deletions. The timing of the Postal Validation Check meant that block codes were not assigned to some new addresses in time to put the questionnaires in the mail stream. So, some addresses were included for the first time in the nonresponse follow-up operation.¹⁰⁹

The update/leave operation, conducted in Menominee and parts of South Carolina, was another source of addresses. For this operation, enumerators canvassed each block in their area, matching, updating, and deleting addresses from their address list and delivered a dress rehearsal questionnaire to each address. Of the 2,060 listings from Menominee, there were 96 new addresses, 566 corrections, and 87 deletions. Of the 66,704 addresses listed in the South Carolina site, 4,331 were new addresses, 7,543 were corrections and 4,225 were deletions.¹¹⁰

Be Counted forms provided another source of late address adds. Many of the addresses added by this operation were not geocoded¹¹¹ in time to be included in the dress rehearsal at all. In the Sacramento site, 84.3 percent of the 1,575 Be Counted cases were properly geocoded, but only 68.3 percent of these were geocoded in time for inclusion in the dress rehearsal. In South Carolina, 91.7 percent of the 661 cases were geocoded in time for inclusion, while in Menominee

¹⁰⁸ U.S. Census Bureau, "Census 2000 Dress Rehearsal Evaluation Summary," August 1999, pp. 5–6.

¹⁰⁹ *Ibid.*, p. 6.

¹¹⁰ *Ibid.*, p. 23.

¹¹¹ Geocoding is the process of assigning an address location identified by one or more geographic codes, e.g. a census block.

76.9 percent of the 13 cases were completed in time. Identifying this problem during the dress rehearsal allowed the Census Bureau to correct it in time for Census 2000.

Dress rehearsal evaluations identified several deficiencies in the MAF building process that could be corrected for Census 2000. However, few of the individual operations were assigned variables that would have identified how each contributed to the overall address list. Address adds and deletes were not linked to specific operations, so the agency was unable to establish a base against which to measure the relative impact of each operation. This problem was corrected for Census 2000.

The Census Bureau planned to conduct a housing unit coverage survey to test the completeness of the MAF but canceled it due to concerns about diverting resources from Census 2000 planning. The agency also recognized that it would gain little of value from an evaluation of the survey, because the survey process was thoroughly revised for Census 2000. Instead of relying on the housing unit coverage survey, the agency generated a preliminary picture of housing unit coverage by analyzing the results of two different operations. The first results came from the initial housing unit match of the Integrated Coverage Measurement/Post-Enumeration Survey (ICM/PES) programs (see below for details). This operation, which took place in the spring of 1998, matched and reconciled the housing units from the MAF with units identified on an independent address list created for ICM/PES. The second involved studying the volume of added and deleted units following that initial match. Taken together, the results of these two operations provided at least a limited indication of housing unit coverage.

Using the returns from these two studies, the Census Bureau evaluated MAF coverage for each site against standards that were based on the 1990 Housing Unit Coverage Study. The agency determined that in Menominee, the MAF coverage was at least as good as the net housing coverage goal of 96.8 percent or better; the net undercount rate there was 0.0 percent. For the Sacramento site, the Census Bureau was unable to determine whether it had met its net housing coverage goal of 98.5 percent or better; the site had a net overcount of 0.5 percent, yet there were indications that the standard may not have been met. The number of additions and deletions following the initial housing unit match indicated that the net undercount could have been sufficiently changed by subsequent operations to prevent the agency from meeting the standard. The MAF of the South Carolina site did not meet the coverage goal of at least 98.5 percent; the net undercount of housing units after the initial housing unit match was 10.5 percent. These results reinforced the agency's decision to redesign the MAF building process.

The lack of a 100 percent block canvass was partially responsible for deficiencies in the dress rehearsal MAF for mailout/mailback areas; this operation was conducted for Census 2000. The Census Bureau also added quality assurance for non-city-style address listing and redefined the delete rules, both of which improved MAF coverage and quality for Census 2000.

Mailing Strategy/Response Options

The dress rehearsal employed the same response options (with the exception of Internet response) that were later used during Census 2000. In addition to mailout/mailback and update/leave, the dress rehearsal used Be Counted forms that were available in several public locations for people to pick up, fill out, and mail back. Respondents also could provide their information over the telephone through the Telephone Questionnaire Assistance (TQA) Program, which used a toll-free telephone number. Less than 1 percent of respondents to the dress rehearsal were counted by these two alternative response options.

Two basic questionnaire delivery methods were used during the dress rehearsal. The first was mailout/mailback, which covered city-style addresses. Each address was sent four pieces of mail: first, an initial notification letter that alerted people that a census questionnaire was coming in time for the April 18, 1998 Census Day; next, the questionnaire itself; after that, a thank you/reminder postcard; and, finally, a second "replacement" questionnaire. This technique was used in Sacramento, CA, and for the portion of the South Carolina addresses with city-style mail delivery (79 percent of addresses).

In Sacramento, questionnaire delivery began on March 28, 1998, while questionnaire delivery to the South Carolina site began on March 24, 1998. The reminder cards and replacement questionnaires were sent between April 3 and April 17, 1998, to all households in the mailout/mailback universe.

The second method, update/leave, was used in areas with rural routes, box numbers, or other non-city-style addresses. For this operation, Census Bureau employees delivered the questionnaires and concurrently updated agency maps and address registers to include any new street addresses. This operation was used in the rural parts of the South Carolina site and all of the Menominee, WI, Indian Reservation. The agency used both long and short questionnaires for each of the sites and delivered them in the same proportion that was used during Census 2000. Respondents were instructed to return completed questionnaires in the mail. As with the mailout/mailback areas, update/leave areas were sent an advance notification letter prior to receipt of their census questionnaire and a thank you/reminder card following it. The advance notification and the reminder card were delivered by the U.S. Postal Service and were addressed to "Postal Patrons" in the update/leave areas. Unlike the mailout/mailback areas, no second questionnaires were delivered to these addresses. The questionnaires were delivered beginning March 14, 1998, and reminder cards were sent between April 7 and April 11, 1998. In Menominee, the mail response rate was 39.4 percent (all update/leave). The update/leave portions of the South Carolina site had a 47.8 percent response rate.

Following the dress rehearsal, the Census Bureau decided not to employ the replacement questionnaire in Census 2000.¹¹² For each of the sites, a majority of all mail respondents returned their completed questionnaire by Census Day; 74.9 percent in Sacramento, 74.6 percent in South Carolina, and 78.8 percent in Menominee. Most respondents used the original questionnaire since the replacement was not delivered until around Census Day. While the replacement questionnaire increased the overall response rate, 56 percent of those that were returned to the agency came from households that had also returned the initial questionnaire. Of the responses from households that returned both, 86.8 percent in Sacramento and 88.3 percent in South Carolina were identical on the initial and replacement. The improvement in the mail response rate due to the replacement questionnaire was just over 8 percent in South Carolina and about 7.5 percent for Sacramento. However, the sheer volume of duplicates that the Census Bureau believed could have been returned from a general mailing of replacement questionnaires threatened the quality of Census 2000.

The Census Bureau also tested non-English-language questionnaires during the dress rehearsal. To areas with high concentrations of Spanish or Chinese households, the agency sent both the English and non-English questionnaires. The Spanish-language questionnaire was returned by 4.9 percent of households that received a Spanish questionnaire. The Chinese version was returned by 7.1 percent of the households that received a Chinese questionnaire. The small proportion of respondents who used the non-English questionnaire demonstrated that either the agency needed better methods to select the targeted areas or that special language forms were not needed by many respondents. The agency experienced difficulties with matching English- and non-English-language questionnaires with the same identification codes and placing both in a single envelope. This was a labor-intensive and time-consuming process that was prone to error, so the Census Bureau decided not to conduct a similar operation for Census 2000. Instead it opted to mail an English-language questionnaire to all households and offer the option of requesting 1 of 5 different language questionnaires by responding to the advance letter. The five languages were Chinese, Korean, Spanish, Tagalog, and Vietnamese. The agency also planned to have language guides¹¹³ in at least 49 languages for Census 2000.

During the dress rehearsal, the Census Bureau tested another response option, Be Counted forms. These forms offered a response option to people who may not have received a census questionnaire or who believed that they were not included on one. Be Counted forms also allowed people

¹¹² Coupled with the experience of the dress rehearsal, replacement questionnaires also were not employed because of the time, space, and cost requirements of identifying, preparing, and mailing replacement questionnaire packages.

¹¹³ Language guides assisted non-English speaking households by walking them, question-by-question, through the questionnaire to enable them to provide their responses.

who had no usual residence on Census Day to be counted in the census. Local government officials, community groups, and local census officials helped the agency to identify locations at which to make the Be Counted forms available; these locations included local businesses, community organizations, libraries, post offices, grocery stores, and churches. These forms were printed in English, Spanish, Cantonese, Vietnamese, Mien, and Russian. The Be Counted campaign began on April 16, 1998, for all three sites and ended on May 1 for Sacramento and Menominee, and on May 14 for South Carolina. There were 218 Be Counted distribution sites for Sacramento, 183 for South Carolina, and 16 for Menominee.

When Be Counted responses were received, they were geocoded and verified. Addresses for individuals listed on the form were searched to guard against the possibility of duplicate enumerations. Those Be Counted forms without an address and for which the respondents indicated that they had no usual address on Census Day were included in the service-based enumeration process. Overall, 1,707 people¹¹⁴ who otherwise would have been missed, were added by Be Counted forms. In Sacramento 1,575 Be Counted forms were submitted which resulted in 907 geocodable addresses; of these, 343 had information for 870 people who would have been missed. In South Carolina, there were 783 responses with 606 geocodable addresses; of these, 337 contained information for 821 people who would have been missed. In Menominee, 21 responses yielded 10 geocodable addresses; of these, 5 had information that added 16 people who would have been missed. In addition to the 1,707 people added at these addresses, 85 people were added by Be Counted forms via the service-based enumeration operation.¹¹⁵

Fewer people than anticipated were enumerated by Be Counted forms, in part due to problems with the geocoding, processing, and unduplication operations that removed responses for reasons such as “nonexistent housing unit” or “duplicates another response.” Many forms did not arrive in time to be included in the Dress Rehearsal because it took too long to process them prior to non-response follow-up. While these forms were discarded, many of the addresses may have received a visit during nonresponse follow-up. For Census 2000, the Census Bureau improved the way it accounted for Be Counted forms by improving or automating several operations, particularly check-in, geocoding, and field verification of addresses that did not match those on the MAF. The agency also consulted with its partners to determine the best locations for Be Counted forms. One residual issue was that Be Counted forms had higher item nonresponse rates which decreased data quality when compared to responses from other mail returns.¹¹⁶

Telephone Questionnaire Assistance (TQA) offered another response option during the dress rehearsal. This operation (managed and staffed by Census Bureau employees during the dress rehearsal), began at the same time as update/leave and remained available through nonresponse follow-up. The TQA was conducted from the Census Bureau’s Tucson, Arizona, telephone call center and served callers from all sites in the same manner; it was not designed to differentiate among callers from the three dress rehearsal sites.

The TQA allowed the agency to field questions from the public regarding what the census was, why it was being conducted, and how to complete the questionnaire. Respondents could use the system to request that a form be sent to them, or they could provide their short-form questionnaire data by completing a telephone interview with a census operator. There were three components of the TQA operation. Calls first were fielded by an Interactive Voice Recognition (IVR) system that was designed to collect an address so that a questionnaire could be sent to the caller. For callers who required direct assistance, the automated system re-routed the call to an interviewer

¹¹⁴ A coding error resulted in some people being incorrectly attributed to Transient Night (T-Night) operations instead of Be Counted. See “Service-based enumeration.”

¹¹⁵ U.S. Census Bureau, “Census 2000 Dress Rehearsal Evaluation Summary,” August 1999, pp. 40–41.

¹¹⁶ Although the data quality from Be Counted forms was less when compared to mail returns, the Census Bureau deemed it more important to deal with the quality issue and count these people as they likely would have been missed by other enumeration methods.

who evaluated the reason for the call, coded the reason, and provided assistance to the caller. Census information could be provided over the telephone for short-form questionnaire recipients.¹¹⁷

The automated system was able to collect addresses from callers so that replacement questionnaires could be sent. The system used three methods to collect addresses. The first used the caller's telephone number to match to a database of residential addresses; these callers merely had to verify their house number and street name. The second method prompted the caller to provide a complete mailing address via the IVR, while the third required an operator to collect the complete address. Overall, these three methods yielded correct addresses 89 percent of the time (91.3 percent for telephone number match, 89.3 percent for those taken by voice capture, and 82.2 percent of those taken by an operator). The first two methods were limited to capturing city-style addresses, which were more likely to match to the MAF. Of the callers who requested a form and who had a city-style address, 69 percent returned a questionnaire, though most returned their original form. About 20 percent of all callers requested a questionnaire; 17 percent made the request through the IVR, while the remaining 3 percent did so through an operator. Of those requesting a questionnaire, 85 percent returned the original questionnaire that was mailed to their address rather than the replacement they requested. Very few opted to provide their information over the telephone through an operator; in all three sites combined, there were just over 100 TQA interviews. Despite the low usage by respondents, the Census Bureau's stakeholders requested that the system be maintained for Census 2000.

The Census Bureau used these two alternative data collection methods (Be Counted forms and Telephone Questionnaire Assistance) in order to reach populations that were expected to have language difficulties and to provide a last resort for people who believed that they had been missed by the count. The agency feared that when it enumerated people through these alternative methods that it would lose long-form data. While TQA respondents were assigned the long-form questions on a sample basis, Be Counted forms were all short-form questionnaires. The overall loss of sample data from alternative data collection methods and other reasons was 0.9 percent in South Carolina, 1.2 percent in Menominee, and 1.4 percent in Sacramento. However, the loss by alternative data collection methods alone was limited; 0.0 percent for South Carolina and Menominee, and 0.4 percent in Sacramento.¹¹⁸

Advertising

In order to raise awareness and stimulate response to Census 2000 among the general population and hard-to-enumerate groups, the Census Bureau planned an extensive advertising and marketing campaign. Census 2000 marked the first time that the Census Bureau decided to use paid advertising (in earlier censuses, the agency relied on *pro bono* advertising to encourage response). While the advertising campaign and marketing program were used in all three test sites, quantitative evaluations of the ad campaign were carried out only for Sacramento and South Carolina. The advertising program included advertisements delivered through television, radio, newspapers, magazines, and out-of-home media (billboards, bus shelters, posters, mobile billboards, and ads on shopping carts, in beauty salons, convenience stores, and check-cashing establishments, etc.). The Census Bureau also conducted a special school-based public information campaign.

Evaluations covered two aspects of the campaign's effectiveness. The first studied changes in census awareness, attitudes, and knowledge before and after the campaign. The second analyzed the relationship between exposure to the advertising campaign and likelihood of returning a completed questionnaire. These evaluations determined that the campaign both increased awareness and demonstrated that those who expected a census questionnaire were more likely to return it. While the evaluations concentrated only on the efforts of the paid advertising campaign, the effect

¹¹⁷ As the cut-off date for telephone nonresponse follow-up neared, callers were encouraged to submit their information by telephone (instead of mailing a replacement questionnaire) so as to avoid the household receiving a mailed replacement questionnaire and a nonresponse follow-up enumerator's visit at approximately the same time and risking duplication of the household.

¹¹⁸ Zakiya T. Sackor, "Census 2000 Dress Rehearsal," *Proceedings of the Survey Research Methods Section*, American Statistical Association, 1999, pp. 761–65.

of other promotional activities certainly influenced people's awareness of the census. These activities included independent promotional and advertising efforts sponsored by local partners and the receipt of census materials (including the pre-notice letter, census forms, and the reminder postcard).

Before and after the media campaign, the Census Bureau conducted a telephone survey of both Sacramento and South Carolina residents to determine their awareness, attitudes, and knowledge of the dress rehearsal. Within the sample households, the household member who was responsible for opening the mail was interviewed. Interviewing began on February 10, 1998, leaving only 19 days to complete the interviews before the media campaign began. The pre-campaign survey allowed for only a short field collection period, so as a result the response rates were much lower than those achieved by the post-campaign survey. For the pre-campaign survey, the response rate in Sacramento was 25 percent and 28 percent in South Carolina. In contrast, the post-campaign response rate was 54 percent in Sacramento and 64 percent in South Carolina. The awareness study showed that in Sacramento, people's awareness of the census increased from 28 percent (158 people out of 565 respondents were aware) before the ad campaign to 80 percent (1,203 people out of 1,504 respondents) after it. In South Carolina, awareness rose from 29 percent (237 people out of 817 respondents were aware of the census) before the campaign to 89 percent (1,340 people out of 1,506 respondents) after it. These results were in line with the agency's goal of increasing awareness by at least 30 percent in both sites.

The advertising campaign began the first week of March and ran through the last week of June, for some media. While awareness was highest among non-Hispanic Whites and those with higher levels of education and income, significant proportions of low income and education groups and targeted race and ethnic groups were found to have been exposed to the campaign. The most effective medium for reaching respondents was television, reaching larger proportions of each of the targeted subgroups than any of the other media. The television campaign reached 62 percent of respondents in Sacramento and 68 percent of respondents in the South Carolina site. Meanwhile, magazine ads were the least effective medium, reaching only 13 percent of the population in Sacramento and 16 percent in South Carolina.

The study also found a positive relationship between reported advertising exposure and level of census knowledge, even when controlling for other factors such as race/ethnicity, income, and education. However, non-Hispanic Whites still had significantly higher levels of census knowledge after the campaign compared to the targeted race and ethnic groups. In addition to awareness about the census, level of civic participation and expectation of receiving a census form both were strongly associated with the likelihood of mailing back the completed questionnaire. While the agency did not find a direct relationship between advertising and response behavior, the analysis suggested that advertising may have had an indirect effect on behavior by making people expect the questionnaire, which in turn was associated with a higher likelihood of returning it.

Data Collection and Field Infrastructure

Not all households responded to the dress rehearsal via their original questionnaire or through alternative response options such as Be Counted forms and Telephone Questionnaire Assistance. The Census Bureau conducted a nonresponse follow-up operation to collect census information from these nonresponding households.

Finding and collecting data from nonrespondents was one of the most difficult and costly operations of the census. In order to obtain an accurate count of nonrespondents while reducing costs, the Census Bureau planned to employ statistical sampling. A budget agreement between Congress and the Clinton Administration (see "Dual-Track Census Planning") stipulated that one site had to use a full nonresponse follow-up, so sampling for nonresponse follow-up was used only in Sacramento.¹¹⁹

Housing units for which questionnaires were not checked in by May 7, 1998, were placed in the nonresponse follow-up universe for each site. The agency conducted a full nonresponse follow-up

¹¹⁹ The small size of the Menominee County, WI, population prevented sampling for nonresponse follow-up.

in South Carolina and Menominee beginning on May 14, 1998. The agency completed this operation on June 26, 1998, for Menominee, and on July 2, 1998, for South Carolina.

In Sacramento, nonresponse follow-up collected census data from only a sample of housing units in the nonresponding universe. The sample was designed so that each census tract reached a final completion rate of at least 90 percent. For example, a tract that reached an initial completion rate of 85 percent would be sampled at the rate of 1-in-3 nonresponding housing units in order for the final completion rate to reach 90 percent. Through statistical estimation techniques, responses from all of the other nonresponding households were derived from the sample responses. Households that were added to the address list too late to be sent a questionnaire were included in the nonresponse follow-up universe. The agency completed this operation in Sacramento, CA, on schedule on June 26, 1998.

Before applying sampling methods, the agency made a concerted attempt to contact nonresponding households. Enumerators were required to make six attempts to collect data, three by personal visit and three by telephone. If household residents were unreachable, enumerators were allowed to interview knowledgeable people who did not live in the housing unit to collect “proxy data.” If an enumerator was unable to get any data on a household, and was unable to determine whether it was vacant or occupied, they listed it as an “unclassified unit.” Final attempt procedures began once an area reached a 95 percent completion rate for nonresponse follow-up.¹²⁰

The dress rehearsal was the first time that enumerators specifically indicated that a response was obtained by proxy, hence it was the first time that the agency directly measured proxy use. While the agency hoped to rely on proxy data for no more than 6 percent of the nonresponding universe (based on 1990 census data), the actual rates were significantly higher. Proxy data were used for 20.1 percent of the occupied nonresponse follow-up universe in Sacramento, 16.4 percent in South Carolina, and 11.5 percent in Menominee.

In Sacramento, 8.9 percent of housing units in the nonresponse follow-up universe were enumerated during final attempt procedures, while the other two sites met the 5 percent standard that the agency established for final attempt cases.¹²¹ The rate was higher in Sacramento, CA, because enumerators failed to follow the operational rules for collecting final attempt data.¹²² Because of concerns about the low quality of proxy and final attempt data, the Census Bureau decided to review the procedures for trying to conduct nonresponse follow-up interviews with household members. As a result, the agency increased the training and quality assurance for nonresponse follow-up.

At the end of nonresponse follow-up, almost all housing units were classified as occupied, vacant, or deleted; only a very small proportion of housing units remained as unclassified. Due to the number of lost forms and problems with the data capture and data processing processes, the agency was unable to meet its goal, of no more than 0.05 percent of households listed as

¹²⁰ Once a local census office reached an average 95 percent rate of completion during the nonresponse follow-up operation, the regional director instructed the office to begin “final attempt” within 2 days. During “final attempt” enumerators made one final visit to nonrespondent addresses that had been visited at least two times and to some housing units for which only minimal data had been collected to complete as much of the questionnaire as possible. If an address was only visited once, an enumerator made up to two additional visits during “final attempt.” The intent of “final attempt” was to resolve all outstanding cases within a few days, but nonresponse follow-up was not over until a questionnaire was completed and checked into the local census office for every unit.

¹²¹ The rate for South Carolina was 3.2 percent and for Menominee, 0.1 percent.

¹²² Assuming that record keeping was accurate in Sacramento, CA, it appears that the “final attempt” procedures—part of nonresponse follow-up—were not properly followed. Greater than 5 percent (8.9 percent) of the nonresponse follow-up universe was enumerated during final attempt procedures. The intended rule was that final attempt procedures for each crew leader district within the dress rehearsal site were not to begin until 95 percent of the housing unit workload in that area had been completed.

Final attempt procedures were successful in South Carolina, as 3.2 percent of the housing units in the nonresponse follow-up universe had their information obtained during final attempt operations. In Menominee, either the final attempt procedures were not utilized or unnecessary, since only one questionnaire indicated that it had been completed during final attempt operations. [C. Robert Dimitri, U.S. Census Bureau, Decennial Statistical Studies Division, “Nonresponse Follow-up Operation,” Census 2000 Dress Rehearsal Evaluation Memorandum A1b, April 1999.]

unclassified. In Sacramento, 1.0 percent of the housing units in the nonresponse universe were unclassified; the unclassified rate for South Carolina was 1.1 percent, and in Menominee, it was 0.8 percent.

Service-based enumeration. The Census Bureau included a service-based enumeration during the dress rehearsal to collect data from people without housing who might have been missed by the traditional procedures applied to housing units and group quarters. Enumeration sites included emergency shelters, soup kitchens, and targeted non-sheltered outdoor locations, such as outdoor encampments. Individuals who submitted Be Counted forms that listed “no address on April 18, 1998” were included in the service-based enumeration universe. In general, the operation in the more carefully controlled sites appeared to be a successful way to include people without housing in the census. A total of 1,615 people were added through service-based enumeration across all three sites. In Sacramento, the Census Bureau enumerated 12 sites (11 shelters, one soup kitchen),¹²³ in South Carolina 19 (13 shelters, four soup kitchens, and two targeted non-sheltered outdoor locations [TNSOLs]) and 2 TNSOLs in Menominee.

Service-based enumeration took place between April 20 and 22, 1998, beginning with emergency shelters on April 20. At least one team of two enumerators went to each shelter, introduced themselves to the contact person, explained the enumeration process, and asked the contact person to make an announcement to encourage participation. Participants received a Privacy Act notice in a packet that also included a questionnaire, pencil, envelope, and for every sixth person, a long form. Respondents were asked to complete and return their questionnaires in the envelope provided.

Soup kitchens were enumerated during the day and evening of April 21, 1998. The Census Bureau sent teams of seven enumerators to each location, with multiple teams working at the larger locations. Upon arrival, the enumerators introduced themselves to the contact person, explained the enumeration process, and asked the contact person to make an announcement to encourage participation. Two members of the team conducted long-form interviews.

Enumeration at targeted nonsheltered outdoor locations took place on April 22, 1998. Census partners provided a contact person to visit each of these locations along with enumerators. No long forms were administered at these sites and enumerators were instructed to note age and sex if they were unable to complete an interview.

The agency developed procedures to handle duplicate questionnaires from individuals providing data from two locations. Questionnaires completed at a shelter were determined to be the primary source if a respondent provided data both there and at a soup kitchen or TNSOL. If respondents provided data at both a soup kitchen and a TNSOL, the more complete questionnaire was regarded as the primary source. People who responded via Be Counted forms were allocated randomly to shelters, soup kitchens, and TNSOLs for tabulation purposes. After enumeration and unduplication, 96.9 percent of the 1,193 respondents to the service-based enumeration in Sacramento were included in the dress rehearsal count; 86.1 percent of the 525 respondents in South Carolina were included, and 100 percent of the seven respondents from Menominee were included.

Coverage edit follow-up.¹²⁴ The Census 2000 Dress Rehearsal Coverage Edit Follow-up operation was a procedure to edit and correct enumeration data indicating household size on short- and long-form mail return questionnaires. Errors in the data on household size resulted either from data capture errors, caused by scanning or imaging problems, or from respondent errors. Data capture audit resolution, a computer edit and computer-assisted review process, was expected to resolve many, if not most, of the data capture errors affecting household size. The coverage edit follow-up was designed to correct respondent errors resulting from the inadvertent omission or duplicate listing of household members, the misunderstanding about who should be included on a census form, or from a general failure to completely and accurately fill out the census form.

¹²³ There were some TNSOL locations in Sacramento; however, they were incorrectly coded as Transient Night (T-Night) enumeration locations. See, U.S. Census Bureau, “Census 2000 Dress Rehearsal: Evaluation Summary,” August 1999, p. 56.

¹²⁴ U.S. Census Bureau, “Census 2000 Dress Rehearsal: Evaluation Summary,” August 1999, pp. 58–59.

Short-form questionnaire households needing coverage edit follow-up were identified by comparing the count of household members at the beginning of the questionnaire (short-form person count box) with the number of person panels filled plus the number of names entered on the short-form roster (for persons 6–12). On long-form questionnaires, the coverage edit compared the number of names on the household roster with the number of person panels filled. If these measures of household size did not agree and the data showed that there were less than six people in the household, the questionnaires failed the coverage edit and required follow-up. (Mail return questionnaires with six or more people were included in the large household follow-up [see below] and were ineligible for coverage edit follow-up.)

For each coverage edit failure, a telephone interview with a household member was attempted to review the information about the count of the household members and the names of the people listed on the form. When the follow-up interview was not possible, the household size was imputed by choosing the maximum count of people, not to exceed a total of five, based on all available data. A comparison between the household sizes determined through the follow-up interviews and the household sizes that would have been imputed had follow-up interviews not been completed demonstrated that the coverage edit follow-up had a substantial downward impact on the net population count for forms that failed the coverage edit. Had the coverage edit follow-up not been conducted, the mail return population would have been 0.3 percent higher in Sacramento, CA, 0.6 percent higher in South Carolina, and 0.8 percent higher in Menominee County, WI.¹²⁵

Large household follow-up.¹²⁶ The Census Bureau unsuccessfully tested a large household follow-up for the first time during the dress rehearsal. The questionnaires included spaces to record information for up to five household members. Households with six or more members were sent a follow-up questionnaire to collect the demographic data for “Person 6” and above in these large households.

Fewer than one-third of large households for all three sites returned the supplemental questionnaire. Only two-thirds of the large households received the follow-up questionnaire and less than one-half of those households returned them. In Sacramento, less than 31.1 percent of large households responded, while only 28.3 percent of large households responded in South Carolina, and 32.7 of those in Menominee. Low collection rates meant that information for additional household members had to be statistically imputed. For example, in South Carolina, 1.9 percent of the mail return population were imputed people and more than 70 percent of those people were imputed in large households.

Certain population groups that tend to predominate in large households, such as children and race/ethnic groups other than non-Hispanic Whites, had disproportionately high rates of imputed data. For instance, in South Carolina, 4.8 percent of all young children (10 and under) versus 32.2 percent of those in the large household population were imputed in large households. The results of this operation led the Census Bureau to revise the Census 2000 self-administered questionnaires to allow households to report information for up to six people, thus reducing the number of large households requiring follow-up. This follow-up was conducted by telephone rather than a supplemental questionnaire to increase completion rates.

Recruiting, hiring, and training. The Census Bureau experimented with its staffing and pay programs to ensure an adequate and stable workforce for nonresponse follow-up and other field operations during the dress rehearsal. Recruiting and training a competent, motivated, and representative staff of local enumerators who were available to work flexible hours, including evenings and weekends, and were geographically distributed across areas of a site, may have been the most important factor affecting the quality, length of time required, and overall cost of the field data collection phase of the census.

¹²⁵ As a result of the dress rehearsal, the Census Bureau designed coverage edit criteria for Census 2000 that were similar to those used in the dress rehearsal. The number of cases receiving a call was not capped as it was in the dress rehearsal and all large households were included in the follow-up operation. For Census 2000, the coverage edit follow-up and the content follow-up for large households were integrated into one operation.

¹²⁶ U.S. Census Bureau, “Census 2000 Dress Rehearsal: Evaluation Summary,” August 1999, pp. 60–61.

The agency engaged in several recruitment activities. Most applicants reported hearing of the job from a friend or through a census mailing (including recruitment postcards and the advance notices to the questionnaire). Newspaper and radio advertisements, though used minimally, proved to be only marginally effective at attracting applicants. In South Carolina, census mailings were ranked the most important method of attracting applicants, while in Sacramento “friend or relative” was the most frequent source cited for providing information about census employment. Local partnerships with community centers and other organizations also were effective in attracting applicants. In Menominee, the two most often cited sources of job information were “friend or relative” and “federal, state, or tribal employment office.” Most applicants were selected 50 to 65 days after taking the test, but this lag varied; the average time between testing and recruitment was 52 days in Sacramento, 81 days for the rural areas of South Carolina, and 61 days for the city of Columbia, SC.

Throughout Census 2000 operations, the Census Bureau made a concerted effort to hire welfare-to-work applicants, in an attempt to meet the hiring goals for federal agencies set by the President. The Secretary of Commerce set a goal of 4,000 of these individuals to be hired by the Census Bureau. At all three sites, the agency relied on its partners to help recruit applicants; the primary partners in this effort were the Department of Social Services, the Supplemental Food Program for Women, Infants, and Children, local churches, community action leagues, vocational rehabilitation centers, and the Department of Veterans Affairs. Overall, the agency exceeded its hiring goals during the dress rehearsal, though individual sites varied in their effectiveness. The Sacramento site, with a hiring goal of 49 welfare-to-work employees, hired 200 people, while the South Carolina effort employed 71 out of a hiring goal of 121, and Menominee met its hiring goal by employing 2 welfare-to-work applicants. Welfare-to-work applicants were identified via a voluntary Office of Personnel Management form (1635). Partner agencies provided additional hiring information. Some applicants chose not to identify their welfare-to-work status, so there may have been more welfare-to-work hires than reported.

There were several hiring obstacles faced when trying to hire applicants. One problem with hiring for field jobs was transportation. While this was minimized in Sacramento and South Carolina by placing welfare-to-work applicants in office positions in the local census offices, it remained a significant issue. Other applicants feared that by accepting a job their benefits would be reduced; this was particularly problematic in South Carolina. The local partners there were more interested in moving welfare recipients to longer term employment than in having people accept a short-term position. In Sacramento, the time lag between recruiting and hiring led some applicant referral sources to lose interest in promoting dress rehearsal jobs. In addition, having to report to headquarters and to referral agencies on the number of applicants tested and hired, completing earnings reports as required by the state of California, and having limited space all posed further obstacles.

Partner agencies worked with California’s Employment Services to automate hiring reports. This, combined with the Sacramento staff’s preparation of test training manuals for applicants, helped make the Sacramento site particularly successful in recruiting, testing, training, and hiring welfare-to-work applicants. The Menominee site had applicants who faced additional problems, such as lack of child care, a driver’s license, or a telephone. It also was a more competitive labor market. Since Menominee was primarily an Indian reservation and the tribe did not require residents to have a driver’s license to drive on the reservation, most applicants were unable to meet the agency’s requirement that applicants possess one. People without telephones were contacted in person by Census Bureau staff.

The agency front loaded, or hired the staff for the entire nonresponse follow-up period in the beginning, to ensure an adequate pool of ready workers for all of its field operations. Doing so allowed the agency to meet or beat established deadlines for field operations and compensate for attrition of temporary staff. The agency used data from the Pre-Appointment Management System/Automated Decennial Administration Management System to track employee payroll and hiring. The agency hoped to attract approximately ten times the number of applicants as there were enumerator positions for nonresponse follow-up. The hiring goal was approximately twice the number of authorized enumerator positions. In contrast, hiring for Integrated Coverage

Measurement/Post-Enumeration Survey (ICM/PES) was equal to the number of positions, with replacement enumerators hired as needed. Most recruits were considered eligible applicants; 70 percent in Sacramento, 83 percent in South Carolina, and 66 percent in Menominee. Relatively few who were offered positions refused—5 percent in Sacramento, 2 percent in South Carolina, and 13 percent in Menominee. The agency had some success in retaining its nonresponse follow-up hires through the training process; in Sacramento and South Carolina, 74 percent of those who began the training completed it, while 79 percent did so in Menominee. In Sacramento, 88 percent of trainees stayed on to receive an assignment, while 100 percent of those in South Carolina did so, and 86 percent of those in Menominee.

Enumerator training was evaluated both by the Census Bureau and by an outside expert. While the evaluation intended to look at trainee and trainer attitudes, trainee comprehension and skill development, and post-training performance, most of the focus was on trainer and trainee attitudes.

Enumerators received training specific to the operation to which they were assigned. The training materials were developed to be generic in nature and used in all geographic areas. There were two key distinctions. Nonresponse follow-up enumerator training provided field experience and feedback while ICM/PES did not, and the ICM/PES enumerators were provided with computer-based training while the nonresponse follow-up enumerators were not. Overall, the enumerator attitudes toward training were similar across sites and did not vary significantly between nonresponse follow-up training and ICM/PES training. All were satisfied with the skill development provided, but both nonresponse follow-up and ICM/PES enumerators still felt underprepared to deal with reluctant respondents. Nonresponse follow-up enumerators appreciated the field training, the pace of the course, and the training video. However, they expressed a need for more map training, role playing, and guidance in completing the long form and following proxy procedures. Observers noted that while enumerators claimed to be prepared to read the questions as worded, many did not do so during actual interviews. Both sets of enumerators expressed dissatisfaction with the explanation of how the supplemental pay system worked.

The Census Bureau evaluated how its new pay rates influenced its ability to recruit, hire, and retain an adequate staff of enumerators. The agency analyzed how the pay rates affected production and turnover, and examined the influence of supplemental pay. The wage rate of \$12.50 per hour in Sacramento and \$10.50 in South Carolina was adequate to hire and retain an adequate staff of enumerators. At both sites, nonresponse follow-up was completed on time and within budget. Focus groups with enumerators, recruiters, and senior managers revealed that most everyone viewed the agency's pay package favorably; the package included high hourly pay, transportation costs, and paying time in training. The agency also evaluated enumerator performance. It found that those who were previously unemployed completed fewer cases on average than enumerators who had been employed part-time or were not in the labor force (retirees); the unemployed also were quick to leave census jobs to take other work. The agency concluded that those not in the labor force could be an effective recruitment pool. It also concluded that high wages were crucial to getting these individuals to become enumerators. Further analysis suggested that a decrease in the wage rate by \$1.00 per hour would have increased the number of enumerators who quit by 25 percent. The Census Bureau concluded that paying a wage rate at least 75 percent of the prevailing wage rate is vital to recruiting part-time employees and individuals who are out of the labor force. Dress rehearsal data suggested that nonresponse follow-up for Census 2000 could be improved by selecting enumerators who were willing to work at least 24 hours per week for about 7 weeks and that all enumerators should be hired prior to the start of operations.

While it was clear that high wages were important to attract and retain enumerators, it was less clear whether the supplemental pay entitlements had any influence on performance. A post-nonresponse follow-up telephone survey of about half of all enumerators revealed that about 70 percent were very satisfied with the hourly pay, but only 32 percent were very satisfied with the supplemental pay tied to the number of cases completed each week, and less than 20 percent were very satisfied with the completion bonuses. The supplemental pay system was complex and the payments were not timely. These findings suggested that the Census Bureau should not implement a supplemental pay system for Census 2000.

The Census Bureau's Equal Employment Opportunity (EEO) office established an automated system to handle all employee and job applicant allegations of discrimination based on race, color, religion, sex, national origin, disability, age, and reprisal for participation in equal employment opportunity protected activities. Initial complaints or contacts were logged into the tracking system and EEO specialists from the agency tried to resolve the complaints and notify complainants of their rights. A limited number of initial contacts during the dress rehearsal made it difficult to evaluate the capacity of the process. A total of 14 complaints were entered between January 1 through June 30, 1998. Limited data made it impossible to predict how well the EEO process would handle the projected Census 2000 caseload.

Logistics. The Census Bureau also evaluated its ability to provide the necessary office equipment and furniture, operational forms, administrative forms, and other supplies needed by its office and field staff. The assessment, based on surveys and supply reporting systems, focused on the timeliness of opening field offices, the timeliness of receipt of supplies, and the adequacy of the quantity of supplies. Supplies that were required to open and set up offices generally arrived in a timely manner and in adequate quantity. In Sacramento, the local census office needed a supplementary order of nonresponse follow-up supplies; in some cases, the original quantities ordered were not received. In South Carolina, the initial order arrived on time and in the precise quantities originally ordered; while there was insufficient detail from Menominee to evaluate the supply ordering process. The resupply/reordering process was minimally adequate. In South Carolina, reorders were sent by facsimile to the Charlotte regional census center, which then placed an order with the General Services Administration (GSA). In some instances, the Charlotte office staff did not forward the orders to GSA and site staff had to purchase supplies locally. Limited data from the Sacramento and Menominee sites indicated that there were delays at least in the Sacramento site. For all three sites, the inventory control system was effective; inventory was checked and updated weekly.

Data Processing¹²⁷

Data processing for the dress rehearsal included: scanning to capture images; creating data files by reading the images; editing and imputation; the Within-Block Search, which searched for people to match across the block; the primary selection algorithm (PSA), which determined the data to be used for each housing unit in the census; and the Invalid Return Detection operation.

Data capture. The data capture operation for the Census 2000 Dress Rehearsal utilized digital imaging technology to capture responses from the census questionnaires. The image system consisted of scanning the questionnaires to create image files. Optical character recognition (OCR) software was used to interpret the handwritten responses, and optical mark recognition (OMR) software was used to interpret the mark responses. The system was designed with a key-from-image component to display responses on a computer screen to a keyer when the OCR software was uncertain of the correct answer. If a questionnaire could not be scanned, it was sent to be keyed from paper.

The evaluation study was only able to analyze data from the mailout/mailback short form questionnaire. Overall, the error rate for the transfer of data in check boxes (read by OMR) on the short-form questionnaire was 0.8 percent. Of these errors, 21.9 percent were from added responses that should not have been on the dress rehearsal response file, 52.8 percent were omitted responses that should have been on the response file, and 25.4 percent had the wrong response captured. Approximately 41 percent of the mark response errors may have been due to the way the respondent answered the questionnaire, while another 25 percent were from questionnaires that were received but had no data on the dress rehearsal file. In cases where a respondent marked more than one race or Hispanic-origin box, the error rate was significantly higher. When respondents marked more than one race, the data capture system missed at least one of the marks in 15.3 percent of the questionnaires. When respondents entered more than one mark on the Hispanic-origin question, the system omitted at least one mark from 23.2 percent of the questionnaires. Taken together, these multiple mark response errors represented about 29 percent of

¹²⁷ U.S. Census Bureau, "Census 2000 Dress Rehearsal: Evaluation Summary," August 1999, pp. 72–78.

the mark omission errors. The high rate of errors in this case was due, in part, to a lack of time. The Office of Management and Budget's (OMB) revised Statistical Policy Directive No. 15, which was released on October 30, 1997, required federal agencies to capture multiple responses to the race question. This requirement was added too late for the Census Bureau to develop and test the data capture system's ability to capture multiple responses prior to the dress rehearsal.

While the Census Bureau was unable to assess the dress rehearsal OCR quality, the overall system yielded a 3.0 percent error rate for write-in fields that were filled (this included OCR and keying in fields that were unreadable by the OCR software). However, the error rate varied by field. For instance, the coverage question (number of household residents) had an error rate of 1.0 percent, while the three race question write-in areas had error rates between 9.8 percent and 12.3 percent across sites. Respondents to the race question sometimes used irregular truncation and abbreviations of their entries to be sure that they fit into the space provided (20 segmented boxes). Of the write-in response errors, 63.7 percent had wrong characters or numbers, 13.8 were omitted responses that should have been on the dress rehearsal response file, 10.9 percent had characters or numbers omitted, 5.5 percent had characters or numbers added, 1.7 percent were added responses that should not have been on the response file, and 4.5 percent were characters in numeric fields, or vice versa. Most of the errors in the OCR system, 40.4 percent, probably were due to illegible handwriting; others arose when respondents edited their answers or did not use a pen to complete the questionnaire. Approximately 24 percent of write-in errors may have been due to the way that a respondent filled out the questionnaire (for instance, crossing out a response and writing in another). Approximately 29 percent of the errors had no apparent cause and 6.6 percent of write-in response errors were from questionnaires that were checked into the data capture system but had no data on the dress rehearsal response file. The agency worked closely with the contractor to address these issues in preparation for Census 2000.

The agency evaluated the effect of segmented write-in areas (boxes) on the quality of data gathered from the three race write-in response areas. It also evaluated the quality of the coding operation for both the general and expert race coding. General coding was handled by an automated system, while expert coding, done manually by expert staff members, was applied to write-in entries that could not be processed through the automated system. More than 80 percent of write-in responses were coded by the automated system, which was far less than the 97 percent that were coded automatically during the 1990 Census. The lower rate was a result of changes in the race question (in particular, the option to select more than one race), changes in coding procedures, and the use of segmented boxes. All long write-ins, those of more than 20 characters, required an expert coder. The major race groups (White, Black, American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander) and the Some Other Race category were represented in the distribution of long write-ins. Nearly 60 percent of long write-ins required the use of more than one race code. In addition, 0.3 percent of respondents wrote in "American" and 4.6 percent of responses were uncodable. The agency predicted that most of the questionnaires that would require expert coding for Census 2000 would be those cases of long write-ins that require multiple codes; all 461 of the long write-ins for the dress rehearsal required expert race coding.

The Census Bureau also tested two methods to resolve instances of multiple responses from the same household and from those individuals who used one of the new response options such as replacement questionnaires, Be Counted forms, and Telephone Questionnaire Assistance (TQA) interviews. In the update/leave areas of South Carolina about 6 percent of households had more than one return, while in all other areas the rate was about 12.5 percent; at all sites fewer than one-half of 1 percent of addresses returned more than two responses. In addition to households submitting multiple mail responses, between 3 and 4 percent of all housing units were counted both by a mail response and by nonresponse follow-up. In some cases, addresses enumerated by Be Counted responses and TQA interviews were not geocoded or matched prior to the identification of the nonresponse follow-up workload. Hence, these addresses which had submitted a response, were still placed in the nonresponse follow-up universe. In some instances, specific nonresponse follow-up cases were assigned to more than one enumerator, generating more than one response for the same address. Households with more than one eligible questionnaire were subject to unduplication procedures within the block and at the address.

Within-Block Search Operation and Primary Selection Algorithm¹²⁸

The plan for Census 2000 included making it easier for people to respond by providing multiple response options. This included allowing people to respond on Be Counted forms, the Internet, and the telephone. In the Census 2000 Dress Rehearsal, a blanket replacement questionnaire, used to improve mail response rates, was another option. Overlaps between late receipts of mail returns and the identification of nonresponding cases that require a personal visit during nonresponse follow-up also resulted in multiple responses. These and other situations can cause the receipt of more than one census return for an address. A special computer program was designed and implemented in the Census 2000 Dress Rehearsal to control the introduction of errors by resolving situations where more than one form was received from an address. The program consisted of two major steps: the Within-Block Search (WBS) and the primary selection algorithm (PSA).

Within-block search operation. The WBS was implemented for the first time in Census 2000 Dress Rehearsal. It was a person-based search operation that occurred prior to the PSA and was designed to screen out certain records on respondent-initiated returns (i.e., forms received as a result of “Be Counted,” Telephone Questionnaire Assistance, etc.). Those records found to match people who were enumerated on another census return were flagged during this operation and were not eligible for selection during the PSA processing.

The WBS had a noticeable effect in update/leave areas of Columbia, SC, and in a minimal to non-existent effect elsewhere. About 9 percent of the persons in the WBS workload for update/leave areas of Columbia were matched to people in the expanded search area. Rates in the other sites were 1 percent or less.

Primary selection algorithm. The PSA was used to determine the person records and housing data that represented each census identification. The PSA processing was performed on all eligible records after the WBS had been run.

Most of the multiple returns in the dress rehearsal occurred when:

- Respondents completed both an initial and a replacement questionnaire.
- A household was enumerated during nonresponse follow-up and also on a late mail return.
- A household was enumerated twice during nonresponse follow-up.
- A household completed either a Be Counted form or a Telephone Questionnaire Assistance interview and also was enumerated during nonresponse follow-up.

With the exception of update/leave areas in Columbia, SC, all sites recognized more than one return for about 12.5 percent of the census identifications. The rate of census identifications with more than one return in Columbia’s update/leave areas was about 6 percent. At all sites, fewer than one-half of 1 percent of the identifications had more than two returns.

A review of the identifications with two returns identified which response options generated the returns. A blanket replacement mailing in mailout/mailback areas intentionally created multiple contacts. This was the major reason for multiple returns in Sacramento, CA, and in mailout/mailback areas of Columbia, SC. Other options inadvertently overlapped with nonresponse follow-up operations (including receipt of late returns, Be Counted forms, etc.). Furthermore, responses on Be Counted forms and from Telephone Questionnaire Assistance required address geocoding and matching to obtain a census identification, which was not completed prior to the start of nonresponse follow-up operations. As a result, many of these households were enumerated again during nonresponse follow-up. Finally, there was evidence that nonresponse follow-up cases were assigned to more than one enumerator, resulting in multiple nonresponse follow-up returns being generated for the same census identification.

¹²⁸ Miriam D. Rosenthal, U.S. Census Bureau, “The Within-Block Search and Primary Selection Algorithm Operational Evaluation,” Census 2000 Dress Rehearsal Evaluation Memorandum, F1c-F2b, April 1999.

Invalid return detection operation. During the invalid return detection operation, a contractor submitted invalid cases to help the Census Bureau assess whether the fraudulent forms could be detected and removed. The operation also looked at the characteristics of the contractor-submitted fraudulent forms that were not removed from the dress rehearsal.

There were two situations that caused fraudulent forms to be removed: the form did not meet census inclusion criteria during a processing step, or the form was detected during invalid return detection operation. The contractor-submitted forms went through normal census processing until the application of WBS and PSA. At that point, the submitted invalid returns were removed from the dress rehearsal processing flow and a parallel evaluation file was created and processed.

Of the 772 contractor-submitted fraudulent cases captured during the dress rehearsal, 401 cases were in South Carolina. Of these forms, 259 (65 percent) were removed from the dress rehearsal enumeration. The remaining forms were included in the evaluation file. In Sacramento, CA, of the 371 invalid returns submitted, a total of 251 (67 percent) were removed from the dress rehearsal evaluation file.

Following the dress rehearsal, the Census Bureau studied the characteristics of the contractor-submitted cases that were not detected so as to design a process to ensure that fraudulent forms were screened out during Census 2000.

Sampling

While Public Law 105-119 required the Census Bureau to prepare for a census that did not include the use of statistical sampling, the possibility remained that the Supreme Court would allow the planned use of sampling to produce the population figures for apportionment. The agency prepared two operations to determine the accuracy of the initial phase of the dress rehearsal. The first, Integrated Coverage Measurement (ICM), measured the undercount and used statistical methods to adjust the results from two dress rehearsal sites (Sacramento and Menominee). The second, Post-Enumeration Survey (PES), measured the accuracy of the population figures derived through traditional methods at the third site (South Carolina).

The ICM/PES processes began with the agency creating an independent list of housing units in the sample of ICM/PES blocks. To ensure its independence, the list was created by a staff that was separate from the one that developed the dress rehearsal master address file. Next, the agency matched the housing unit list to the MAF and resolved the status of nonmatches during a field check. At the end of nonresponse follow-up (NRFU), the agency staff interviewed every housing unit on the independent list and matched those interviewed with the people enumerated in the census in the same sampled block or surrounding block. All mismatches were resolved during a follow-up interview. The agency then imputed any missing information. Once these operations were complete, the Census Bureau created post-strata for each dress rehearsal location based on such variables as age, sex, race, and tenure. The agency used the data to calculate the coverage factor in each post-stratum using dual system estimation. After applying the coverage factors to the appropriate post-stratum of census people, the agency created population estimates for each. The results were integrated into the final dress rehearsal numbers in Sacramento and Menominee and provided coverage estimates for the results from South Carolina.

Though the results were used differently, the ICM and PES used similar procedures and both were designed to measure net coverage error in the census.¹²⁹ Both included an independent enumeration in a sample of census blocks, matched the results with the returns from the census, and created estimates of those missed (people not counted), counted more than once (duplicates), and erroneously enumerated (those who were counted, but should not have been) or who were counted in the wrong location. The results of both were used to create coverage factors for a variety of sub-populations. The main difference was that the PES estimates served as a measure of dress rehearsal coverage for South Carolina, while the ICM results were incorporated into the final population figures for Sacramento and Menominee.

¹²⁹ The comparable coverage measurement survey used for Census 2000 was the Accuracy and Coverage Evaluation (A.C.E.). See Chapter 10, "Testing, Experimentation, Evaluation, and Coverage Measurement Programs" for more on the A.C.E.

The Census Bureau created a Master Activity Schedule (MAS) for the dress rehearsal ICM/PES to determine whether planned tasks were completed on time. While the overall ICM/PES schedule was met and several individual tasks were completed on time, the majority of tasks were completed late. Every group of major tasks took longer than planned and several took twice as long as planned. The agency reviewed field observation reports and other contractor reports concerning field management, telecommunications, and computer-assisted personal Interviewing (CAPI) components of the ICM/PES personal interview operations. These reports raised a number of field and systems concerns. The former included the need for strong managers for the Census 2000 Coverage Measurement Survey (later named the Accuracy and Coverage Evaluation) who had sufficient experience with CAPI operations, the need for more space for crew leaders to meet with ICM interviewers, and space away from the local census office that could act as a staging location for equipment and as a distribution hub.¹³⁰ The systems concerns included hiring sufficient staff, particularly for key functions (e.g. CAPI instrument testing and sampling and estimation programs). Other staffing concerns related to the need for sufficient help desk support for field interviewers, field technicians for regional offices, and computer engineers and software specialists. The agency also recommended conducting full systems tests.

Because ICM/PES interviews took place after Census Day, the Census Bureau attempted to account for people who completed a census questionnaire at one address and then moved before they could be enumerated through the ICM/PES process. In Sacramento and South Carolina, 5 percent of all households were considered to be outmovers, those who had moved out of enumerated households. In Menominee, the number of outmovers was too small to produce enough data for analysis. The agency tested two methods to collect data on outmovers: either via proxy data that were collected from neighbors or the new residents (inmovers) or by tracing outmovers to their new residences and collecting data from them. Tracing the outmovers to their new residences proved to be difficult, time consuming, and expensive. As a result, the agency evaluated whether it could rely on proxy data. It tested the quality of estimates based on proxy data versus traced outmover data and found that there were no significant differences in the dual system estimates calculated using either method. Dual system estimation was the method used by the ICM/PES to calculate the coverage factors used to measure and possibly correct for net coverage errors. As a result of this evaluation, the agency recommended dropping outmover tracing from the Census 2000 Accuracy and Coverage Evaluation.

The dress rehearsal used dual system estimation to produce final population numbers for Sacramento and Menominee, and coverage estimates for South Carolina. This method required the agency to produce two independent lists of the population. These independent lists were used to test differences between ICM/PES blocks and non-ICM/PES blocks. The agency's model assumed that there would be no "contamination," which happened when an individual's inclusion or exclusion from one list affected the probability of their inclusion on the other list. The agency tested whether this was a valid assumption and found no evidence of contamination in the dress rehearsal. In order to protect against contamination in Census 2000, the agency planned to minimize the overlap between census field operations and the Accuracy and Coverage Evaluation survey.

The Census Bureau evaluated the extent of ICM/PES interview falsification during the dress rehearsal by conducting field reinterviews. Before initiating quality assurance reinterviews, the agency conducted the initial ICM/PES interviews; there were 17,060 interviews in Sacramento, 18,302 in South Carolina, and 801 in Menominee. The agency used two methods to conduct these quality assurance reinterviews: for the first, a 5 percent systematic sample was drawn to identify participants, and for the second, the agency selected targeted households based on specific selected criteria. In Sacramento, there were 1,696 quality assurance reinterviews, 821 of which were randomly selected and 875 were targeted. In South Carolina, there were 1,634 reinterviews: 853 were randomly selected and 781 were targeted. In Menominee there were 113 reinterviews: 32 were selected randomly and 81 were targeted. At all 3 sites, targeting identified a nominally higher percentage of potentially falsified cases than did systematic sampling.

¹³⁰ Since ICM/PES had to follow strict rules of independence from the census, its location could not be part of the census infrastructure.

The agency also analyzed survey processing and measurement errors through three studies: the Matching Error Study, the Evaluation Follow-up Interview, and the Data Collection Mode Study. The Matching Error Study examined the clerical matching process of the ICM/PES to determine accuracy rates. Computers performed the initial match of ICM/PES returns to census records; those cases that the computer could not resolve were sent to clerical matchers and expert matchers. For this operation, expert matchers rematched people within each block of a subsample of the ICM/PES blocks that were chosen for the evaluation. The discrepancy rates between the ICM/PES and Matching Error Study operations were less than one percent in each of the three dress rehearsal sites; this error rate was lower than expected. Because expert matching proved to be so reliable, the agency decided that once a trained matcher's work met certain criteria, a 10 percent sample of the work would be reviewed in Census 2000, rather than 100 percent.

The Evaluation Follow-up Interview measured two types of survey error. The first type, which was introduced to the survey process by the interviewer, respondent, or instrument, identified measurement error by redoing the person follow-up interviews in a subset of the evaluation sample blocks. Matchers used both sets of person follow-up interviews to determine the final residence status and match status for each person. The results of this study provided a measure of the error in the production data. The second type of error measured was production error that resulted from the decision to omit certain people from the person follow-up interview, even though they did not match between the initial enumeration and the ICM/PES. The Evaluation Follow-up Interview was designed to determine whether omitting these people would have a significant effect on the final data. For Sacramento and South Carolina, the agency found no significant differences in the dual system estimates at the site level or for any of the post strata. Estimates for Menominee were not calculated.

Due to operational problems during the dress rehearsal, the sample for the Data Collection Mode Study was too small to draw any conclusions.

The Census Bureau, in preparation for the possibility that it would be barred from conducting a census that utilized statistical sampling, tested the efficacy of using administrative records to supplement the enumeration. Administrative records were program specific files that were maintained by various federal, state, and local agencies and contained individual-level identifying information. The agency targeted four specific federal files: the Department of Housing and Urban Development's 1997 Tenant Rental Assistance Certification System, the Internal Revenue Service's Tax Year 1996 Individual Master Return File, the Department of Health and Human Service's Public Health Services 1997 Indian Health Service Patient Registration File, and the Selective Service System's 1997 Registration File. The Census Bureau also tried to acquire various site specific administrative records, such as school enrollment, driver's license, and voter registration files. Acquiring administrative records proved to be labor intensive and time consuming and offered no guarantee of success. The agency chose not to use administrative records during Census 2000 and recommended that in cases where the agency wanted to use them, it should identify those state and local files that promise the greatest return.

As part of its evaluation program, the Census Bureau examined the consistency of housing and population totals for the dress rehearsal with independent benchmarks,¹³¹ such as persons per household, age/sex distributions, race/Hispanic-origin distributions, vacancy rates, and group quarters population. The agency compared these independent benchmarks to census data. It also used independent population estimates to make inferences about the magnitude of the population undercoverage. This independent study helped the agency to evaluate the consistency of the dress rehearsal PES estimates and the effectiveness of the ICM in achieving a reduction in the overall and differential net undercounts. In general, the demographic distributions (e.g. age, race, sex, Hispanic origin) and rates (e.g. vacancy rates, persons per household) were in line with previous census results and expected trends since 1990.

¹³¹ J.G. Robinson, A Adlakha, and K.K. West, U.S. Census Bureau, "Assessment of Consistency of Census Results with Demographic Benchmarks," Census 2000 Dress Rehearsal Evaluation Memorandum C7, 1999.

In Sacramento, the final population numbers for the dress rehearsal were produced by applying a statistical correction based on ICM to the results of the initial enumeration. The ICM was a series of data collection and processing operations designed to provide a measurement of the undercount and to produce an accurate, adjusted one-number census. These operations included about 16,400 households. The agency attempted to contact each household by telephone and personal visits to households that were not reachable by telephone. When the telephone and personal visits were unsuccessful, the agency tried a final personal visit a few weeks later, known as nonresponse conversion. Telephone interviewing began May 11, 1998, and ended on May 27, 1998. Personal interviewing (including nonresponse conversion) was scheduled to end on September 4, 1998, but actually was completed one day earlier. The response rate was at least 95 percent but is not directly comparable to 1990 Census PES response rates, as each used different methodologies. The final population figure for Sacramento, released on January 14, 1999, was 404,313 people. This figure was consistent with the State of California's estimate. The net ICM correction of the initial enumeration was 6.3 percent, which also was validated by comparison to independent benchmarks, which predicted population undercoverage between 3 and 7 percent for the enumeration without ICM correction. The independent figures were generated using the 3.0 percent PES net undercount estimate in 1990 and estimated population change for 1990–1998 (births, deaths, and migration). The dress rehearsal housing unit total of 158,281, however, was below the Census Bureau demographic and State of California agency estimates (by 0.5 and 1.9 percent, respectively).

In Menominee, as in Sacramento, the Census Bureau used a correction based on ICM for the initial enumeration to produce population numbers. ICM operations were conducted for about 800 households. The telephone interview phase began on May 11, 1998, and ended on May 26, 1998. The personal visit interview (including nonresponse conversion) ended on September 3, 1998. The response rate was 98.5 percent, but again, this figure is not comparable to 1990 Census PES response rates, as the two sets of numbers were derived using different methodologies. The final population figure for Menominee, released on January 14, 1999, was 4,738. This initial enumeration corrected by ICM results was consistent with the independent demographic benchmarks, not adjusted for undercoverage, and fell between the estimate provided by the State of Wisconsin and the Census Bureau's demographic estimates. The ICM estimate showed a net undercount of 3.0 percent, which also was validated by comparison to independent demographic estimates adjusted for net undercount. However, the agency could not make any reliable statements given the imprecision in the independent estimate for such a small site; the alternative adjusted estimates predicted a population undercoverage between 3 and 11 percent. The independent figures were generated by using a 10.0 percent net undercount estimate in 1990 and estimated change for 1990–1998. The dress rehearsal housing unit total of 2,046, however, was higher than expected.

In South Carolina, the Census Bureau used a Post-Enumeration Survey (PES) to measure net undercounts or overcounts. The PES operations were the same as those conducted for the ICM, but the results of the PES were only used to measure the accuracy of the traditional enumeration results. This operation covered about 18,000 households. The telephone interview phase began on May 11, 1998, and ended on June 9, 1998. The personal visit interview (including nonresponse conversion) was completed on August 27, 1998, 16 working days ahead of the original deadline of September 21, 1998. The response rate was at least 95 percent. The final population for the South Carolina site was 662,140, which was below expected levels predicted by demographic estimates. The population figure was about 4.5 percent below the independent benchmark of the 1990 census numbers adjusted for change but not undercoverage. The PES revealed that the net undercoverage for the site was 9.0 percent, a figure that was broadly consistent with the Census Bureau's demographic estimates, which had predicted a population undercoverage of about 7.0 percent. The housing unit total of 273,497 also was short of the estimated level.

Overall, the Census 2000 Dress Rehearsal was successful. The agency produced population figures on schedule, and those numbers, including ICM/PES data, compared favorably with independent benchmarks. The dress rehearsal confirmed that statistical methods such as ICM and PES produced population figures that were closer to the independent estimates of the population than were those numbers produced by counting alone. While the agency hoped to use ICM to adjust

Census 2000, its ability to do so depended on the outcome of two court cases that reached the U.S. Supreme Court. While waiting for a decision, the agency was following two operating plans, one that included the planned use of statistical sampling and one that did not.

THE SUPREME COURT'S SAMPLING DECISION

On January 25, 1999, the U.S. Supreme Court ruled that a 1976 amendment to the Census Act barred the use of statistical sampling techniques to produce the state population counts from Census 2000 used to apportion seats in the U.S. House of Representatives. However, the Court also acknowledged that the 1976 amendment allowed the use of statistical sampling for non-apportionment purposes, if it were feasible to do so. In accordance with the Court's decision, the Census Bureau also planned to conduct an Accuracy and Coverage Evaluation (coverage measurement) survey to evaluate the results of the traditional enumeration and to assess the feasibility of potentially adjusting the figures for non-apportionment purposes. For more on the controversy over the use of sampling, including a discussion of court cases, see Chapter 11, "Legal Issues." For more on the specific aspects of the enhanced traditional enumeration used during Census 2000 (e.g. the marketing program, questionnaire development, address list development, etc.), see the relevant chapters.

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Chapter 3: Population and Housing Questions

INTRODUCTION

This chapter describes each population and housing question in the basic form used for Census 2000 in terms of the question's purpose and history, instructions for completion, relevant instructions for coding, and summary of the computer editing and allocation specifications.

Questionnaires

The two primary Census 2000 questionnaires were (1) the "short" form (D-1), which contained only the "100 percent" items, that is, those questions asked about every person and about each housing unit and (2) the "long" form (D-2), which included both the 100 percent questions and additional questions asked of the occupants of a sample of the housing units. The U.S. Census Bureau mailed about 83 million short forms, with 7 questions, and 15 million long forms, with 53 questions that included the 7 questions on the short form. In most areas 5 out of 6 households received the short form, while 1 out of 6 received the long form. The short form was the shortest decennial census questionnaire in 180 years, containing six population questions and one housing question. The long form, containing 32 population questions and 21 housing questions, was the shortest such form since the Census Bureau began long-form sampling in the 1940 census. In addition to the two basic questionnaires, special forms were used to enumerate people in group quarters.¹ These included the Individual Census Report (D-20A and D-20B), Military Census Report (D-21), Shipboard Census Report (D-23), and Individual Census Questionnaire (D-15A and D-15B), known as the ICR, MCR, SCR, and ICQ respectively.²

Respondent Assistance

Census 2000 made several services available to respondents in order to increase participation and accuracy. From March 8 to April 14, 2000, the Census Bureau maintained 23,556 Questionnaire Assistance Centers (QACs), staffed by Census Bureau employees and volunteers.³ These QACs were located in community centers, large apartment buildings, health centers, and other sites appropriate to the particular community served. About 559,000 respondents visited QACs during their approximately 5 weeks of operations.

From March 31 to April 17, 2000, the Census Bureau also maintained 51,692 "Be Counted" sites in places such as private businesses, churches, community centers, tribal offices, libraries, post offices, and QACs. In the Be Counted operation, people who believed they had not been counted in the census could pick up and complete unaddressed census questionnaires. The 804,939 Be Counted forms returned to the Census Bureau added 239,128 people living in 116,019 households to the census who had not been included on other forms.⁴

The Census Bureau also provided assistance to non-English-speaking respondents. Individuals could request versions of the long- and short-form questionnaires in Spanish, Tagalog, Vietnamese, Chinese, or Korean and language assistance guides in 49 languages plus Braille and large

¹ See the "Group Quarters" section in this chapter for a definition and description of group quarters.

² See Appendix D and Appendix E at the end of this volume for facsimiles of the short and long Census 2000 questionnaires. For a discussion of the separate questionnaires developed for the Island Areas, see Chapter 12, "Puerto Rico and the Island Areas," in Volume 2 of this *History: 2000 Census of Population and Housing*. Facsimiles of those questionnaires are in the appendixes of Volume 2. The content of these questionnaires differed somewhat from those used in the states and Puerto Rico.

³ See Fred R. Borsa and Christine L. Hough, *Data Collection in Census 2000*, Census 2000 Testing, Experimentation, and Evaluation Program Topic Report No. 13, TR-13 (Washington, DC: U.S. Census Bureau, 2004), esp. pp. 30–32.

⁴ See Jon R. Clark and Darlene A. Moul, *Coverage Improvement in Census 2000 Enumeration*, Census 2000 Testing, Experimentation, and Evaluation Program Topic Report No. 10, TR-10 (Washington, DC: U.S. Census Bureau, 2004), p. 9.

print. By April 5, 2000, the Census Bureau had received about 2.5 million such requests, of which nearly 2 million were for the Spanish form.⁵ Enumerators also used foreign-language guides, available in 49 different languages, when the enumerator or the respondent was more comfortable using a language other than English. Additionally, between March 3 and June 30, the Census Bureau provided its Telephone Questionnaire Assistance (TQA) program with seven toll-free telephone numbers offering assistance in six languages (English, Spanish, Tagalog, Vietnamese, Chinese, and Korean) and by telecommunications device for the deaf (TDD). By the end of June, the TQA program's 22 call centers had received over 6 million calls (86.9 percent English, 12.6 percent Spanish, and 0.4 percent Asian languages) and had taken about 120,000 census enumerations over the phone.⁶

The Internet Questionnaire Assistance and Internet Data Collection services began on March 3, 2000, offering information about the census as well as an opportunity for respondents to complete the short form online. The Internet Data Collection service received almost 70,000 census responses, nearly 66,000 of which were from unique addresses before it closed on April 19. The number of such responses was small because virtually none of the Census 2000 advertising alerted respondents to the Internet as a vehicle for answering the census. After much discussion, the Census Bureau decided not to advertise the Internet response option because it had not been tested during the dress rehearsal and because of the possible adverse public reaction to a perceived threat to census confidentiality posed by hackers during the transmission of completed census forms. Internet Questionnaire Assistance continued until early in July.⁷

Remote Alaska

Enumeration of remote areas of Alaska presented special challenges, in part because those areas often were accessible only by small plane, snowmobile, four-wheel-drive vehicle, dogsled, or some combination of these. The spring thaw made travel even more difficult and increased the likelihood that potential respondents would be away from their residences fishing or hunting. Therefore, this enumeration began on January 20, 2000, in Unalakleet and proceeded northward in three successive waves, ending on April 22.

Data Collection

The Census Bureau used four basic types of enumeration to get responses to the census: mailout/mailback, list/enumerate, update/enumerate, and update/leave. The **mailout/mailback** method was used to enumerate households located in cities, towns, suburban areas, selected rural areas, and small towns where mailing addresses consisted mainly of house numbers and street names that permitted letter carriers to deliver questionnaires to specific housing units. Respondents completed and mailed back their questionnaires. This method applied to the majority of households enumerated.

The **list/enumerate** method (formerly the "conventional" or door-to-door method), was used in remote, sparsely populated areas of the country with hard-to-determine mailing addresses. Enumerators compiled a list of addresses or locations, delivered and collected questionnaires in one visit, then revised the census map as needed. Census workers visited nearly half a million such housing units.

The **update/enumerate** and **update/leave** methods were used mostly in rural or remote areas where existing mailing addresses were unreliable and likely to need updating. Such areas included some selected American Indian reservations; resort areas with high concentrations of seasonal vacant housing units; and small, rural, unincorporated Spanish-speaking communities known as "colonias" located largely along the Mexican border with Texas and Arizona.⁸ In update/enumerate areas, census workers visited households, updated address lists, and completed a

⁵ James B. Treat, *Response Rates and Behavior Analysis*, Census 2000 Testing, Experimentation, and Evaluation Program Topic Report No. 11, TR-11 (Washington, DC: U.S. Census Bureau, 2004), pp. 14–15.

⁶ John Chesnut, "Telephone Questionnaire Assistance," Census 2000 Evaluation No. A.1.a., March 20, 2003.

⁷ Erin Whitworth, "Internet Data Collection," Census 2000 Evaluation No. A.2.b., August 14, 2002.

⁸ The California/Mexico border also contained a small number of colonias.

questionnaire for each occupied or vacant housing unit. In update/leave, the Census Bureau compiled lists of housing units in advance of the census. Enumerators then visited each household, updated their address lists, and left a census questionnaire to be completed by the resident and returned by mail in an addressed envelope. At the same time, enumerators added new addresses to their address lists and marked new housing unit locations on the census maps. The update/leave method was used for all households in Puerto Rico, as well as in targeted urban areas in the United States where mail delivery could be a problem, as in apartment buildings where letter carriers might leave census questionnaires in a common space. The Census Bureau delivered about 22.5 million questionnaires in update/leave areas.

In late February and early March of 2000, the U.S. Postal Service (USPS) delivered advance letters to over 98 million of the nation's residential addresses, notifying recipients that they would soon receive the Census 2000 questionnaire or would be contacted by a census enumerator. Census Bureau staff delivered nearly 23 million additional advance letters to housing units in update/leave areas. Then from March 13 through March 15, in the mailout/mailback areas of the country, the USPS delivered questionnaires to about 98 million addresses and asked respondents to mail back the completed questionnaire by April 1 in the enclosed, preaddressed envelope. The update/leave process started on March 3. Census enumerators personally delivered about 22.5 million questionnaire packages to occupied and vacant housing units that did not have city-style addresses. The list/enumerate process began on March 13.

Along with the short- or long-form questionnaire, respondents received a brochure titled "Your Guide for the 2000 U.S. Census Form" (Form D-3 for the short questionnaire and Form D-4 for the long questionnaire). Beginning March 20, 2000, the Census Bureau mailed about 120 million reminder cards to encourage respondents to complete and mail back the form and to thank those who had done so.

In mail census areas (these included mailout/mailback areas where the USPS delivered questionnaires and update/leave areas where census enumerators left questionnaires), enumerators followed up on nonresponding households (those not returning questionnaires) and vacant units. In list/enumerate areas, enumerators visited every housing unit to conduct an interview at each household and to administer a long-form questionnaire at a sample of housing units. Enumerators had specific instructions (in the D-561, *Census 2000 Questionnaire Reference Book*, and the *Enumerator's Manual*, forms D-546, D-547, and D-548) on how to conduct an interview, ask each question, and fill in respondents' answers to certain questions. These instructions were designed to maximize self-enumeration and minimize the amount of error introduced into data collection by the enumerator. For example, respondents were asked to provide answers to age and race items rather than enumerators' inferring the answers from observation. Enumerators also received classroom training on the key aspects and requirements of the job.

Data Capture and Processing

The Census Bureau adopted a new data capture technology for Census 2000 and employed a contractor, Lockheed Martin Corp., to develop, deploy, and maintain the new system in four data capture centers (DCCs) located across the country. The Data Capture System 2000 (DCS 2000) used high-speed electronic (digital) imaging, optical mark recognition (OMR), and optical character recognition (OCR) technologies, and replaced the FOSDIC-based (film optical sensing device for input to computers) microfilm-scanning technology used in the previous four decennial censuses. DCS 2000 scanned the completed questionnaires, then produced electronic images of the pages, optically read handwritten marks and write-in entries from the imaged questionnaires, and converted these data into files that were sent to Census Bureau headquarters for tabulation and analysis. When the OMR/OCR process could not interpret the data within specified confidence limits, the form image was automatically sent to the key-from-image operation, which required operators to key the data into the system manually.

At the peak period for data capture (late March 2000), as many as 17 tractor trailers arrived at each DCC, each trailer carrying up to 324,000 short-form questionnaires or 43,200 long-form questionnaires. Nationwide, on a typical peak day DCS 2000 processed about 22 million short forms or 2.9 million long forms. (See Chapter 6, "Data Capture and Processing," for a detailed description of data capture and pretabulation processing.)

General automated coding. As was done in the 1990 census, an automated coding system for written responses to the race, Hispanic origin, ancestry, relationship, language, industry and occupation, place of work, place of birth, and migration items was used for Census 2000. The automated system aimed to reduce the potential for error associated with clerical coding. Using master files containing millions of unique coded written responses from previous censuses and surveys, the system automatically coded the written responses if the entry matched an entry already in the master files. Specialists with a thorough knowledge of subject-matter categories and classification systems reviewed and coded responses that were not automatically coded.

The major difference between the 1990 and the Census 2000 automated system was that the Census 2000 system assigned up to two 3-digit codes for a multiple race response or for a written response on the “American Indian or Alaska Native” write-in line, the “Other Asian” or “Other Pacific Islander” write-in line, or the “Some Other Race” write-in line for the race item.

Editing and allocation. Editing addressed inconsistent responses and used other information on the questionnaire to help fill blank or inconsistently reported items. Missing values were assigned from the related responses provided by other household members (“within-household” imputation) or, if necessary, from responses provided by individuals in other housing units who had similar characteristics (“hot-deck”⁹ imputation). Imputations based on within-household or hot-deck procedures were called “allocations.”

In some cases “substitution” (or “whole-household substitution”) was used when there were no “data-defined” (see definition below) people in the household. In substitution, the population characteristics of a nearby household of the same size were assigned, using a substitution hot deck, into the household lacking these characteristics. “Data-defined” person records were those with two or more responses to the 100 percent population items. A respondent’s name counted as a response. Any person record that did not meet this criterion was considered non-data defined. If no person record for the household was data defined, substitution was applied. Otherwise, the editing and allocation procedures described above were used to provide the information needed, either one item at a time or jointly for two or more items.

Housing Units

The Census Bureau recognizes two types of living quarters: housing units and group quarters. Living quarters are structures intended for residential use (for example, a one-family home, apartment house, nursing home, dormitory, or mobile home). Housing units are defined as houses, apartments, mobile homes or trailers, groups of rooms, or single rooms occupied as separate living quarters or, if vacant, intended for occupancy as separate living quarters. To qualify as living in a separate housing unit, the occupants must live separately from any other individuals in the building and have direct access from outside the building or through a common hall.

Group Quarters

All people not living in housing units are classified by the Census Bureau as living in group quarters.¹⁰ As in previous censuses, the Census Bureau conducted a separate operation to enumerate people living in group quarters in Census 2000. The group quarters enumeration was conducted from April 1 to May 6, 2000.¹¹ Locations classified as group quarters included such places as college dormitories, correctional institutions, nursing homes, group homes, mental hospitals or wards, hospitals or wards for the chronically ill, hospices, and military quarters. Special procedures and questionnaires were used to enumerate people in group quarters. The questionnaires

⁹ A “hot deck” was a data table (or matrix) in which values of reported responses, stratified by selected characteristics of the respondents, were stored and updated on a flow basis and used as needed to assign values of the variable in question to people with similar characteristics who did not have a response.

¹⁰ People without conventional housing who were enumerated at service facilities (e.g., shelters for abused women, soup kitchens, and regularly scheduled mobile food vans) or at targeted nonsheltered outdoor locations were classified as part of the group quarters population even though many of them had no visible living quarters.

¹¹ Florence H. Abramson, *Special Place/Group Quarters Enumeration*, Census 2000 Testing, Experimentation, and Evaluation Program Topic Report No. 5, TR-5 (Washington, DC: U.S. Census Bureau, 2004), p. 4.

(Individual Census Reports, Individual Census Questionnaires, Military Census Reports, and Shipboard Census Reports) included the 100 percent population questions but excluded housing questions. All people in group quarters were asked the basic population questions; in most group quarters, additional questions were asked of a sample of people (1 in 6). In 2000, 7.8 million people were tabulated in group quarters, representing 2.8 percent of the total population. This was an increase of 16 percent, or almost 1.2 million people, since 1990.

Two general categories of people were recognized in group quarters: (1) the institutionalized population and (2) the noninstitutionalized population.

Institutionalized population. This included people under formally authorized, supervised care or custody in institutions at the time of enumeration. Such people were classified as patients or inmates of an institution regardless of the availability of nursing or medical care, the length of stay, or the number of people in the institution. Generally, the institutionalized population was restricted to the institutional buildings and grounds (or must have had passes or escorts to leave) and thus had limited interaction with the surrounding community. Also, they were generally under the care of trained staff who were responsible for their safekeeping and supervision.

Institutions included schools, hospitals, or wards for the physically or mentally handicapped; hospitals or wards for mental or chronic disease patients; patients in wards of general and military hospitals who had no usual home elsewhere; hospital wards for drug/alcohol abuse; rooms for long-term care patients in wards or buildings on the grounds of hospitals, nursing homes, convalescent homes, and rest homes for the aged and dependent; juvenile institutions, including homes, schools, orphanages, or residential-care facilities for neglected, abused, and dependent children; and correctional institutions, including halfway houses operated for correctional purposes. Staff residents, that is, staff personnel who lived at the facility, were classified with the noninstitutionalized group quarters population.

Noninstitutionalized population. This included people who lived in group quarters other than institutions, such as staff residing in military and nonmilitary group quarters on institutional grounds who provided formally authorized, supervised care or custody for the institutionalized population. This population also included college student dormitories and fraternity and sorority houses on and off campus; military quarters, including barracks or dormitories on base, transient quarters on base for temporary residents (both civilian and military), and military ships; agricultural and other workers dormitories; dormitories for nurses and interns in general and military hospitals; Job Corps and vocational training facilities; religious group quarters such as convents, monasteries, or rectories; community-based group homes, including those which provided supportive services for the aged, mentally ill, mentally retarded, physically handicapped, and drug/alcohol abusers; communes; maternity homes (for unwed mothers); other nonhousehold living situations, such as youth hostels, YMCAs, and YWCAs; and service-based enumeration locations, including emergency and transitional shelters (public and private) for people experiencing homelessness; shelters for children who were runaways, neglected, or without conventional housing; and hotels and motels used to provide shelter for people without conventional housing. Although soup kitchens, regularly scheduled mobile food vans, and targeted nonsheltered outdoor locations were not living quarters, people enumerated at these locations were considered part of the noninstitutionalized group quarters population.

Comparability. The Census Bureau has collected and published data on certain types of institutions since 1850. However, several changes have occurred in how some group quarters were classified and tabulated. For Census 2000, the definition of the institutionalized population was consistent with the definition used in the 1990 census. As in 1990, the definition of “care” only included people under organized medical or formally authorized supervised care or custody.

In Census 2000, the 1990 and 1980 rule of classifying ten or more unrelated people living together in a housing unit as living in noninstitutional group quarters was dropped. (In 1970, the

criterion was six or more unrelated people.) Some examples of changes in the tabulation of specific types of group quarters included the following:

- Police lockups were included with local jails and other confinement facilities in 2000 and grouped separately in 1990.
- Homes for unwed mothers were included in “other group homes” in 2000 and grouped separately in 1990.
- Military hospitals or wards for the chronically ill, other hospitals or wards for the chronically ill, hospices or homes for the chronically ill, wards in both military and general hospitals with patients who had no usual home elsewhere, and Job Corps and vocational training facilities were tabulated separately in 2000.
- Rooming and boarding houses were classified as housing units in 2000 rather than as group quarters as in 1990.

Transient Night (T-Night). The Census Bureau conducted its Transient Night (T-Night) enumeration on the evening of March 31, 2000, aiming at locations where residents were highly transient, such as campgrounds at racetracks and parks, recreational vehicle campgrounds, commercial and public campgrounds, fairs, carnivals, and marinas. This enumeration stretched out over a couple of weeks in some large recreational vehicle parks, but was essentially complete by May 5. Enumerators conducted personal interviews using simplified enumerator questionnaires. People enumerated during T-Night were tabulated in housing units rather than in group quarters, as was done in 1990.

Service-Based Enumeration (SBE). In preparation for the SBE, the Census Bureau contacted national organizations and governmental agencies to acquire lists of facilities such as shelters and soup kitchens that primarily served people without any usual residence.¹² In the spring of 1999, the Census Bureau conducted a follow-up mailing to about 39,000 governmental units and national advocacy groups requesting a list of all service-based facilities in their areas. At that time, the Census Bureau also asked governmental units to indicate whether they had or would have targeted nonsheltered outdoor locations such as bridges, boarded-up buildings, alleys, or streets where people without any usual residence were known to live or sleep. Sites were required to have specific location descriptions. Commercial sites such as all-night movie theaters or all-night diners were excluded.

Based on responses received, the Census Bureau conducted a targeted mailing to those governmental units who reported such locations in order to elicit specific information about the sites, to establish contacts, and to plan for the enumeration process. Census Bureau personnel then visited the sites several weeks before the enumeration to formulate plans for conducting enumerations at particular facilities and locations. During the advance visit, the Census Bureau collected relevant information such as the number of people expected to be housed at each shelter, the number of meals served, which meals served the most people at each soup kitchen, and how many people received services at each regularly scheduled mobile food van site. The Census Bureau made a special effort to recruit and train enumerators for the SBE who had experience working with people who did not live in conventional housing.

The SBE operation consisted of four separate enumerations conducted from March 27 through March 29, 2000. These were the shelter enumeration, the soup kitchen enumeration, the regularly scheduled mobile food van enumeration, and the targeted nonsheltered outdoor locations enumeration. Enumerators attempted to gain complete responses from all people interviewed. If faced with refusals, they tried to obtain information from knowledgeable workers or contact people at the site. SBE data-captured records were considered data-defined if they contained two or more of the following data characteristics: name, sex, age and/or date of birth, Hispanic origin, and race. Forms were available in Spanish and English. There was a total of 14,817 SBE sites visited.

¹² Tracey McNally, “Service-Based Enumeration Final Report,” Census 2000 Evaluation No. E.6., November 6, 2002.

The shelter enumeration involved 7,571 sites and took place on March 27, 2000, from 6 p.m. to midnight in order to maximize the completeness of the count. Two-member enumeration teams enumerated people at most shelters using Individual Census Reports (ICRs). At some shelters, enumeration teams containing more than two enumerators were used because of the size of the shelter. All clients were asked the basic 100 percent population items, and additional questions were asked of a sample (1 in 6) of the clients at emergency and transitional shelters (with sleeping facilities) for people experiencing homelessness; shelters for children who were runaways, neglected, or without conventional housing; shelters for abused women (or shelters against domestic violence); and hotels and motels used to provide shelter for people without conventional housing. The soup kitchen enumeration and the regularly scheduled mobile food van enumeration involved 2,223 sites. These two operations were planned separately and had distinct training materials. However, both were conducted on the same day, often by the same enumerators who divided their time between the soup kitchens and the regularly scheduled mobile food vans. The soup kitchen enumeration was conducted on March 28 during the meal at which the greatest number of clients at that particular site were served. If more than one seating was used to serve clients at the chosen meal, enumerators waited for the next group and continued until people at all seatings had been enumerated. The regularly scheduled mobile food van enumeration took place on March 28 at various times of the day as vans made rounds. At both soup kitchens and regularly scheduled mobile food vans, enumerators conducted personal interviews with clients using the Individual Census Questionnaire (ICQ). This questionnaire included the 100 percent basic population questions that were asked of all clients. Additional questions were asked of a sample (1 in 6) of the population at soup kitchens only.

The Census Bureau conducted its targeted nonsheltered outdoor locations enumeration, involving 5,023 sites, on March 29, 2000, from 4 to 7 a.m. Enumerators interviewed each respondent using a D-20A short form ICR only. Enumerators did not wake sleeping people, but tried to interview as many people as possible before daybreak, when people dispersed. If a person was not awake or refused to respond, the enumerator completed as much information as possible by asking the contact person or someone else who might know the individual.

People enumerated at shelters or at targeted nonsheltered outdoor locations were counted in the census geography where the shelter or nonsheltered outdoor site was located. People enumerated at soup kitchens or regularly scheduled mobile food van locations were counted at the census geography where those service facilities were located at the time of enumeration, unless a person provided a usual home elsewhere (UHE) address. If a UHE address was provided, the UHE address was used.

Limitations of the data. People who were well hidden, moving about, or in locations other than those identified by the local governments as targeted nonsheltered outdoor locations could not be enumerated. The Census Bureau's objective was to count everyone. The agency neither wanted nor intended to provide an official count of the homeless population. Also, the SBE operation did not represent a count of the population that used services in 2000 at any geographic level, for a number of reasons including:

- The dynamic conditions of homelessness meant that a one-time count produced different results than measurement over time would have.
- Federal and local jurisdictions used differing definitions of homelessness.
- Some types of service locations, such as drop-in centers and street outreach teams, were not included as service locations in the SBE operation.
- Those lacking conventional housing living at outside locations other than the targeted nonsheltered outdoor locations identified for the census were not included in this operation.

SIMILARITIES AND DIFFERENCES BETWEEN THE 2000 AND 1990 CENSUS QUESTIONNAIRES

Justification for the Questions Asked in Census 2000

All of the questions included in the Census 2000 questionnaires were subjected to a rigorous review to ascertain whether they were necessary. Between December 1992 and the summer of 1994, the U.S. Office of Management and Budget and the Census Bureau worked together to identify federal agencies' data needs for Census 2000, according to the degree to which these subjects were required by law and the lowest geographic level needed. Also, the needs of state, local, and tribal governments were considered as part of obtaining nonfederal requirements for the content of Census 2000.¹³

The Census Bureau used the same three-category typology to classify the data needs expressed by both federal agencies and nonfederal data users: mandatory, required, and programmatic. Mandatory needs covered instances in which federal law explicitly called for decennial census data. Required needs were those in which federal law required the data and the decennial census was the only source or the historical source, or in which there were case law requirements imposed by the federal court system. Programmatic needs were considered data items that were used for federal program planning, implementation, or evaluation or for providing legal evidence (but the underlying laws of which did not explicitly require the use of data).¹⁴

Only those questions with a strong legislative or judicial justification were included in Census 2000, meaning only those subjects where the assessment identified needs as either mandatory or required. Programmatic needs were insufficient by themselves to justify inclusion. All items on the 100 percent questionnaire (short form) were classified as mandatory: name,¹⁵ relationship to Person 1, sex, age, Hispanic origin, race, and tenure (home owner or renter). On the sample questionnaire (long form), the Census Bureau classified another 18 of the sample questions as mandatory (for a total of 24) and 28 as required. Individual questions or parts of questions could provide data for more than one category of use and for more than one federal agency or department.

New Questions on the Long Form for 2000

These included the following: Question 8b (current grade level) and Question 19 (grandparents as caregivers).

Essentially Unchanged Questions

Questions, also referred to as "items," that were the same or much the same in 2000 as in 1990 were 3 (sex); 8a (school enrollment); 9 (educational attainment); 10 (ancestry or ethnic origin); 11a, b, c (language); 13 (citizenship); 15a, b (residence 5 years ago); 20c (years of active-duty military service); 22a, b, c, d, e, f (place of work); 23a, b (means of transportation to work); 24a, b (time of departure from home and travel time to work); 25d (work absence last week); 27a, b, c (industry or employer); 28a, b (occupation); 29 (class of worker); 30b, c (weeks and hours usually worked); 31a, d, g (income); 32 (total income); 43 (vehicles available); 44a (value screener); 44c (farm residence); 47a, b, c, d (mortgage status, monthly payment, taxes and insurance included in monthly mortgage payment); 48b (second mortgage and home equity loan, amount); 49 (real estate taxes); 50 (fire, hazard, and flood insurance payments); and 52 (condominium fee).

¹³ For a description of federal, state, and local data needs and the uses to which these data are put, see Constance F. Citro, Daniel L. Cork, and Janet L. Norwood (eds.), *The 2000 Census: Counting Under Adversity*, Chapter 2, "Census Goals and Uses," (Washington, DC: National Academies Press, 2004).

¹⁴ U.S. Census Bureau, "Preparing for Census 2000: Questions Planned for Census 2000," March 1998, pp. 1-1-1-3 and "Talking Points for the Congressional Briefing on the Long Form," loose-leaf binder memorandum, March 28, 2000. In conjunction with the adoption of the American Community Survey as the replacement for long-form data collection in the 2010 census, the Census Bureau adopted a different policy on content determination. See "U.S. Census Bureau Policy on New Content for the American Community Survey," memorandum, March 31, 2006.

¹⁵ Strictly speaking, "name" was not considered a data item by the Census Bureau; it is included in this list because it was asked of all respondents.

Revised Questions

The following items on the 2000 long-form questionnaire included wording changes that differed from their counterparts in 1990: 1 (name and person); 2 (relationship); 4 (age and date of birth); 5 (Spanish/Hispanic/Latino origin); 6 (race); 7 (marital status); 12 (place of birth); 14 (year of entry); 16a, b (disability); 17a, b, c, d (mobility limitations, self-care limitations, and work limitations); 18 (age screen); 20a (veteran status); 20b (period of active-duty military service); 21 (employment last week); 25a, b, c, e (work absence last week); 26 (year last worked); 30a (work experience); 31b, c, e, f (income); 33 (tenure); 34 (units in structure); 35 (year built); 36 (year householder moved in); 37 (number of rooms); 38 (number of bedrooms); 39 (complete plumbing facilities); 40 (complete kitchen facilities); 41 (telephone service in housing unit); 42 (fuel used most for house heating); 44b (value screener/farm residence); 45a, b, c, d (costs of utilities and fuels); 46a, b (monthly rent, meals included in rent); 48a (second mortgage, home equity loan); 51 (value of property); and 53a, b (mobile home costs).

Items 33, 36, 37, 38, 39, 40, 42, 45, and 46a in the 2000 questionnaire differed from their counterparts in 1990 solely or principally in the addition of “mobile home” to the “house or apartment” terminology used in the wording of these questions; mobile homes were considered to be housing units in both censuses.

1990 Census Questions Omitted in 2000

The following items from the 1990 census were omitted in 2000: 20 (children ever born); 21b (number of hours worked last week); H15 (source of water); H16 (sewage disposal); and H18 (condominium status).

INTERCENSAL RESEARCH

Between censuses, the Census Bureau consults with a wide range of data users; tests various approaches to questionnaire design, question wording and order, data collection and capture, and tabulation and publication of data products and media for distributing them; and evaluates the efficacy and cost-effectiveness of new methods and technologies. The results of this research informs all aspects of census taking. For example, in an effort to halt or reverse the decline in mail response rates that the census suffered between 1970 and 1990 (from 78 to 65 percent), the Census Bureau investigated ways to increase the user friendliness of the questionnaire. One goal was to increase the attractiveness of the questionnaire, but this conflicted with the need to improve coverage. Initially, the Census Bureau planned to use a questionnaire in 2000 that asked for information on up to five people instead of the seven-person form used in 1990. A compromise resulted in the adoption of a six-person version.¹⁶ Because of the more stringent criteria used for placing questions on the 100 percent questionnaire (short form) in Census 2000, the number of questions was reduced from 13 in 1990 to 6 in 2000. On the other hand, the number of items on the sample form (long form) remained about the same in 2000 as in 1990. Research carried out in 1992 and 1993 suggested that response rates would improve markedly with repeated contact with respondents. The Census Bureau decided to adopt a multiple-contact approach (including an advance letter sent before the questionnaire and a reminder postcard sent later) as well as a redesigned, more attractive census form. However, direct mail firms informed the agency that a targeted mailing of a second questionnaire to nonresponding households would not be possible in the short time available.¹⁷ For a more detailed description of the intercensal research that preceded Census 2000, see Chapter 2, “Planning the Census.”

LONG-FORM SAMPLING

The sample, or “long,” form asked the 100 percent questions plus additional questions (e.g., income, marital status, housing unit value or rent) from a sample of people and housing units. The primary sampling unit was the housing unit, including all occupants. There were four different housing unit sampling rates: 1 in 8, 1 in 6, 1 in 4, and 1 in 2 (designed for an overall average

¹⁶ U.S. Census Bureau, “New Six Person Mailback Questionnaires,” Census 2000 Decision Memorandum No. 62, October 30, 1998.

¹⁷ See the research summarized in Constance F. Citro, Daniel L. Cork, and Janet L. Norwood (eds.), *The 2000 Census: Counting Under Adversity* (Washington, DC: National Academies Press, 2004) pp. 80–82.

of about 1 in 6). For people living in group quarters or enumerated at long-form-eligible service sites (shelters and soup kitchens), the sampling unit was the person, with only one rate, 1 in 6. Census 2000 used these variable sampling rates in order to plan levels of sampling error for small areas and to decrease respondent burden in the more densely populated areas, while maintaining the reliability of the data.

The Census Bureau assigned each block a sampling rate based on precensus estimates of occupied housing units in various geographic and statistical entities, such as incorporated places and census tracts. (For a discussion of census geography, see Chapter 7, “Census Geography and the Geographic Support System.”) Therefore, the observed sampling rate for any geographic area varied according to the mix of the sampling rates of the area’s blocks and the success in collecting the sample data for all assigned housing units. When all sampling rates and implementation were taken into account across the country, Census 2000 sampled about 15 percent of the population and 16 percent of the housing units. Tables of the observed sampling rates for population and housing units, by various levels of geography, can be found at <http://censtats.census.gov/SamplingRate.shtml>.

The sample designation method for housing units depended on the data collection procedure (see Chapter 5, “Data Collection,” for details). Approximately 115.9 million housing units were enumerated by mail procedures in the United States and Puerto Rico (92.5 million by mailout/mailback and 23.4 million by update/leave). Housing units included on the decennial master address file (DMAF) were electronically designated as sample units based on each block’s assigned sampling rate. The questionnaires were either mailed or hand-delivered to the addresses with instructions to complete and mail back the form.

About 1 million housing units were in update/enumerate areas. Housing units included on the DMAF were electronically designated as sample units based on each block’s assigned sampling rate. Housing units that were added in the field were sampled at a rate equal to the highest sampling rate assigned to a block within the enumerator’s assignment area.

Long-form sampling entities (LFSEs) were defined for sampling purposes as counties and county equivalents, cities, and incorporated places; minor civil divisions in Connecticut, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin; American Indian reservations, tribal jurisdiction statistical areas (later replaced for Census 2000 by entities called Oklahoma tribal statistical areas), and Alaska Native Village statistical areas; census designated places in Hawaii; and school districts. Except as described below for list/enumerate areas, blocks in an LFSE with an estimated occupied housing unit count less than 800 were sampled at 1 in 2, while blocks in an LFSE with an estimated occupied-housing-unit count of at least 800 but less than 1,200 were sampled at 1 in 4. Blocks in census tracts with an estimated occupied housing unit count of less than 2,000 were sampled at 1 in 6 for those portions not already assigned a sampling rate of 1 in 2 or 1 in 4. Blocks within tracts with an estimated 2,000 or more occupied housing units were sampled at 1 in 8 for those portions not already assigned a higher sampling rate.

In list/enumerate areas (about 0.4 million housing units), the enumerators had blank address registers with designated sample lines. Beginning about Census Day, they systematically canvassed their assigned areas and listed all housing units in the address register. They collected 100 percent data for all units, plus sample information for any housing unit listed on a designated sample line. In list/enumerate areas, the housing unit sampling rate was 1 in 2 when fewer than 1,200 occupied housing units (as measured in the 1990 census) were estimated to be in any LFSE containing a block within the enumerator’s assignment area, and 1 in 6 elsewhere. All Remote Alaska assignment areas were sampled at 1 in 2. A sample tolerance check detected and corrected enumerator biases in distributing the long form according to the predesignated sampling pattern.

Housing units in American Indian reservations, tribal jurisdiction statistical areas, and Alaska Native village statistical areas were sampled according to the same criteria as other LFSEs, except that the occupied-housing-unit estimates used in the sample selection process were modified to

reflect the size of the American Indian and Alaska Native population as measured in the 1990 census. Trust lands were sampled at the same rate as their associated reservations.¹⁸

LONG-FORM ESTIMATION

Requirements

As in previous decennial censuses, all estimation procedures used for Census 2000 required the assignment of sampling weights to individual records for each sample person and housing unit. These records were then stored on data files that had undergone computer edits for accuracy and consistency. For all census tabulation areas, the characteristic totals were estimated by simply summing the weights assigned to the appropriate sample person records or housing unit records. The weighting procedures were required to meet the following criteria:

- Only a single weight was to be assigned to each individual sample person record or housing unit record. In principle, each response item could be individually weighted to reflect edited and imputed items. However, the practicalities of assigning, storing, controlling, and using different item weights, especially for composite variables, combined to make the use of item weighting infeasible.
- The assigned weights were to be integers. This was necessary for data users' convenience since it eliminated problems of differences due to rounding between data tables with similar marginal categories.
- Sample estimates from the long form were to equal short-form census counts, or controls, for items that were on both forms. This agreement was required for total population and housing unit counts for counties and larger geographic areas and for some smaller areas as well. Agreement between the sample estimates and control figures for other characteristics such as age, race, sex, and Hispanic origin were also to be achieved, except where sample sizes were too small. This constraint was imposed to reduce sampling variance and for the convenience of the data users.
- The estimation procedure was to be designed to dampen the effect of any bias that occurred in sample selection.

In general, the estimation procedure dealt with groups of records within specially defined areas called "weighting areas." Within each weighting area, control counts and sample counts were obtained for various characteristics. For these characteristics, the sample was weighted to agree with the control counts, using an iterative procedure to assign weights to the sample records within each weighting area. Weighting areas and procedures are described on the next page.

Background and Research

After the 1960 census, agency staff examined the properties of a number of different ratio-estimation procedures and used the iterative proportional fitting methodology, also known as "raking." Experience with the 1960 estimator suggested that the procedure ought to incorporate household size in the definition of the ratio-estimate groups. However, the number of these groups defined by expanding each of the 44 age, sex, and race groups by six household size categories could not be used efficiently by an estimator of the 1960 type, and other estimators therefore had to be considered.

The Census Bureau chose the estimator for the 1970 census using the following criteria. The estimator was to:

- Dampen the effect of any biases that occurred in sample selection.
- Reduce the variance of sample estimates.
- Improve the consistency between complete counts and sample estimates.

¹⁸ U.S. Census Bureau, "Requirements for Measures of Size to Assign Long Form Sampling Rates," Census 2000 Informational Memorandum No. 24, September 17, 1999.

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- Be economical to execute.
 - Permit reasonably accurate estimates of sampling error to be computed.

Prior to the 1980 census, the agency decided to conduct an empirical and theoretical study using 1970 census data to compare alternative estimation procedures.¹⁹ These included a simple inflation estimator, a poststratified ratio estimator, and the raking ratio estimator. In addition, the estimates for various characteristics of available sample and complete-count (i.e., 100 percent) totals were compared for the poststratified and raking ratio estimators. Considering the same criteria for choosing an estimator as noted above, the results of the research indicated the raking ratio estimator was preferable, particularly for controlling the effect of biases resulting from the systematic undercoverage of some demographic groups. The staff also investigated this estimator's convergence properties. Because the 1990 census sample was selected using three sampling rates, the Census Bureau decided to incorporate sampling rate as the fourth dimension in the ratio-estimation procedures.

In 1990, the staff completed an empirical study designed to compare several methods for producing sample tabulations of family characteristics. Based on results from the study, it was concluded that none of the methods under consideration was significantly better than the method used in 1980 to produce family estimates. In 2000, as in the previous two censuses, family estimates were tabulated by adding the weight of Person 1 in family households.

For Census 2000, the reduction in the items on the short form forced the elimination of some categories in the raking procedure for occupied housing units.

Weighting Areas

Prior to the raking ratio-estimation procedure, each state was divided into weighting areas. Initial weighting areas were formed by combining records with the same area sampling rate within tabulation block groups. Final weighting areas required a minimum sample of 400 people and were formed by combining initial weighting areas. In counties with a sample count of less than 400 people, the minimum sample size requirement was relaxed so the entire county could be a weighting area.

Ratio Estimation Groups and Weighting Procedure

Within a weighting area, the ratio-estimation procedure for people was performed in four stages. The first stage applied 21 household-type groups. The second stage used three groups: sampling rate of 1 in 2; sampling rate of 1 in 4; and sampling rates less than 1 in 4. The third stage used the householder/nonhouseholder dichotomy.²⁰ The fourth stage applied 312 aggregate age-sex-race-Hispanic-origin groups. The stages were as follows:

PERSONS

Stage I—Type of Household

People in housing units with a family with own children under 18:

- | | |
|---|----------------------------------|
| 1 | 2 people in housing unit |
| 2 | 3 people in housing unit |
| 3 | 4 people in housing unit |
| 4 | 5 people in housing unit |
| 5 | 6–7 people in housing unit |
| 6 | 8 or more people in housing unit |

¹⁹ Jay Kim, John H. Thompson, Henry F. Woltman, and Stephen M. Vajs, "Empirical Results from the 1980 Census Sample Estimation Study," paper presented at the Joint Statistical Meeting, 1981, Chicago, IL; printed in *Proceedings of the Section on Survey Research Methods of the American Statistical Association* (Alexandria, VA: American Statistical Association, 1981), pp. 170–75.

²⁰ The person or individuals occupying a housing unit were termed a "household," and the reference person (Person 1) was the "householder."

People in housing units with a family without own children under 18:

7–12 2 through 8 or more people in housing unit

People in all other housing units:

13 1 person in housing unit

14–19 2 through 8 or more people in housing unit

Group quarters:

20 people in group quarters

Service-based enumerations:

21 people enumerated at service sites

Stage II—Sampling Type

1 1 in 2

2 1 in 4

3 1 in 6 or 1 in 8

Stage III—Householder Status

1 Householder

2 Nonhouseholder

Stage IV—Race/Hispanic Origin/Age/Sex

People of Hispanic origin:

Black:

Male:

1 0–4 years

2 5–14 years

3 15–17 years

4 18–19 years

5 20–24 years

6 25–29 years

7 30–34 years

8 35–44 years

9 45–49 years

10 50–54 years

11 55–64 years

12 65–74 years

13 75+ years

Female:

14–26 Same age categories as Groups 1 through 13

American Indian or Alaska Native:

27–52 Same gender and age categories as Groups 1 through 26

Asian:

53–78 Same gender and age categories as Groups 1 through 26

Native Hawaiian or Pacific Islander:

79–104 Same gender and age categories as Groups 1 through 26

White:

105–130 Same gender and age categories as Groups 1 through 26

Other:

131–156 Same gender and age categories as Groups 1 through 26

People not of Hispanic origin:

157–312 Same race, gender, and age categories as Groups 1 through 156

Respondents who indicated that they belonged to two or more races (multirace respondents) were included in one of the six major race groups for estimation purposes only. Subsequent tabulations were based on the full set of responses to the race item.

Within a weighting area, the first step in the estimation procedure was to assign an initial weight to each sample person record. This weight was approximately equal to the inverse of the observed sampling rate for the initial weighting area. These weights were added into a four-dimensional matrix, called the “raking matrix,” and added to the marginal totals for the four dimensions. Census counts were obtained as control counts corresponding to these marginals.

The next step in the estimation procedure, prior to iterative proportional fitting, was to combine categories in each of the four estimation stages, when needed, to increase the reliability of the ratio-estimation procedure. For each stage, if a group did not meet certain criteria for the unweighted sample count or for the ratio of the control count to the initially weighted sample count, it was combined, or collapsed, with another group in the same stage according to a specified collapsing pattern. The fourth stage applied an additional criterion concerning the number of sample people in each race/origin category.

As the next step, the initial weights underwent four stages of ratio adjustment, with the grouping procedures described above applied. At the first stage, the ratio of the control count to the sum of the initial weights for each sample person was computed for each Stage I group. The initial weight assigned to each person in a group was then multiplied by the Stage I group ratio to produce an adjusted weight. In Stage II, the Stage I adjusted weights were again adjusted by the ratio of the control count to the sum of the Stage I weights for sample people in each Stage II group. Next, at Stage III, the Stage II weights were adjusted by the ratio of the control count to the sum of the Stage II weights for sample people in each Stage III group. Finally, at Stage IV, the Stage III weights were adjusted by the ratio of the control count to the sum of the Stage III weights for sample people in each Stage IV group. The four stages of ratio adjustment were repeated in the order given above until predefined stopping criteria were met.

The weights obtained from the final iteration for Stage IV were then assigned to the sample person records. However, to avoid complications in rounding for tabulated data, only whole number weights were assigned. For example, if the final weight of the people in a particular group was 7.25, then one-quarter of the sample people in this group were randomly assigned a weight of 8, while the remaining three-quarters received a weight of 7. If any weights were excessive, the collapsing criteria were tightened to achieve additional collapsing and lower final weights.

The ratio-estimation procedure for housing units was essentially the same as that for people, except that vacant units were treated separately. The occupied-housing-unit ratio-estimation procedure was done in three stages, while the one for vacant units was done in a single stage. The first stage for occupied housing units applied 19 household-type groups, while the second stage

applied 3 sampling-type groups. The third stage used 24 tenure/race/Hispanic–origin groups. The stages for ratio estimation for housing units were as follows:

OCCUPIED HOUSING UNITS

Stage I—Type of Household

People in housing units with a family with own children under 18:

- 1 2 people in housing unit
- 2 3 people in housing unit
- 3 4 people in housing unit
- 4 5 people in housing unit
- 5 6–7 people in housing unit
- 6 8 or more people in housing unit

People in housing units with a family without own children under 18:

- 7–12 2 through 8 or more people in housing unit

People in all other housing units:

- 13 1 person in housing unit
- 14–19 2 through 8 or more people in housing unit

Stage II—Sampling Type

- 1 1 in 2
- 2 1 in 4
- 3 1 in 6 or 1 in 8

Stage III—Race and Hispanic Origin of Householder/Tenure

Owner:

Householder of Hispanic origin:

- 1 Black or African American
- 2 American Indian or Alaska Native
- 3 Asian
- 4 Native Hawaiian or Pacific Islander
- 5 White
- 6 Other

Householder not of Hispanic origin:

- 7–12 Same race categories as Groups 1 through 6

Renter:

- 13–24 Same race and Hispanic origin categories as Groups 1 through 12

A simple ratio adjustment in one dimension was used for vacant housing units.

VACANT HOUSING UNITS

- 1 Vacant for rent
- 2 Vacant for sale
- 3 Other vacant

The estimates produced by this procedure realized some of the gains in sampling efficiency that would have resulted if the population had been stratified into the ratio-estimation groups before sampling and if the sampling rate had been applied independently to each group. The net effect was a reduction in both the standard error and the possible bias of most estimated characteristics to levels below what would have resulted from simply using the initial, unadjusted weight. This estimation procedure was designed so that the estimates from the sample would be more consistent with the control counts for the population and housing unit groups used in the estimation procedure than simply using the initial, unadjusted weights.

Weighting Approval Process

In Census 2000, the weighting operation was reviewed by state as the states were processed. The entire weighting procedure was independently programmed, and results were compared to the production results. A fully detailed review was completed for three test states, Vermont, West Virginia, and New Jersey. There were a summary review and detailed analysis of selected weighting areas for the remaining states. Final weights were verified for all persons for all states. In addition, Census Bureau headquarters staff received output from the weighting operation that gave both detailed and summary information concerning the weighting operation for each weighting area in a state. The output included certain demographic counts, marginal weighting matrix counts, details of the weighting area formation and weighting matrix collapsing, and other analytical data relating to the weighting operations.

Long-Form Estimation

Once the final weights were developed, long-form estimation was relatively simple: to estimate the number of people with certain characteristics in a given geographic area, add the weights of people with the characteristics. To estimate means, such as per capita income, for some group, divide the total weighted income of people in the group by the weighted number of people in the group.

LONG-FORM SAMPLING VARIABILITY

Due to sampling variability, statistics based on a sample of the population differ from figures that would have been obtained if a complete census had been taken using the same questionnaires, instructions, and enumerators. Sample results were also subject to the same response, reporting, and processing errors which would be present in data from a complete census.

To ensure that sample statistics from the census would be properly interpreted, a statement on their reliability appeared in census publications. The estimates of reliability reflected sampling error and some effects of the estimation procedure but did not reflect the effect of response or processing variance or any effect of bias arising in data collection, processing, or estimation.

A major concern in the choice of a method of presenting sampling errors arose from the number of statistics produced. To compute and show the sampling error for each published characteristic in each tabulation area would have been costly and time-consuming, and it also would have doubled space needed to present the results in published volumes. Also, the estimates of sampling errors for individual small estimates are highly variable and, therefore, not very reliable. The Census Bureau decided, therefore, to group the individual census items into homogeneous classes. The publications show the average of the sampling errors for the items in each class. Users are instructed how to estimate this average, or typical sampling error, for any characteristic.

Almost all of the statistics tabulated from the census sample could be characterized as 0-1 variates; that is, the person or housing unit was assigned the value “1” if that person or housing unit possessed the characteristic, and “0” otherwise. The design of the census sample and the ratio-estimation procedure used suggested that the variances would usually have a fairly simple relationship to those arising from a simple random sample of the same size. This led to a decision to present the sampling errors in the form of “design factors”—the ratio of the estimate of the standard error of the census sample to the standard error for a 1 in 6 simple random sample.²¹

Methodology

The first step in the process of providing estimates of sampling error, as represented by the variance or the standard error (the square root of the variance), was to estimate the sampling errors for a large number of characteristics. Because a complex estimator and a systematic sample of clusters (households) were used, no simple mathematical formula could be derived that would directly estimate the variance from the census sample. The variance of census estimates was therefore approximated by a procedure known as successive difference replication.²² This procedure involved generating 52 replicate samples for each weighting area. The order of selection in the sample was reflected in the replicates. All sample units in the weighting area were included in each replicate, although with differing weights. A ratio adjustment was made to the replicate weights in order to adjust the total population estimate for each replicate to the full sample total. The variance was estimated from the resulting replicate samples using a standard variance formula for successive difference replication.

Approximately 300 direct variance estimates were calculated for states, counties, places, and census tracts for the demographic profiles. In addition, the agency produced approximately 4,000 direct variance estimates for each weighting area. These were used to calculate generalized variance design factors for all possible estimates by dividing the estimated standard error by the standard error which would be expected from a simple random sample of the same size. Extremely high estimates of design factors were removed. The average of the remaining data item design factors by sampling rate category was calculated across weighting areas within the state. The average design factor (weighted by the weighted count of the data item) was then computed over data items by 60 subjects, such as place of work or poverty, and by four observed sampling rates (less than 15 percent, 15 to 25 percent, 25 to 35 percent, and over 35 percent). The national- and state-level design effects are available at <<http://www.census.gov/prod/cen2000/doc/sf3.pdf>>.

Presenting Sampling Errors

The design factors at the national or state level can be used to estimate the long-form standard error of any estimate. Data users are instructed to find the design factor for the subject area of interest (e.g., language usage or number of rooms) based on the observed sampling rate and to estimate the standard error which would be obtained if the sample were a simple random sample by a simple formula using only the estimate and the size of the area. They then multiply the design factor by the simple random sample standard error to obtain an estimate of the standard error of the census statistic of interest.

²¹ Stephen P. Hefter and Philip M. Gbur, “Overview of the U.S. Census 2000 Long Form Weighting,” paper presented at the Joint Statistical Meeting, 2002, New York; printed in *Proceedings of the Section on Survey Research Methods of the American Statistical Association* (Alexandria, VA: American Statistical Association, 2003), pp. 1418–23.

²² Robert E. Fay and George F. Train, “Aspects of Survey and Model-Based Postcensal Estimation of Income and Poverty Characteristics for States and Counties,” paper presented at the Joint Statistical Meeting, August 14, 1995, Orlando, FL; printed in *Proceedings of the Government Statistics Section of the American Statistical Association* (Alexandria, VA: American Statistical Association, 1996), pp. 154–59.

PRESENTATION OF INDIVIDUAL QUESTIONS

The questionnaire items discussed below, including all instructions, appear as they did on the 2000 questionnaire. With two exceptions, the items fall into one of four groupings: 100 percent population questions (those asked of every respondent), sample population questions (asked only of randomly selected respondents), 100 percent housing questions, and sample housing questions. The exceptions are the “household roster” questions, which are discussed below, just before the individual population and housing items.

In an effort to maximize the response rate and increase the “user friendliness” of the census form, Census 2000 presented a much simplified questionnaire to respondents. Questions were worded to be as direct and self-explanatory as possible, with instructions kept to a minimum to improve clarity. Respondents received no separate instruction booklet with the mailed questionnaire, as they had in the 1990 census. People seeking a questionnaire in one of several languages other than English (or Spanish in Puerto Rico) could request one in response to a mailed, precensus advance letter from the Census Bureau.

Follow-up enumerators had additional instructions in the *Nonresponse Follow-Up Enumerator Manual*. Because the enumerators’ instructions generally only rephrased or clarified respondents’ instructions, this discussion will mention them only when necessary to explain how the Census Bureau resolved certain special situations. Also, where relevant, this chapter will discuss variables derived from questions and specifications for editing and allocation.

HOUSEHOLD ROSTER QUESTIONS

Question 1. Number of Residents

1 How many people were living or staying in this house, apartment, or mobile home on April 1, 2000?

Number of people

INCLUDE in this number:

- foster children, roomers, or housemates
- people staying here on April 1, 2000 who have no other permanent place to stay
- people living here most of the time while working, even if they have another place to live

DO NOT INCLUDE in this number:

- college students living away while attending college
- people in a correctional facility, nursing home, or mental hospital on April 1, 2000
- Armed Forces personnel living somewhere else
- people who live or stay at another place most of the time

In comparison with the 1990 census, Census 2000 simplified the residence instructions for including and excluding people—the eight “include” categories in 1990 were reduced to three, and the five “exclude” categories were reduced to four. These instructions helped respondents apply the census residence rules when deciding whom to include in or exclude from the household count.²³

The Census Bureau added this question to the Census 2000 questionnaire to evaluate census coverage. Census analysts compared the response to this question with the roster of household members the respondent provided and with the number of individual responses on the completed questionnaire to determine if information on all household members had been supplied. It also allowed nonre-

sponse follow-up enumerators to check that the number of respondents on which a questionnaire contained information matched the number of people living or staying in the house, apartment, or mobile home.

²³ See Chapter 2, “Planning the Census,” p. 34, for a brief description of the rostering research included in the 1995 Census Test.

Question 2. Names of Residents

2 Please print the names of all the people who you indicated in question 1 were living or staying here on April 1, 2000.

Example — Last Name
J O H N S O N
First Name MI
R O B I N J

Start with the person, or one of the people living here who owns, is buying, or rents this house, apartment, or mobile home. If there is no such person, start with any adult living or staying here.

Person 1 — Last Name

First Name MI

Person 2 — Last Name

First Name MI

Census 2000, like the 1990 census, asked respondents for their names and the names of all people living in the residence on April 1. Census 2000 simplified the process by eliminating the need for respondents to list people who lived in the residence only occasionally. Both short and long forms of the Census 2000 questionnaire allowed room for twelve people to be listed in a household, though respondents were given room to answer questions on no more than six people.²⁴ If more than six people were listed on a mail return form, a telephone operation called coverage edit follow-up collected information on the remaining individuals.²⁵

100 PERCENT POPULATION QUESTIONS

Question 1. Name

1 What is this person's name? Print the name of Person 1 from page 2.

Last Name

First Name MI

The census included the name as a person's basic identifier and as a means of safeguarding against duplication. From the first census in 1790 through the 1840 census, only the names of family heads were recorded. Beginning in 1850, the census recorded the names of all people in the household except slaves, whose descriptions were recorded on a separate form along with the names of slave owners. Beginning with the 1870 census, enu-

merators recorded the names of all people because the Thirteenth Amendment to the U.S. Constitution dissolved any legal distinction between slaves and free people.

The Census 2000 questionnaire differed from the 1990 questionnaire in its approach to asking respondents to record information for household members. On the 1990 questionnaire, the 100 percent population items were arranged in a matrix format that allowed respondents to answer these questions for each of up to seven household members first, followed by the 100 percent housing questions. For long forms, the sample housing questions came next. The final sections of the sample questionnaire were devoted to the sample population questions. The 2000 questionnaire, however, asked respondents to answer every question (7 on the short form; 53 on the long form) for a particular individual, then do the same for the next individual, and so on until data for

²⁴ The enumerator questionnaires (D-1(E) short form and D-2(E) long form) used in nonresponse follow-up had room for only five respondents.

²⁵ For a description of coverage edit follow-up and other census data collection operations, see Chapter 5, "Data Collection."

all people listed (up to six) had been recorded. The long-form housing questions appeared in the individual section for Person 1. This approach was intended to reduce the possibility for confusion and error by focusing respondents on one person at a time for a sequence of questions, rather than focusing them on one question at a time for a sequence of people.

Census 2000 was the first decennial census to data capture all names reported on all questionnaires.²⁶ Use of names was an important tool for coverage improvement and editing the questions on sex and Hispanic origin. Having names in a machine-readable format made it possible to try to resolve the large number of duplications found in the enumerated population.

Coding. None was required.

Editing and allocation. First names were used to help impute a value for sex when that question was not answered. When a person with a particular first name did not report a sex, the sex reported by the majority of people reporting that same first name was used to assign a sex. All surnames captured were categorized by whether they were Spanish, not Spanish, or indeterminate (or not reported). Determination of whether a particular surname was Spanish was based on the origin given by people who reported that surname. If a surname occurred ten or more times in a state and 85 percent or more of people with this surname reported they were of Spanish origin, that surname was considered to be Spanish. If 85 percent or more of people with this surname reported they were not of Spanish origin, that surname was classified as not Spanish. If less than 85 percent of people reported either Spanish or not Spanish, the surname was considered indeterminate. (See edit procedures for Hispanic origin below.)

Question 2. Household Relationship

2 How is this person related to Person 1?
Mark ONE box.

Husband/wife
 Natural-born son/daughter
 Adopted son/daughter
 Stepson/stepdaughter
 Brother/sister
 Father/mother
 Grandchild
 Parent-in-law
 Son-in-law/daughter-in-law
 Other relative — *Print exact relationship.*

If NOT RELATED to Person 1:

Roomer, boarder
 Housemate, roommate
 Unmarried partner
 Foster child
 Other nonrelative

Relationships were categorized in reference to Person 1. Therefore, Person 1 did not need to answer the relationship question. For Person 1, the Census Bureau used this space to ask for the telephone number at which Person 1 could be contacted.

Relationships between people sharing a residence provided data on living arrangements as well as social and economic characteristics. The federal government required these data to plan for social security needs; to define poverty; and to determine funding needs for programs such as Head Start, the School Breakfast Program, and the Compensatory Education of the Disadvantaged Program.

The census began recording data on the relationships between household members in 1880, though the definition of a family for census purposes at the time was very inclusive—everyone who ate at the same table, including people living alone as sole members of a household. In the tenement houses or “flats” of America’s growing cities, enumerators counted families by counting the dining tables. In

1950, the census distinguished “families” from “households” by noting blood relations or adoption as defining characteristics of a family for census purposes.

²⁶ All the safeguards protecting respondent confidentiality spelled out in Title 13 of the United States Code remained in force. For a description of the confidentiality requirements of Title 13, see Chapter 11, “Legal Issues.” During the 1990 census, the surnames and initials of the first person listed on about 4.7 million questionnaires were data captured via a keying operation. This was done for questionnaires that were returned by residents of multiunit structures and housing units without house number and street name addresses. Nonresponse follow-up enumerators used respondent surnames to help resolve apartment mix-ups caused by misdelivered questionnaires and to assist in locating nonresponse units. See *1990 Census of Population and Housing, History, Part C*, 1990 CPH-R-2C (Washington, DC: Government Printing Office, 1995), p. 8-6.

Over the years, refinements in data collection technology have enabled the census to respond more accurately to changing social conditions. Census 2000 included ten possibilities for family relationship, whereas the 1990 census had offered seven. The 2000 questionnaire separated the category of “adopted son/daughter” from “natural-born son/daughter,” whereas the 1990 census had put these two categories together. Census 2000 also included son-in-law/daughter-in-law and parent-in-law as new categories. Among the categories of “not related,” Census 2000 separated the category of “foster child” from the 1990 category of “roomer, boarder, or foster child” in order to provide a more accurate count of children living in foster care.

Derived variables. The person or individuals occupying a housing unit were termed a “household,” and the reference person (Person 1) was the “householder.” Households were either “family” or “nonfamily.” Family households had at least one person related to Person 1 by birth, marriage, or adoption. The family consisted of the householder and all persons related to him or her. Any other persons in the household not related to the householder by birth, marriage, or adoption were termed “nonrelatives.” A nonfamily household contained a person living alone or with nonrelatives only. A household might include only one family (or none), but could also contain subfamilies (defined below) among the family members.

Families were further classified by family type such as a “married-couple family” when a household member was listed as “husband/wife” of Person 1. Two other family categories frequently used were “families with a male householder, no wife present” and “families with a female householder, no husband present.”

The measure “persons in household” was calculated by dividing all occupants in a household, not just those related to the householder, by the number of occupied housing units. Figures for “persons in household” matched those for “persons in unit” in population and housing tabulations, respectively, based on 100 percent data. In sample tabulations, these figures sometimes differed because of the weighting process. “One-person households” and “persons living alone” were synonymous. “Persons per family” was obtained by dividing the number of persons in families by the total number of families. In cases where individuals in households and families were cross-classified by race or Hispanic origin, household members were typically classified by the race or Hispanic origin of the householder rather than the race or Hispanic origin of each individual. However, the Summary File 2 Supplement contained data for people in households based on the race or Hispanic origin of each individual, rather than on the race or Hispanic origin of the householder.

Enumerators and telephone follow-up clerks received additional instructions in the *Questionnaire Reference Book*. They filled the “husband/wife” box for the person reported as the husband or wife of Person 1. Other married couples might have resided in the household, but the entry for “husband/wife” was filled only for the person reported married to Person 1.

Subfamilies were “families within a family.” A “subfamily” was a family group of two or more persons related to the reference person but not including the reference person or his/her spouse. There were two types of subfamilies: “married-couple” and “parent-child.” A “married-couple” subfamily contained a married couple and their never-married children under 18 years of age, if any. Examples would include the son and daughter-in-law of Person 1 and their never-married child (the grandchild of Person 1) or the mother and father of Person 1. A “parent-child” subfamily contained one parent (with no spouse present) and one or more never-married children under 18 years of age. Examples would include Person 1’s daughter and her never-married children under 18 years (grandchildren of Person 1) or Person 1’s mother and a never-married brother or sister under 18 years of age.

A “natural-born son/daughter” or an “adopted son/daughter” was a son or daughter of Person 1 by birth (or adoption), regardless of the age of the child. If Person 1 was also the stepparent of the adopted child, the category “adopted son/daughter” took precedence over “stepson/stepdaughter.” “Adopted son/daughter” appeared as a separate category and response option in Census 2000, whereas in the 1990 census adopted children had been counted in the same category as natural-born children. Additionally, foster children appeared as a separate category in 2000, having been included with roomers and boarders in the 1990 census.

A “stepson/stepdaughter” was a son or daughter of Person 1 through marriage but not by birth, regardless of the age of the child (excluding sons- and daughters-in-law). If the “stepson/stepdaughter” of Person 1 also was legally adopted by Person 1, he or she was considered an “adopted son/daughter,” not a “stepson/stepdaughter.” In other words, “adopted son/daughter” took precedence over “stepson/stepdaughter.”

A “brother/sister” was either the brother or sister of Person 1 by birth or adoption or the stepbrother or stepsister of Person 1. A “father/mother” was either the parent by birth, the stepparent, or the adoptive parent of Person 1. A “grandchild” was the grandson or granddaughter of Person 1. A “parent-in-law” was either the mother or father of Person 1’s spouse. A “son-in-law/daughter-in-law” was the spouse of Person 1’s daughter or son. “Other relative” included brothers- and sisters-in-law, as well as anyone else related to Person 1, either by blood, marriage, or adoption (such as nephew, aunt, cousin, grandparent, great-grandchild, etc.), and the exact relationship was printed in the space provided. However, Census 2000 counted parents-in-law of Person 1 who lived in the household as a separate category. This differed from the 1990 census which included parents-in-law in the “other relative” category.

A “roomer, boarder” was a roomer, boarder, or lodger not related to Person 1. A “housemate, roommate” was a person who was not related to Person 1 but used common living quarters primarily to share expenses. An “unmarried partner” was a person who was not related to Person 1 but shared living quarters and had a close personal relationship with him or her. “Other nonrelative” referred to any other person who was not related to Person 1 by blood, marriage, or adoption but could not be described by the given categories.

Coding. For respondents marking the “other relative” box on the questionnaire, space was provided to write in the specific relationship of that person to Person 1. For most cases, the written response was automatically coded by scanning and interpreting the written image, matching the interpreted response to a dictionary of names, and then selecting the appropriate final set of relationship coded categories. This dictionary included numerous variations on relationship types (for example, sister, sis), misspellings (soster, sisster, sissterr), and foreign-language equivalents. For those entries that could not be found in the relationship dictionary, the interpreted electronic images of the write-in responses produced by the optical character recognition software were visually interpreted by coders who then assigned the write-in to the predetermined set of responses. Write-in responses which could not be classified were then coded to the “other relative” category. If the write-in clearly indicated that this person was not related to the householder (for example, “best friend”), the coders then assigned the response to the proper nonrelative category.

Editing and allocation. Relationship categories were edited for consistency using the age and sex of the respondent in relation to the householder. Certain criteria were established to ensure that there would not be multiple entries of the same relationships where only one response was acceptable (for example, only one spouse per householder). In addition, age limits were established between people for acceptability of responses (for example, the parent of the householder had to be older than the householder by 15 or more years). In instances where inconsistent or blank responses were noted, items were either assigned on the basis of logical relationships between people or were allocated from matrices based on questionnaires completed with acceptable responses.

A major change in the editing routine of the relationship item between the 1990 census and 2000 census was in the editing of married couples where the householder and the spouse were of the same sex. In 1990, the response of “spouse” was retained but the sex of the spouse was changed to the opposite sex to establish only opposite-sex spouses. In 2000, no change was made in the sex of the spouse, but the relationship category “spouse” of the householder was changed to “unmarried partner” of the householder. A new allocation category, “changed for household consistency,” was added for edits of this type.²⁷ More detailed descriptions of this editing procedure

²⁷ Relationships changed for household consistency were treated as self-reported on the Census 2000 public use microdata sample files.

can be found in the technical note on unmarried partners located at <<http://www.census.gov/prod/cen2000/notes/errata.pdf>> or in the Census 2000 publication *Notes and Errata: 2000*, SF/01-ER, Summary File 1, Technical Documentation, Note 3.

In addition, the relationship item in 2000 was not edited using marital status because marital status was present only on the long form. In 1990 marital status was included on the short form, and its inclusion aided in the editing and allocation of relationship responses.

Question 3. Sex

3 What is this person's sex? Mark ONE box.
 Male
 Female

Every census since the first in 1790 has recorded a person's sex (male or female) as a basic population characteristic. Sex refers to the biological categories of male and female. Gender refers to a person's sexual identity and to the constellation of traits or characteristics that a particular society

ascribes to people of a given sex. Prior to 1960, enumerators noted a person's sex by simple observation, by inference (a "wife" was considered female, as was someone with a female name), or by direct questioning as necessary. Starting with the 1960 census, when the census first used the mail extensively to collect data, respondents began recording their own responses, including their sex, on a mail-in census questionnaire. By 1970 about 60 percent of census data was gathered by mail, and by 1980 the percentage had climbed to about 90 percent. The census collects data on sex in part to comply with a variety of legal mandates and requirements, such as laws concerning affirmative action and equal employment opportunity, public health, and veterans' programs ("hot-deck" imputation).²⁸

Coding. None was required.

Editing and allocation. The consistency checks for the relationship, sex, age, and date-of-birth items were conducted jointly to reconcile inconsistencies between each household member's relationship to Person 1 and between the respondent's sex and age. First name was used to impute a sex if none was reported. During the householder edit that involved the question on relationship, there was a consistency check of householder/spouse responses to assure that the householder and spouse entries were for opposite sexes. The edit assigned values for inconsistently reported or missing values based on the values of other variables for that person, from other people in the household, or from people in other households.

Question 4. Age and Date of Birth

4 What is this person's age and what is this person's date of birth?
Age on April 1, 2000
| | | | |
Print numbers in boxes.
Month Day Year of birth
| | | | | | | | |

The census has collected data on age since 1790, though in that first census age was used only to divide free white males into those 16 years old and above and those below the age of 16. Subsequent censuses expanded the recording categories, first as age ranges and then, in 1850, as single years. The 1850 census asked people their "age at last birthday," with infants under 1 year of age entered as twelfths of a year (for example, 3 months was recorded as 3/12). The 2000 questionnaire differed

from the 1990 questionnaire in asking for the person's month and day of birth as of Census Day in addition to age and year of birth, thus allowing for a more accurate measure of this item. Minor variations in recording peoples' ages have occurred over the years, as follows:

²⁸ See footnote 9 in this chapter for a definition of hot-deck imputation.

Year	Census Day	Asked	Additional detail
1890	June 1	Age at nearest birthday	In 1890 and 1900, age for the under-1-year-old population was reported in months as twelfths of a year. In 1950, month of birth was reported for babies under 1 year old.
1900	June 1	Age, month, and year of birth	
1910	April 15	Age at last birthday	
1920	January 1	Age at last birthday	
1930	April 1	Age at last birthday	
1940	April 1	Age at last birthday	
1950	April 1	Age at last birthday	
1960	April 1	Quarter of year in which birth occurred and year	
1970	April 1	Age, month, quarter, and year of birth	
1980	April 1	Age, month, quarter, and year of birth	
1990	April 1	Age and year of birth	
2000	April 1	Age on April 1 and month, day, and year of birth	

Accurate age data were crucial to a successful census. Numerous laws, such as those concerning public health, civil rights and voting rights, special education, juvenile justice, veterans' programs, and low-interest insured student loans, required age data gathered by the census.

Coding. None was required.

Editing and allocation. Both preediting and editing procedures were used to assess consistency and quality of age and date-of-birth responses. When there were inconsistencies between reported age and age calculated from date of birth, the latter generally took precedence. The consistency checks for the relationship, sex, age, and date-of-birth responses were conducted jointly to reconcile inconsistencies between each household member's relationship to the householder and between the respondent's sex and age. The edit imputed values for inconsistently reported or missing values based on the values of other variables for that person, from other people in the household, or from people in other households.

Question 5. Spanish/Hispanic/Latino Origin

5 Is this person Spanish/Hispanic/Latino? Mark the "No" box if *not* Spanish/Hispanic/Latino.

No, not Spanish/Hispanic/Latino

Yes, Mexican, Mexican Am., Chicano

Yes, Puerto Rican

Yes, Cuban

Yes, other Spanish/Hispanic/Latino — *Print group.* ↗

The census has included a question on Spanish/Hispanic origin since 1970, though at that time it was asked of only a 5 percent sample of the population. Starting in 1980 the question was asked of every census respondent, reflecting a dramatic rise in the number of Spanish/Hispanic people in the U.S. population. This information was required or mandated by federal laws concerning affirmative action and equal opportunity, civil and voting rights, public health, and certain areas of commerce.

People of Spanish/Hispanic origin or descent were those who classified themselves in one of the specific Spanish/Hispanic origin response categories listed on the questionnaire—Mexican, Puerto Rican, or Cuban—as well as those who indicated they were of “other Spanish/Hispanic origin.” Individuals reporting “other Spanish/Hispanic origin” were those who traced their origin to other Spanish-speaking countries, such as those of Central or South America, Spain, and the Dominican Republic, or people identifying themselves generally as Spanish, Spanish American, Hispano, Latino, etc. Starting in 1980, the census questionnaire asked for Spanish/Hispanic origin and race data separately. Census 2000 simplified the 1990 question, changing “Is this person of Spanish/Hispanic origin?” to “Is this person Spanish/Hispanic/Latino?” The 2000 wording also reflected the frequent use of the word “Latino” by people of Spanish/Hispanic origin to describe themselves.

Coding. For the second time during a census, an automated coding system for written responses to the Hispanic-origin question was used in Census 2000. The automated system aimed to reduce the potential for error associated with a clerical review. Using master files containing millions of unique coded written responses from previous censuses and surveys, the system automatically coded more than 90 percent of the written responses if the entry matched an entry already in the master files. Specialists with thorough knowledge of Hispanic-origin categories and classification systems reviewed and coded responses that were not automatically coded.

Editing and allocation. Reediting and editing procedures were used for the Hispanic-origin question. Preediting procedures eliminated duplicate responses and adjudicated other situations where more than one response was provided (only one response was allowed for this question). For Census 2000, if both Hispanic origin and race were missing, they were imputed jointly (in the 1990 census, each response was imputed independently). The 2000 editing procedures could have imputed a value from an ethnic response provided by that person in the question on race, a response from another household member of the same race using a precedence order of household relationships, or a response from another person of the same race and age group in a different household based on whether the person needing an origin had a Spanish surname (hot-deck imputation). The computer software identified people with a reported origin and a Spanish surname as potential donors for origin to the Spanish surname-assisted hot deck.²⁹ For those with a reported origin and a non-Spanish surname, the computer program copied their origin to the non-Spanish surname-assisted hot deck. For all other people with a reported origin, the software identified their origin as potential donors to a non-surname-assisted hot deck. If a person requiring an origin from the hot deck had a Spanish surname, he or she would receive an origin from the Spanish-surname-assisted hot deck. If a person requiring an origin from the hot deck had a non-Spanish surname, he or she would receive an origin from the non-Spanish-surname-assisted hot deck. All other people requiring an origin from the hot deck would receive an origin from the non-surname-assisted hot deck. Census 2000 was the first decennial census to use surname-assisted hot decks.

Question 6. Race

6 What is this person's race? Mark **one or more races** to indicate what this person considers himself/herself to be.

White

Black, African Am., or Negro

American Indian or Alaska Native — *Print name of enrolled or principal tribe.* ↴

Asian Indian Native Hawaiian

Chinese Guamanian or Chamorro

Filipino Samoan

Japanese Other Pacific Islander — *Print race.* ↴

Korean

Vietnamese

Other Asian — *Print race.* ↴

Some other race — *Print race.* ↴

The census has collected data on race since 1790. Race has been an evolving and sensitive concept in American life and has continued to be a required or mandated item in numerous government programs involving affirmative action and equal employment opportunity, civil and voting rights, public health, and veterans' benefits. In 2000, the Census Bureau used a concept of race that did not denote any clear-cut scientific definition of biological stock but instead acknowledged that people often identify with one or more racial groups.

The 1990 questionnaire asked respondents to choose only one racial identification, whereas the 2000 questionnaire allowed for "one or more" racial choices. Census 2000 added the descriptor "African Am." to "Black or Negro," reflecting the increased use of African American as a racial self-identifier. It also modified other categories in order to increase accuracy. It created a single category, "American Indian or Alaska Native," whereas the 1990 census had contained three: "Indian (Amer.)," "Eskimo," and "Aleut." The category of "Other Asian or Pacific Islander," which had

²⁹ For a description of how surnames were classified into Spanish, non-Spanish, and indeterminate, see the "Editing and allocation" section for Question 1 (name and number of people).

appeared for the first time in the 1990 census, was separated into two distinct categories, “Asian” and “Native Hawaiian or Other Pacific Islander.” The category “Hawaiian” became “Native Hawaiian”; “Chamorro” was added to “Guamanian,” as in “Guamanian or Chamorro”; and “Asian Indian” was added to more clearly distinguish it from “American Indian.”

Coding. For the second time during a census, an automated coding system for written responses to the race question was used in Census 2000. The automated system aimed to reduce the potential for error associated with clerical coding. Using master files containing millions of coded written responses from previous censuses and surveys, the system automatically coded the written responses if the entry matched an entry already in the master files. Specialists with thorough knowledge of race categories and classification systems reviewed and coded responses that were not automatically coded.

Editing and allocation. Both preediting and editing procedures were used for the race question. Preediting procedures accomplished the following tasks:

- Eliminated duplicate responses, including situations where write-in responses duplicated checkbox categories, such as checking the “White” box and writing “White” in one of the write-in spaces (in these cases the write-in code was chosen over the checkbox code).
- Selected more-specific responses over more-general responses within the same racial group (for example, if “Asian” and “Laotian” were provided, “Asian” was dropped). This included situations where the respondent provided a general response, such as “Biracial,” in addition to a specific race combination (such as “Black and White”).
- Allowed for regional variations in coding a particular race term.
- Attempted to adjudicate responses of “Indian” into either “American Indian” or “Asian Indian.”
- Eliminated uncodable responses.
- Adjudicated situations where the write-in response was not consistent with checkbox categories that required a write-in response (i.e., “American Indian or Alaska Native,” “Other Asian,” “Other Pacific Islander,” and “Some Other Race”).
- Adjudicated situations where more than eight races were provided.
- Collapsed multiple responses in the “White” and “Black or African American” code range.

Editing procedures imputed a race (1) provided by the person himself or herself in the question on Hispanic origin, (2) provided by other people of the same origin within the household using a precedence order of household relationships, or (3) provided by people of the same origin and age group in another household (hot-deck imputation). If both Hispanic origin and race were missing, they were imputed jointly. (In the 1990 census each response was assigned independently.)

SAMPLE POPULATION QUESTIONS

Question 7. Marital Status

7 What is this person's marital status?

- Now married
- Widowed
- Divorced
- Separated
- Never married

A question on marital status first appeared in the 1880 census under the title “Civil Condition,” with four options: single, married, widowed, or divorced. From 1850 through 1890, the census asked whether the person, male or female, had married during the previous year. In 1950 the census added the category “separated” and changed the category “single” to “never married,” as some separated or divorced

people were describing themselves as single. The 1970 questionnaire’s wording on marital status sought further clarity, and achieved its current form, by making the “married” category “now married,” the other statuses being “widowed,” “divorced,” “separated,” or “never married.” In the 1990 census, marital status was one of seven items asked of all respondents; in Census 2000, marital status was only asked of a sample of the population.

Marital status data for people 14 years and older were available from the 1890 census to the 1970 census. Since 1980, marital status data have been published for people 15 years and older. People under age 15 were all categorized as never married regardless of their answers on the census form.

Federal legislation required marital status data for programs involving public health, low-income housing tax credits, and mortgage revenue bonds programs.

Coding. None was required.

Editing and allocation. Marital status was included on only the long form in 2000 and, hence, was edited only after all of the relationship items were first edited and allocated during the processing of the short-form items. Consistency checks were made between the marital status item and the age and relationship responses. In instances where some items were unanswered, responses were either assigned through a logical edit or were allocated from matrices using data filled by previous respondents. Examples of logical assignments included assigning the marital status category “now married” to people who were spouses of householders and the category “never married” to all people under the age of 15.

Unlike in 1990 when marital status was simultaneously edited and allocated in conjunction with the short-form items of age, sex, and relationship, marital status in Census 2000 was edited only after these items were finalized in the previous edit. In instances where the marital status response was inconsistent with the final relationship category (for example, an unmarried partner reporting that he/she was “now married”), the marital status response was rejected and allocated to a category consistent with the relationship response.

Questions 8 and 9: Education

The census has measured education in several ways since 1840, when it included a simple question about basic literacy skills. Starting in 1850, the census supplemented this literacy question with an additional item about school attendance. In 1940, it replaced the literacy question with an item about educational attainment—the highest grade that the person had completed. Thus by 1940 the two measures of education that have been used in every subsequent census—enrollment and attainment—were in place.

Subsequent censuses carried forward the two inquiries about school enrollment and highest grade completed that the 1940 census had introduced, while adding some new items. Type of school (public or private) was first asked in 1960. In 1970 the “private” category was expanded to include “parochial” and “other private,” while the 1980 census used the wording “private, church-related” and “private, not church-related.” Neither the 1990 census nor Census 2000 differentiated between types of private schools. However, the 1990 census shifted the emphasis in educational attainment from highest grade completed to actual degrees earned. This was the first major change in measuring education since 1940 and was continued in Census 2000.

Federal legislation concerning numerous educational programs, voting rights, and bilingual election procedures required the use of education data.

Questions 8a and 8b. School Enrollment and Attendance

8 a. At any time since February 1, 2000, has this person attended regular school or college?
Include only nursery school or preschool, kindergarten, elementary school, and schooling which leads to a high school diploma or a college degree.

No, has not attended since February 1 → Skip to 9

Yes, public school, public college

Yes, private school, private college

8 b. What grade or level was this person attending?
Mark ONE box.

Nursery school, preschool

Kindergarten

Grade 1 to grade 4

Grade 5 to grade 8

Grade 9 to grade 12

College undergraduate years (freshman to senior)

Graduate or professional school (for example: medical, dental, or law school)

The 1990 census had asked whether a person had attended school or college since February 1 but did not ask for the exact grade level in which the person was enrolled. Enrollment level was derived using an algorithm based on the level indicated in the response to the educational attainment question. Census 2000 included a two-part question on attendance: first, the fact of attendance (8a); and second, the grade level attended (8b). The question on educational attainment (highest degree or level of school completed), which was essentially unchanged from the 1990 questionnaire, followed this two-part question on attendance and enrollment.

Beginning with the 1950 census, college students were enumerated where they lived while attending college; prior to 1950 they generally were enumerated at their parental homes. This change should not have affected the comparability of national figures on college enrollment since 1940; however, it may have affected the comparability over time of college enrollment data at subnational (region, state, county) levels.

Coding. No coding was necessary for Questions 8a and 8b.

Editing and allocation. Individuals without a response to the school enrollment questions were imputed a school enrollment status, type, and level by using information from other people who had the same age, race, Hispanic origin, labor force status, and occupation and resided in the same or a nearby area.

Question 9. Educational Attainment

9 What is the highest degree or level of school this person has COMPLETED? Mark ONE box.
If currently enrolled, mark the previous grade or highest degree received.

No schooling completed

Nursery school to 4th grade

5th grade or 6th grade

7th grade or 8th grade

9th grade

10th grade

11th grade

12th grade, **NO DIPLOMA**

HIGH SCHOOL GRADUATE — high school DIPLOMA or the equivalent (for example: GED)

Some college credit, but less than 1 year

1 or more years of college, no degree

Associate degree (for example: AA, AS)

Bachelor's degree (for example: BA, AB, BS)

Master's degree (for example: MA, MS, MEng, MEd, MSW, MBA)

Professional degree (for example: MD, DDS, DVM, LLB, JD)

Doctorate degree (for example: PhD, EdD)

Census 2000's focus on "highest degree or level of school this person has COMPLETED" continued the change in emphasis on actual degree attainment that the 1990 census had introduced. In prior censuses, degree possession had been inferred from the highest grade completed. However, by 1990 there was evidence that the comparability between years of school and degrees had deteriorated over time. Some individuals, for example, had completed 4 years of college but had not actually been awarded a degree. The increase in postsecondary degrees like associate's, master's, professional, and doctorate had further complicated the prospect of inferring degree possession from highest level completed, as the number of years attended do not necessarily translate into degree level attained. Therefore, comparison of post-1990 data with earlier years is possible only for the levels of high school diploma and bachelor degrees and should be made with caution.

Coding. No coding was necessary for Item 9.

The following table is an illustration of the content of the classification schemes used to present language data.

Table 3-1.
Classifications (4 Groups and 39 Groups) of Census 2000 Languages Spoken at Home, With Illustrative Examples

4-group classification	39-group classification	Examples
Spanish	Spanish and Spanish Creole	Spanish, Latino
Other Indo-European languages	French French Creole Italian Portuguese and Portuguese Creole German Yiddish Other West Germanic languages Scandinavian languages Greek Russian Polish Serbo-Croatian Other Slavic languages Armenian Persian Gujarati Hindi Urdu Other Indic languages Other Indo-European languages	French, Cajun, Patois Haitian Creole Dutch, Pennsylvania Dutch, Afrikaans Danish, Norwegian, Swedish Serbo-Croatian, Croatian, Serbian Czech, Slovak, Ukrainian Bengali, Marathi, Punjabi, Romany Albanian, Gaelic, Lithuanian, Rumanian
Asian and Pacific Island languages	Chinese Japanese Korean Mon-Khmer, Cambodian Miao, Hmong Thai Laotian Vietnamese Other Asian languages Tagalog Other Pacific Island languages	Cantonese, Formosan, Mandarin Dravidian languages (Malayalam, Telugu, Tamil), Turkish Chamorro, Hawaiian, Ilocano, Indonesian, Samoan
All other languages	Navajo Other Native North American languages Hungarian Arabic Hebrew African languages Other and unspecified languages	Apache, Cherokee, Choctaw, Dakota, Keres, Pima, Yupik Amharic, Ibo, Twi, Yoruba, Bantu, Swahili, Somali Syriac, Finnish, other languages of the Americas, not reported

Question 12. Place of Birth

12 Where was this person born?

In the United States — *Print name of state.*

Outside the United States — *Print name of foreign country, or Puerto Rico, Guam, etc.*

The three earliest censuses (1790, 1800, 1810) did not ask about place of birth, and the 1820 through 1840 censuses simply asked whether a person was a “foreigner non-naturalized.” Beginning in 1850, censuses have requested the name of the specific state, territory, or foreign country of birth. Censuses from 1870 through 1970 inquired about parents’ place of birth in addition to the respondent’s place of birth, though the 1870 question concerned only

whether the mother and father were foreign-born and did not ask for their specific place of birth. In 1980, 1990, and 2000 the census omitted questions about parents' birthplace and asked only for the enumerated individual's place of birth.

Place of birth data help distinguish native from foreign-born people. In Census 2000 "native" included people born in the United States, the Commonwealth of Puerto Rico, and other U.S. Island Areas (including Guam, the U.S. Virgin Islands, American Samoa, and the Commonwealth of the Northern Mariana Islands), and individuals born in a foreign country or at sea but having at least one U.S. citizen parent. "Foreign-born" included all individuals who were not U.S. citizens at birth, regardless of their citizenship status in 2000.

Coding. Place-of-birth coding required matching the write-in responses to reference files and attaching a geographic code. The goal of place-of-birth coding was to code responses to a U.S. state, Puerto Rico, a specific U.S. Island Area, or foreign country where the respondents were born. The primary reference file used in geocoding place of birth was the State and Foreign Country File (SFCF), which contained (1) the names and abbreviations of each state, the District of Columbia, Puerto Rico, and the U.S. Island Areas and (2) the official names, alternate names, and abbreviations of foreign countries and selected foreign city, state, county, and regional names. Other reference files (such as a military installation list and city reference file) were available and used in instances where the respondent's information was either inconsistent with the instructions or was incomplete.

Once the write-in responses were captured, either through keying or OCR interpretation, they were matched to the SFCF and other computer-based reference files in an automated computer-coding operation; the responses did not have to match a reference file entry exactly. The coding algorithm allowed for equivocations, such as using Soundex values of letters (for example, m=n, f=ph, etc.) and reversing letter combinations (ie=ei). Each equivocation was assigned a numeric value or confidence level, with exact matches receiving the best score or highest confidence. A preference was given for matches that were consistent with any checkboxes marked and/or response boxes filled. The responses had to match a reference file entry with a relatively high level of confidence in order for the automated match to be accepted. Nearly 99 percent of the place-of-birth responses were matched with an acceptable confidence level during the automated phase of geocoding.

The remaining 1 percent of the place-of-birth responses were coded in a computer-assisted clerical coding (CACC) operation. Clerks used an interactive computer system to search for and select reference file entries that they thought best matched the responses, then the computer assigned the codes associated with that geographic entity. The work units in the CACC operation included a three-way independent quality-control sample of the responses that required clerical coding. The CACC operation included a referral coding unit, a specially trained group of clerks who used additional paper-based and Internet-based reference materials to code responses that could not be resolved using the standard reference files and procedures.

Editing and allocation. A person who did not report place of birth was allocated the birthplace of another family member or the response of another person with similar characteristics. Matching characteristics included age, sex, household relationship, Hispanic origin, race, citizenship, and any responses to the residence-5-years-ago question (migration). A person imputed as being "abroad, not specified" or "born in an outlying area, not specified" during the geocoding process was subsequently allocated a specific country of birth during the imputation process.

Nonresponse was allocated in a similar manner in 1970 through 1990; however, a person allocated as foreign-born was not assigned a specific country of birth but was classified as either "born abroad, country not specified" or "born in an outlying area, not specified." Prior to 1970, nonresponse to the place-of-birth question was not allocated but was shown in tabulations as "not reported"; individuals who did not report place of birth were generally classified as "natives."

Question 13. Citizenship Status

13 Is this person a CITIZEN of the United States?

- Yes, born in the United States → *Skip to 15a*
- Yes, born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas
- Yes, born abroad of American parent or parents
- Yes, a U.S. citizen by naturalization
- No, not a citizen of the United States

An inquiry about U.S. citizenship status appeared in the censuses of 1820 and 1830; in 1870, for males 21 years of age and older; and since 1890, with the exception of 1960. Under special arrangements with the appropriate local governments, the 1960 100 percent questionnaires used in New York City and Puerto Rico included a question on citizenship, and results were tabulated only for those areas.

The census used information on citizenship status to classify the population into U.S. citizens and non-U.S. citizens. Both the 1990 census and Census 2000 classified U.S. citizens further into four subcategories. The first three included U.S. citizens at birth—people born in the United States; those born in the Commonwealth of Puerto Rico, or other U.S. Island Areas (including Guam, the U.S. Virgin Islands, American Samoa, and the Commonwealth of the Northern Mariana Islands); and those born abroad of U.S. citizen parents. The fourth subcategory consisted of naturalized U.S. citizens, that is, people who, by any means, obtained U.S. citizenship after birth.

Coding. No coding was required.

Editing and allocation. For cases where a respondent either did not provide an answer or provided an answer that conflicted with another of his or her Census 2000 responses, such information was edited. Citizenship status and year-of-entry information were edited jointly for Census 2000. To determine what degree of editing (or allocation) was required, responses to citizenship status were first compared with responses to Question 12 (place of birth).

If the respondent indicated in Question 12 that he or she was born in the United States, Puerto Rico, or a U.S. Island Area (such as Guam), but did not provide a response to the citizenship status question, that person was recorded as being a U.S. citizen by birth in the citizenship status question.

If the respondent indicated in Question 12 that he or she was born outside the United States, Puerto Rico, or a U.S. Island Area, but did not provide a response to the citizenship status question, the edit procedure first searched for additional information about other related household members that would provide evidence as to the citizenship status of the respondent. If available, this information was used to impute a citizenship status to the respondent. If this information was not available, the edit procedure allocated citizenship status based on answers from other nonrelated respondents who shared similar characteristics such as age, race/ethnicity, year of entry, and citizenship status (where available).

The editing process of citizenship status and year-of-entry responses differed somewhat depending on whether the respondent lived in a household (e.g., single-family home, apartment, mobile home) or group quarters (institutional and noninstitutional). Answers reported by respondents living in households were edited using information from other relatives living in the same residence, if any were present. Such relationship-specific editing procedures were not used in group quarters as these living arrangements consisted of unrelated people.

Question 14. Year of Entry

14 When did this person come to live in the United States? *Print numbers in boxes.*

Year

The 1890 census was the first to gather data on the year of entry into the United States by foreign-born people. It asked foreign-born respondents how long they had been in the United States, then inferred the year of entry from that information. The 1900, 1910, 1920, and 1930 censuses asked foreign-born people directly for their “year of immigration” to the United States. The 1940, 1950, and

1960 censuses made no inquiry into year of entry. The 1970 census resumed collection of information on entry into the United States. As in the two subsequent censuses, the 1970 census

offered ranges of years from which the respondent would select (e.g., 1935–1944 or 1965–1970). It was not until Census 2000 that respondents born outside the United States were asked to write in a specific year of entry.

In addition to asking for specific year-of-entry information, the Census 2000 question on year of entry differed from the 1990 question, changing from “When did this person come to the United States to stay?” (1990) to “When did this person come to live in the United States?” (2000). For Census 2000, a person entering the United States more than once was instructed to enter the latest year he or she came to live in the United States. This instruction was provided to respondents who were interviewed by an enumerator either over the phone or in person, but was not provided to respondents who simply returned the questionnaire through the mail.

Coding. No coding was required.

Editing and allocation. See the “Editing and allocation” section of Question 13 (citizenship status) for a detailed description of this item.

Question 15. Residence 5 Years Ago

15 a. Did this person live in this house or apartment 5 years ago (on April 1, 1995)?

Person is under 5 years old → *Skip to 33*

Yes, this house → *Skip to 16*

No, outside the United States — *Print name of foreign country, or Puerto Rico, Guam, etc., below; then skip to 16.*

No, different house in the United States

15 b. Where did this person live 5 years ago?

Name of city, town, or post office

Did this person live inside the limits of the city or town?

Yes

No, outside the city/town limits

Name of county

Name of state

ZIP Code

Beginning in 1940, the census has gathered data on residential mobility (migration) by asking where respondents lived 5 years earlier and then comparing that location to respondents’ residence at the time of the census. The exception to this was the 1950 census, just 5 years after the end of World War II and demobilization, when inquiry was made about peoples’ residence 1 year earlier instead of 5 years. Legislation concerning state projections of veteran populations required information on residential mobility, though the data were widely used by a variety of planning and policy-making agencies.

Question 15a in Census 2000 served as an initial screen to determine whether a person was a mover, a nonmover, or under 5 years old. This question also determined whether any change of location that had taken place in the preceding 5 years was from a house or apartment outside or inside the United States. If inside the United States, the respondent was directed to Section b of the question, which asked for details about the location. If outside the United States, the respondent was asked for the name of the foreign country or Puerto

Rico or Island Area, and then was directed to the next question. This approach differed slightly from that used in 1990. The 1990 census question about residence 5 years earlier outside the United States had been included in Part b, rather than Part a. In the 2000 format, Part b concerned U.S. locations only, thus making it clearer to the respondent that no town or city names were required if the residence had been outside the United States.

Coding. Migration (residence 5 years ago) coding required matching the write-in responses of state/foreign country, county, city, inside/outside city limits, and ZIP Code given by the respondent to geocoding reference files and then attaching geographic codes to those responses. The goal of migration coding was to code responses to U.S. state (Puerto Rico, U.S. Island Area, or foreign country), U.S. county (municipio in Puerto Rico), minor civil division (MCD) in 12 states, and place (city, town, or post office). The inside/outside city limits indicator and the ZIP Code responses were used in the coding operations but were not a part of the final outgoing geographic codes.

Once the write-in responses were captured, either through keying or optical character recognition interpretation, they were sent through an automated geocoding system. This system was developed to recognize (1) states and statistically equivalent entities; (2) counties and statistically equivalent entities; (3) foreign countries, including (a) provinces in Canada and (b) continents and regions if that was the only information the respondent provided; (4) areas in the city reference file (the place, MCD [in 12 states], county, and state associated with each post office name and ZIP Code in the United States and Puerto Rico); and (5) military installations (including the state, county, MCD [in 12 states], and places for those in the United States and the foreign country for those located abroad).

During the automated coding operation, the responses did not have to match a reference file entry exactly. The coding algorithm allowed for equivocations, such as using Soundex values of letters (for example, m=n, f=ph, etc.) and reversing letter combinations (ie=ei). Each equivocation was assigned a numeric value or confidence level, with exact matches receiving the best score or highest confidence. The responses had to match reference file entries with a relatively high level of confidence in order for the automated match to be accepted. Nearly 96 percent of the migration responses were matched with an acceptable confidence level during the automated phase of geocoding.

The remaining 4 percent of the migration responses were coded in a computer-assisted clerical coding (CACC) operation. Clerks used an interactive computer system to search for and select reference file entries that they thought best matched the responses, then the computer assigned the codes associated with that geographic entity. The work units in the CACC operation included a three-way independent quality-control sample of the responses that required clerical coding. The CACC operation included a referral coding unit, a specially trained group of clerks who used additional paper-based and Internet-based reference materials to code responses that could not be resolved using the standard reference files and procedures.

Editing and allocation. When information on residence in 1995 was incomplete, previous residence for other family members, if available and consistent with partial responses, was used to impute it; if not available, the previous residence of another respondent with similar characteristics for whom complete information had been provided was allocated. Matching characteristics included state of current residence, age, sex, Hispanic origin, race, household relationship, educational attainment, employment status, and metropolitan/nonmetropolitan residence. People imputed to “abroad, not specified” during the geocoding process were subsequently allocated to a specific country of previous residence during the allocation process.

Nonresponse was allocated in a similar manner in 1980 and 1990. However, Census 2000 was the first to impute a specific city or town of previous residence within the United States or a specific foreign country during the allocation process. In 1980 and 1990, only state and county (or state, county, and MCD in the Northeast) were imputed within the United States. Prior to 1980, nonresponse to the migration question was not allocated but was shown in tabulations as “not reported.”

Questions 16 and 17: Disability

Disability questions have been included in numerous censuses since 1830. The conceptual scope of disability in the decennial census environment has varied from one or two questions about one or two specific impairments, as in the 1930 census in which deafness and blindness were the only disability items, to the six concepts of disability collected in Census 2000. In this most recent decennial census, the concept of disability included two distinct elements: the presence of an underlying, identifiable health condition and the identification of a limitation in specified functions or activities.

The 1830 census schedule introduced the concepts of blindness and deafness. The 1840 census added the categories of insanity and “idiocy,” the term used at that time for mental retardation. But it was the 1880 census that first framed the question of disability as a health condition limiting the person’s ability “to attend to ordinary business or duties.” After the 1910 census, which asked about disability in a supplemental questionnaire, inquiries about disability disappeared

from the census until 1970. In a 5 percent sample, that census asked whether a person had a “health or physical condition which limits the *kind* or *amount* of work he can do at a job”; whether his condition kept him from holding “*any* job at all”; and if so, how long he had been thus limited.

While similar to the 1970 census, the 1980 census differed in some significant respects. It added a specific reference to mental condition, specified a time period of 6 months or more for a condition’s duration, and an inquiry about the person’s condition-related difficulties in using public transportation. The transportation question was omitted from the 1990 census due to its limited usefulness.³⁰

In comparison with prior censuses, Census 2000 widened the scope of questions on conditions that interfered with a person’s normal activities to include more than those pertaining to his or her ability to work. Census 2000 included two questions (with a total of six components) that dealt with the impact of health conditions on several types of functions or activities. Such information was widely used by numerous health, housing, transportation, veterans’, and public assistance programs.

Question 16. Sensory and Physical Disability

16	Does this person have any of the following long-lasting conditions:	Yes	No
	a. Blindness, deafness, or a severe vision or hearing impairment?	<input type="checkbox"/>	<input type="checkbox"/>
	b. A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying?	<input type="checkbox"/>	<input type="checkbox"/>

The Census 2000 questionnaire reintroduced specific items about blindness, deafness, and visual and hearing impairments that had been omitted since 1910 (except in supplemental forms in 1920 and 1930).

Coding. No coding was required.

Editing and allocation. Items 16 and 17 were edited together using the same procedure. For each

part of Item 16, entries for people under 5 years of age were removed from consideration. Two allocation matrices for Items 16 and 17 contained fully reported data based on age, sex, employment status, form type, and group quarters type. For a person who had missing data for 16a, 16b, or both, these allocation matrices were used to determine whether the person had any of the following long-lasting conditions: blindness, deafness, or a severe vision or hearing impairment (16a); and a condition that substantially limited one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying (16b).

Question 17. Mental, Self-Care, Go-Outside-Home, and Employment Disability

17	Because of a physical, mental, or emotional condition lasting 6 months or more, does this person have any difficulty in doing any of the following activities:	Yes	No
	a. Learning, remembering, or concentrating?	<input type="checkbox"/>	<input type="checkbox"/>
	b. Dressing, bathing, or getting around inside the home?	<input type="checkbox"/>	<input type="checkbox"/>
	c. (Answer if this person is 16 YEARS OLD OR OVER.) Going outside the home alone to shop or visit a doctor’s office?	<input type="checkbox"/>	<input type="checkbox"/>
	d. (Answer if this person is 16 YEARS OLD OR OVER.) Working at a job or business?	<input type="checkbox"/>	<input type="checkbox"/>

Both the 1990 census and Census 2000 recognized that the conceptualization of “disability” was changing and the increasing involvement of people with disabilities in everyday activities meant that limitations may impact more than a person’s ability to work at a job. This broader approach to disabilities included identifying such activities as bathing, dressing, getting around inside the home, and going outside the home unaided. Census 2000 expanded on the 1990 census term “health condition” by specifying “a physical, mental, or emotional condition,” thus making more explicit to respondents the variety of condi-

tions that were included in the concept “health.” The “emotional condition” category, covering mood disorders like depression and bipolar disorder, appeared for the first time in this census. Additionally, Census 2000’s question differed from the 1990 census question by asking about impairment of cognitive functions like memory, learning, and concentration. Such impairments

³⁰ Public transportation planners concluded that the data the question produced were too general to be of real value.

could affect self-care capacity significantly, especially among elderly people. The Census 2000 question restricted the applicability of Parts c and d of Question 17, which focused on the ability to go outside the home alone to shop or visit a doctor’s office and the ability to work, to people 16 years and older, thereby providing disability information relevant to adults of all ages.

Coding. No coding was required.

Editing and allocation. Items 16 and 17 were edited together using the same procedure. For Parts a and b of Item 17, the computer program first eliminated consideration of entries for people under 5 years of age. For Parts c and d of Question 17, the computer program first eliminated consideration of entries for people under 16 years old. Two allocation matrices for Items 16 and 17 contained fully reported data based on age, sex, employment status, form type, and group quarters type. For a person 5 years and older who had missing data for 17a, 17b, or both, these matrices were used to allocate whether the person had a condition lasting 6 months or longer that caused difficulty in any of the following activities: learning, remembering, or concentrating (17a); and dressing, bathing, or getting around inside the home (17b). For a person 16 years and older who had missing data for 17c, 17d, or both, these matrices were used to allocate whether the person had a condition lasting 6 months or longer which caused a person difficulty in any of the following activities: going outside the home alone to shop or visit a doctor’s office (17c); and working at a job or business (17d).

Question 18. Age Screen

18 Was this person under 15 years of age on April 1, 2000?

Yes → Skip to 33

No

This item was used to screen for individuals 15 years and older, for whom the balance of the inquiries on the questionnaire would be asked, and to inform respondents and enumerators if they were to continue answering questions for a specific person.

The wording of the Census 2000 age screener differed from the 1990 item, which asked, “When was this person born?” The Census 2000 item allowed respondents to answer simply “yes” or “no” without asking the exact birthday.

Coding. No coding was required.

Editing and allocation. The computer used these entries only as indications that subsequent responses for a particular person were either to be ignored or to be edited and/or supplied. Responses to Item 18 involved no tabulation. The entry in 18 was compared with the age found in Item 4 and completed or corrected as necessary. If the person was born before April 1985, the program continued with the next question. If the person was born on or after April 1985, the program skipped the remaining questions for the person and went on to the next person, if any.

Question 19. Grandparents as Caregivers

19 a. Does this person have any of his/her own grandchildren under the age of 18 living in this house or apartment?

Yes

No → Skip to 20a

b. Is this grandparent currently responsible for most of the basic needs of any grandchild(ren) under the age of 18 who live(s) in this house or apartment?

Yes

No → Skip to 20a

c. How long has this grandparent been responsible for the(se) grandchild(ren)? *If the grandparent is financially responsible for more than one grandchild, answer the question for the grandchild for whom the grandparent has been responsible for the longest period of time.*

Less than 6 months

6 to 11 months

1 or 2 years

3 or 4 years

5 years or more

The question on grandparents as caregivers appeared for the first time in Census 2000. It reflected the widespread perception that social changes such as increases in the number of working parents and single-parent families, and social problems such as drug abuse and chronic unemployment, had shifted primary responsibility for child care in some families from parents to grandparents. Federal legislation passed in 1996 (Public Law 104-193) mandated that the census collect data on grandparents as caregivers.

In accordance with this mandate, the census inquiry aimed to distinguish between “a household in which a grandparent temporarily provides a home for a grandchild for a period of weeks or months during periods of parental distress” and “a household in which a grandparent provides a home for a grandchild and serves as the primary caregiver for the grandchild.” A grandparent could

house a grandchild and his/her working parent(s), for instance, but not be financially responsible for the grandchild. Or a grandparent might house a grandchild and be financially responsible for the grandchild’s basic needs, as in instances where the child’s parent(s) were temporarily unemployed or injured, without becoming the permanent or primary caregiver for the child. Question 19 did not ask respondents to determine permanence; instead, Part c of Question 19 offered five time spans, ranging from less than 6 months to 5 years or more. If the grandparent cared for more than one grandchild, the question asked for information regarding the grandchild for whom he or she had been responsible for the longest period of time.

Coding. No coding was required.

Editing and allocation. The questions relating to the grandparent items were first edited on the basis of the composition of the household. The presence or absence of a potential grandchild in the household for any respondent was first ascertained by examining the relationships of the household members. After qualifying the respondent on this basis, the questions were edited based on the potential age of the grandchild in the household. For example, if a person reported having a grandchild in the household but none under the age of 18 years could be identified, the response was changed to “no.” Similarly, if a person did not respond “yes” to the presence of a grandchild in the household in Item 19a, but the household roster indicated that he or she was a grandparent of a person in the household, the response was then assigned a “yes.”

Because the grandparent-grandchild population is relatively small, whenever a young person under 18 was allocated a relationship category of relative, the edit could potentially identify a grandparent-grandchild combination when none existed. Once a “yes” answer was established based on the household roster, all subsequent items in the series would require an answer and hence could potentially require allocations. These circumstances could account for the relatively high allocation rates for these items in Census 2000.

Question 20. Veteran Status, Period of Active-Duty Military Service, and Years of Active-Duty Military Service

20 a. Has this person ever served on active duty in the U.S. Armed Forces, military Reserves, or National Guard? *Active duty does not include training for the Reserves or National Guard, but DOES include activation, for example, for the Persian Gulf War.*

Yes, now on active duty

Yes, on active duty in past, but not now

No, training for Reserves or National Guard only → *Skip to 21*

No, never served in the military → *Skip to 21*

b. When did this person serve on active duty in the U.S. Armed Forces? Mark a box for EACH period in which this person served.

April 1995 or later

August 1990 to March 1995 (including Persian Gulf War)

September 1980 to July 1990

May 1975 to August 1980

Vietnam era (August 1964—April 1975)

February 1955 to July 1964

Korean conflict (June 1950—January 1955)

World War II (September 1940—July 1947)

Some other time

c. In total, how many years of active-duty military service has this person had?

Less than 2 years

2 years or more

The 1840 census asked a question about military pensioners, and the 1890 and 1910 censuses inquired about veterans of the Civil War. In 1890, an item counted the number of veterans and veterans' widows from both the Union and Confederate Armed Forces, though a special schedule for specific information about veterans included only Union survivors "and the widows of such as have died." The 1910 census counted only the number of survivors of the Union and Confederate services, not their widows, and gathered no additional information.

Veteran status inquiries next appeared in 1930 and in every subsequent census. Initial data on veteran service of women were collected in 1980. The 1990 census was the first to count service during World War II as a merchant-marine seaman as active-duty military service, and people with such service were counted as veterans.

The wording of Part a of the three-part veteran status question in Census 2000 differed from the 1990 wording, which asked if the person had ever been on active duty in the U.S. Armed

Forces or had ever been in the Reserves or in the National Guard. By asking instead if the person had ever served on active duty in the U.S. Armed Forces, Reserves, or National Guard, the Census 2000 question clarified for respondents the difference between regular service in the Reserves or National Guard and being called to active duty as a member of the Reserves or the National Guard.

Part B of Question 20, concerning dates of service, also differed from its counterpart in 1990. It dropped the World War I time period (April 1917 to November 1918) and added two others: "August 1990 to March 1995 (including Persian Gulf War)" and "April 1995 or later." Part c, the last part of the question, also differed from the 1990 section, which had been an open-ended inquiry about the total years of active-duty military service. The Census 2000 item offered a more restricted choice of "less than 2 years" and "2 years or more." Federal legislation concerning veterans' benefits, job training, outreach programs, and health care needs required information about veteran status and active duty military service.

Coding. No coding was required.

Editing and allocation. For Question 20a, the edit examined some closely related items to see whether there was any evidence that the person either was serving on active duty at the time of the census or had ever served on active duty prior to that time. If the person's employment status was "Armed Forces," then, unless the response in Question 20a was "no, training for Reserves or National Guard only," the edit made the person's final value for Question 20a "yes, now on active duty." If the person's employment status was not "Armed Forces," and if the person's current or most recent industry was "Armed Forces," or if the person reported one or more periods in Question 20b (period of active duty service), the edit made the person's final value for Question 20a "yes, on active duty in past, but not now." If none of the above conditions was true, then the edit did not change the reported answer to Question 20a; or, if Question 20a was blank, the edit allocated a final value to the person from a hot-deck matrix.

On Question 20b, for nonveterans, the edit made the final value "not in universe." For veterans, the edit rejected a reported period of service if it calculated that the person was too young or too

old to have served in the period. It also rejected unlikely combinations of served and not-served periods, such as served in World War II and post-September 1980, but not in between. After making these checks, the edit gave veterans a final value of “served in period” to any not-rejected reported period and gave “did not serve” to all other periods. If all periods were unreported or rejected, the edit imputed a final value for each period in a joint hot-deck allocation procedure.

On Question 20c, for nonveterans, the edit made the final value “not in universe.” For veterans, the edit did not change the reported answer. If the response was blank, the edit imputed a final value in a hot-deck allocation procedure.

Questions 21 Through 32: Employment, Commuting, Income

Questions 21 through 32 concerned employment, transportation to work, and income. This series of questions provided information needed to classify the entire working-age population into categories showing the labor force status of the nation, as well as information crucial to assessing the nation’s patterns of commuting and its transportation needs. Additionally, questions about income were useful in providing accurate data for economic planning and analysis and in deriving poverty status. Federal laws concerning such areas as education, job training, housing, civil rights, home mortgages, energy assistance, waste disposal, guaranteed commercial loans, highway planning, transit grants, and clean air either required or mandated the use of data on employment, transportation, and income.

Question 21. Employment Last Week

21 **LAST WEEK, did this person do ANY work for either pay or profit?** Mark the “Yes” box even if the person worked only 1 hour, or helped without pay in a family business or farm for 15 hours or more, or was on active duty in the Armed Forces.

Yes
 No → Skip to 25a

This item differed from its equivalent in the 1990 census in both wording and structure. It asked, “LAST WEEK, did this person do ANY work for either pay or profit,” whereas the 1990 question asked, “Did this person work at any time LAST WEEK?” The Census 2000 wording clarified for respondents the distinction between work (for pay or profit) and volunteer or other nonworkforce activity. The reason

for the change was to make the census question conform with the corresponding question on the Current Population Survey. Additionally, the Census 2000 item omitted the 1990 question’s second section asking for the number of hours worked during the last week. A separate question in both Census 2000 and the 1990 census gathered similar data on the weeks worked and usual hours per week worked in the last calendar year.

The remaining place-of-work responses were coded in computer-assisted clerical coding (CACC) operations, one operation to code to the place level and one to code to the block level. Clerks used interactive computer systems to search for and select reference file entries that they thought best matched the responses, then the computer program assigned the codes associated with that geographic entity. The work units in the CACC operations included a three-way independent quality-control sample of the responses that required clerical coding. Both the place-of-work place-level and block-level CACC operations included referral coding units, groups of specially trained clerks who used additional paper-, Internet-, and geographic information systems-based reference materials to code responses that were not resolved using the standard reference files and procedures.

Editing and allocation. Data on place of work were edited to be consistent with responses on employment status. That is, nonworkers were set as “not in universe.” When place of work was not reported for an individual, or the response was incomplete, a work location was allocated for that worker from that of another respondent with similar characteristics for whom complete information had been provided. Matching characteristics included employment status, means of transportation to work, travel time to work, industry, location of residence, and the workplace of others. Workplace information was always reported or allocated down to the place level within the United States and Puerto Rico but was not always available or possible below that level (census tract and block level). People classified as “abroad, not specified” either during coding or allocation were not assigned to a specific country during the allocation process. Place of work was allocated in a similar manner in 1990; however, prior to 1990, nonresponse to the place-of-work question was not allocated but was shown in tabulations as “not reported.”

Question 23. Means of Transportation to Work and Private Vehicle Occupancy (Carpooling)

23 a. How did this person usually get to work LAST WEEK? *If this person usually used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance.*

Car, truck, or van

Bus or trolley bus

Streetcar or trolley car

Subway or elevated

Railroad

Ferryboat

Taxicab

Motorcycle

Bicycle

Walked

Worked at home → *Skip to 27*

Other method

23 b. How many people, including this person, usually rode to work in the car, truck, or van LAST WEEK?

Drove alone

2 people

3 people

4 people

5 or 6 people

7 or more people

While censuses starting with 1960 have collected data on the means of transportation to work, those data have not been entirely comparable because the 1980 census added four answer options—“truck,” “van,” “motorcycle,” and “bicycle”—and the 1990 census added “ferryboat” while combining “car, truck, or van” into one option. Part a of the Census 2000 question was essentially the same as its 1990 equivalent. Part b of the Census 2000 question differed in that it reduced the answer options from eight to six by combining 1990’s four options for over 4 people in a car pool (“5,” “6,” “7 to 9,” and “10 or more”) into two (“5 or 6” and “7 or more”).

Coding. No coding was required.

Editing and allocation. Data on means of transportation and private vehicle occupancy (carpooling) were edited to be consistent with employment status responses. That is, nonworkers were set as “not in universe” on both means of transportation and private vehicle occupancy items. Workers who did not report their means of transportation to work as “car, truck, or van” were also set as “not

in universe” on the private vehicle occupancy item. Unreported or incomplete responses for these items were allocated based on the individual’s employment status, sex, race, metropolitan status of current residence, and the means of transportation and vehicle occupancy of this and other persons.

Nonresponse for means of transportation to work was allocated in a similar manner in 1970, 1980, and 1990. However, the categories presented varied somewhat from census to census,

making comparisons rather difficult. In the 1970 census, the means-of- transportation item included “driver, private auto” and “passenger, private auto” as an approximation of carpooling. In the 1960 census, the means of transportation question included a single category, “private auto or car pool.” Prior to 1970, nonresponse to the means-of-transportation question was not allocated but was shown in tabulations as “not reported.”

Question 24. Time of Departure From Home and Travel Time to Work

24 a. What time did this person usually leave home to go to work LAST WEEK?

: : a.m. p.m.

b. How many minutes did it usually take this person to get from home to work LAST WEEK?

Minutes

| |

The 1980 census was the first to inquire about travel time to work, reflecting an increasing national concern over the combined effects of population density, development, and air pollution on usual patterns of commuting. Travel time referred to the total number of minutes usually spent traveling from home to work (one way) during the previous week. In 1990, the time of departure from home was added in order to quantify the observation that workers were leaving home earlier to compensate for increased amounts of time

spent commuting. Travel time was calculated from door-to-door and included time spent waiting for public transportation, picking up passengers in car pools, etc. Because many commuters, such as those using public transportation or car pool riders who never drove, could not report accurately the exact distance of their trip from home to work, travel time gave a better approximation of relative distance to work and relative efficiency of various transportation modes.

Coding. No coding was required.

Editing and allocation. Data on departure time and travel time to work (minutes) were edited to be consistent with responses from the employment status item and means-of-transportation-to-work item. Thus, nonworkers were set as “not in universe” on both time of departure and travel time to work. Also, workers who reported in Question 23 that they worked at home were set as “not in universe” for departure time and travel time to work. Unreported or incomplete responses for these items were allocated based on the individual’s employment status, sex, race, metropolitan status of current residence, means of transportation, vehicle occupancy, and information on departure time or travel time of this and other persons.

Departure time was converted from the input values of hour and minutes with a.m./p.m. indicators to military time (2400 is midnight). The maximum allowed value for travel time to work was set at 200 minutes in Census 2000, whereas the maximum value captured during the 1990 and 1980 censuses was 99 minutes.

Question 25. Layoff/Work Absence/Recall/Job Search/Availability Last Week

- 25** a. **LAST WEEK, was this person on layoff from a job?**
- Yes → *Skip to 25c*
- No
- b. **LAST WEEK, was this person TEMPORARILY absent from a job or business?**
- Yes, on vacation, temporary illness, labor dispute, etc. → *Skip to 26*
- No → *Skip to 25d*
- c. **Has this person been informed that he or she will be recalled to work within the next 6 months OR been given a date to return to work?**
- Yes → *Skip to 25e*
- No
- d. **Has this person been looking for work during the last 4 weeks?**
- Yes
- No → *Skip to 26*
- e. **LAST WEEK, could this person have started a job if offered one, or returned to work if recalled?**
- Yes, could have gone to work
- No, because of own temporary illness
- No, because of all other reasons (*in school, etc.*)

Census 2000 asked this five-part question in place of the two questions (with a combined total of three parts) that the 1990 census used to gather information on absent or unemployed workers. The 1990 item asking about temporary absence or layoff from work in the last week became two separate items in Census 2000, one concerning layoff status (25a) and one concerning temporary absence (25b). This allowed for a clearer distinction between absence due to layoff versus absence due to vacation, sickness, family needs, or other exigencies. The third part (25c) was new and asked if the laid-off person had been informed about going back to work “within the next 6 months OR been given a date to return to work?” The remaining parts of the question (25d and 25e) were essentially the same as in 1990 and inquired about the person’s ability to have started a job if offered one “LAST WEEK.” However, the Census 2000 answer options to this part omitted one of the options presented in 1990—“no, already has a job.”

The two questions—work during the previous week (21) and layoffs, absences, and job search and availability (25)—were used together with Item 27 (industry, from which Armed Forces status was derived) and other economic items to classify the person’s employment status in the “reference week.” The reference week referred to the calendar week preceding the date on which a respondent completed the questionnaire or was interviewed by an enumerator. It was not the same for all respondents since the enumeration was not completed in one week. The labor force status categories, defined in subsequent sections, may be diagrammed as follows:

Labor force

Armed Forces, at work

Armed Forces, with a job but not at work

Civilian labor force

Employed, at work

Employed, with a job but not at work

Unemployed

Not in the labor force

The 1880, 1890, and 1900 censuses inquired about the number of months the person had been unemployed in the previous census year. The 1910 census added an inquiry as to whether the person was unemployed on the date of the census (April 15). Questions about unemployment appeared in every census from 1930 onward. The 1930 census included a special census on unemployment, in accordance with legislation passed on June 18, 1929, that reflected widespread concern over rising levels of unemployment in the late 1920s. That situation rapidly worsened after the stock market crash that occurred a few months later. In 1940, 1950, and 1960, data were presented for people 14 years and older and in 1970 and afterwards for people 16 years and older. In 1970, tabulations for 14- and 15-year-olds allowed comparability with earlier censuses; in 1980, 1990, and 2000 the data were collected for 15-year-olds but tabulated in general for people 16 years and older.

“Labor force” referred to everyone in the Armed Forces or in the civilian labor force. The “Armed Forces” comprised people 17 years and older on active duty in the U.S. Army, Air Force, Navy, Marine Corps, or Coast Guard, but not members of the merchant marine or civilian employees of the U.S. Department of Defense. The “Armed Forces” designation was made using information from Question 28 (occupation) or information about the type of group quarters in which the person resided.

The “civilian labor force” was made up of employed and unemployed civilians. “Employed” referred to people 16 years and older who were either (a) “at work”: those who did any work at all as paid employees, in their own business or profession, on their own farm, or for 15 or more hours as unpaid workers in a family business or farm or (b) “with a job but not at work”: those who did not work during the reference week but had jobs or businesses from which they were temporarily absent due to illness, bad weather, industrial dispute, vacation, or other personal reasons. “Employed” excluded respondents whose only activity consisted of work around the house or volunteer work for religious, charitable, and similar organizations. “Unemployed” civilians were those, age 16 and older, who were neither “at work” nor “with a job, but not at work” and who were looking for work during the previous 4 weeks and available to accept work. Examples of job-seeking included registering at a public or private employment office, meeting with prospective employers, investigating possibilities for starting a professional practice or opening a business, placing or answering advertisements, writing letters of application, and being on a union or professional register. Also included as unemployed were civilians 16 years and older who did not work at all during the reference week, were on temporary layoff from a job, had been informed that they would be recalled to work within the next 6 months or had been given a date to return to work, and were available to return to work during the reference week, except for temporary illness.

“Not in the labor force” encompassed people 16 years and older who were not classified as members of the labor force under the definitions outlined above. This category consisted mainly of students, housewives, retired workers, seasonal workers enumerated in an “off” season who were not looking for work, institutionalized people, and individuals doing only incidental unpaid family work (that is, fewer than 15 hours during the reference week). Also included were the so-called “discouraged workers” who did not have a job and had not actively looked for work during the previous 4 weeks.

A error in the data capture system seems to have adversely affected the labor force data in Census 2000 for about 15 percent, or around 500,000 people, of the civilian noninstitutional population 16 years and older in the United States residing in group quarters. The data capture system apparently created erroneous answers to a specific set of labor force items on the long form Individual Census Report used by residents of civilian noninstitutional group quarters. This phenomenon had an impact on labor force statistics for the entire country, but its effects were most visible and substantial for places, such as college towns, with high concentrations of people living in civilian noninstitutional group quarters. The Census Bureau estimated that the major effects of this problem were to incorrectly decrease the number of employed people and those not in the labor force and to increase both the number of unemployed people and the unemployment rate.³¹

Coding. No coding was required.

Editing and allocation. Data for unreported or incomplete employment-status responses (Questions 21 and 25) were imputed by allocating the employment status of a person with similar characteristics (e.g., age, sex, household relationship, school enrollment, educational attainment, and presence and age of own children).

The edit classified the employment status of people under 16 years of age as “not in universe.” People whose industry was “active-duty Armed Forces” were given an employment status of “Armed Forces.” Civilians who answered “yes” to Question 21 were made “employed, at work”;

³¹ See U.S. Census Bureau, Sandra Luckett Clark, John Iceland, Thomas Palumbo, Kirby Posey, and Mai Weismantle, “Comparing Employment, Income, and Poverty: Census 2000 and the Current Population Survey,” Appendix 3 “Problem in Employment Estimates for Population in Group Quarters,” September 2003; U.S. Census Bureau, “Summary File 3, Data Note 4—Updated April 2006”; and Susan Love and Donald Dalzell, “Researching the Williamsburg Pattern in Census 2000 Labor Force Responses,” February 17, 2006.

those who answered “no” to Question 21 but “yes” to Question 25b were made “employed, with a job, but not at work.” Civilians who did not work in the reference week (answer of “no” in Question 21), but who were available to start or return to a job (“yes” or “no, because of all other reasons” in Question 25e), and who either (a) were on layoff (“yes” in Question 25a) and expected to be recalled to work (“yes” in Question 25c), or (b) looked for work in the last 4 weeks (“yes” in Question 25d), were classified as “unemployed.” The edit made all other civilians who completely answered Questions 21 and 25 “not in labor force.” All other people were either assigned to one of the above categories, if one could be reasonably surmised from the incomplete answers, or imputed to a category using a hot-deck allocation procedure, if one could not.

Question 26. Year Last Worked

- 26** When did this person last work, even for a few days?
- 1995 to 2000
 - 1994 or earlier, or never worked → *Skip to 31*

Every census from 1960 onward inquired about the year that the person had last worked. The census asked this question of all individuals who did not work during the reference week (that is, had a “no” response in Question 21 on work status last week). The question served primarily as a screening device for the industry, occupation, class-of-worker, and

work experience items (see Questions 27 to 30 below) so that respondents who had never worked or had last worked more than 5 years ago were not asked to answer them. Screening out those questions reduced the burden on respondents and processing costs. Furthermore, information obtained from this item helped to classify respondents in an employment-status category when entries to some of the other items were missing or inconsistent. The Census 2000 question wording was identical to its 1990 equivalent, though the answer options were reduced from seven (including specific years and ranges of years) to two ranges (“1995 to 2000” and “1994 or earlier, or never worked”). Combining “never worked” with “1994 or earlier” in 2000 was particularly significant because it meant the Census Bureau was no longer able to construct the category “experienced civilian labor force.”

Coding. No coding was required.

Editing and allocation. This question was edited for consistency with the employment-status classification and with the response to Question 30. The edit program classified people under 16 years of age as “not in universe”; it gave employed people and people who reported “yes” in question 30 a final value of “1995 to 2000.” It made the final value for all other people who responded to the item equal to their reported value. It imputed a value to people who did not respond to the question, using a hot-deck allocation procedure in conjunction with allocation for missing entries to Questions 27 to 31.

entry in Question 27b was only “furniture,” a correct response was needed in Question 27c to determine if the company was a furniture factory (manufacturing) or a retail furniture store. This question was identical to the one asked in 1990 and 1980.

Coding. See the coding section after Question 29 (class of worker).

Editing and allocation. See the “Editing and allocation” section after Question 29 (class of worker).

Question 28. Occupation

28 Occupation

a. What kind of work was this person doing?
(For example: registered nurse, personnel manager, supervisor of order department, auto mechanic, accountant)

b. What were this person's most important activities or duties?
(For example: patient care, directing hiring policies, supervising order clerks, repairing automobiles, reconciling financial records)

The 1850 census was the first to inquire about a person's occupation, though the 1850 and 1860 censuses excluded slaves. Throughout the latter part of the nineteenth century and in 1900, the census approached the general category of industry or employment not as a valuable, separate piece of information but as a vague description in need of clarification. Census enumerators received detailed instructions about the difference between a person's employment in general terms versus the specific job a person held (e.g., manufacturing, cotton manufacturer, or mill worker; agriculture, dairy farmer, or farm laborer; or business, banker, or bank clerk) and about the importance of being as precise as possible. The length of the instructions in this regard reflected the difficulty in carrying out the task.

The 1910 census solved the problem by recouping the value of the general area of industry or employer as a question separate from that about occupation. Instructions to enumerators in that census clarified the difference between “the specific occupation or work performed . . . and the character of the industry or place in which such work is performed.” The instructions also reminded enumerators that “The occupation, if any, followed by a child, of any age, or by a woman is just as important, for census purposes, as the occupation followed by a man. Therefore it must never be taken for granted, without inquiry, that a woman, or child, has no occupation.” Every census since 1910 has carried forward the distinction between general and specific work activity and the separate collection of information about them.

In Census 2000, Question 28a (type of occupation) was the fundamental census item on occupation: respondents described the kind of work they did. Starting in 1990, coverage of this question was broadened to allow active-duty Armed Forces personnel to describe their military jobs. The Census 2000 question was identical to the 1990 question, except the examples “auto mechanic” and “accountant” replaced “gasoline engine assembler” and “cake icer.”

The census used Question 28b (most important activity) in combination with Question 28a to obtain sufficient information to classify an occupational description. The use of this additional probe permitted finer distinctions among occupational categories and allowed more detailed classifications. The 2000 version was identical to 1990, except the examples “repairing automobiles” and “reconciling financial records” replaced “assembling engines” and “icing cakes.”

Question 29. Class of Worker

- 29 Was this person — Mark ONE box.
- Employee of a PRIVATE-FOR-PROFIT company or business or of an individual, for wages, salary, or commissions
 - Employee of a PRIVATE NOT-FOR-PROFIT, tax-exempt, or charitable organization
 - Local GOVERNMENT employee (*city, county, etc.*)
 - State GOVERNMENT employee
 - Federal GOVERNMENT employee
 - SELF-EMPLOYED in own NOT INCORPORATED business, professional practice, or farm
 - SELF-EMPLOYED in own INCORPORATED business, professional practice, or farm
 - Working WITHOUT PAY in family business or farm

In addition to formalizing separate inquiries about industry and occupation, the 1910 census was also the first to ask about the class of worker. In that census, the categories were “employer, employee, or working on own account.” Every subsequent census recorded this information in different ways. The 1950, 1960, and 1970 censuses, for example, categorized people as working for private employers, for government, in their own business, or without pay on a family farm or business. The 1970 census introduced three categories of government work (federal, state, and local) while the 1990 census reversed the order of presentation of these three categories: local, state, and federal. The 1990 question included two additional distinctions, between “private for profit” and “private not-for-profit” and between self-employment in an incorporated versus a nonincorporated business, professional practice, or farm. This raised the number of worker classes to eight. The 2000 question was identical to the 1990 question.

Question 29 rounded out the series on job-description items. Unlike the industry and occupation questions, it did not require coding but was reviewed by the coders, along with the person’s industry and occupation entries, to ensure consistent responses.

Question 29 rounded out the series on job-description items. Unlike the industry and occupation questions, it did not require coding but was reviewed by the coders, along with the person’s industry and occupation entries, to ensure consistent responses.

Historically, the class-of-worker question yielded higher figures for federal government employees when compared with other sources, such as records from the U.S. Office of Personnel Management (OPM). Part of this difference has been attributed to the fact that the census question, unlike data from OPM, counted “nonappropriated funds” employees as federal workers. Such employees worked in military commissaries and base or post exchanges and were paid from revenues generated by those facilities. A second reason was that the Census Bureau counted approximately 500,000 temporary census workers hired to conduct all phases of its own census enumeration and data processing operation as federal employees, whereas OPM did not. Employees of federal government corporations, such as the Tennessee Valley Authority, represented a third component of the census class-of-worker category excluded in data from other sources. Lastly, employees of quasi-governmental entities like AMTRAK and the Federal Reserve Bank were classified as federal employees because these entities are federal government agencies and institutions that are owned by the federal government or partially owned and controlled by the federal government.

Coding. The data on industry, occupation, and class of worker were derived from answers to long-form questionnaire items 27, 28, and 29 respectively. These questions were asked of a sample of the population 15 years and over. Information on industry related to the kind of business conducted by a person’s employing organization; occupation described the kind of work a person did on the job.

For an employed person, the data referred to the person’s job during the reference week. For someone who worked at two or more jobs, the data referred to the job at which the person worked the greatest number of hours. For an unemployed person, the data referred to the last job. The industry and occupation statistics were derived from the detailed classification systems developed for Census 2000 as described below.

Respondents provided the data for the tabulations by writing on the questionnaire descriptions of their industry and occupation (I&O). These descriptions were data captured and sent to an automated coder (computer software) that assigned a portion of the written entries to categories in the classification system. The automated system assigned codes to 59 percent of the industry entries and 56 percent of the occupation entries.

Those cases not coded by the computer were referred to clerical staff in the Census Bureau’s National Processing Center (NPC) in Jeffersonville, IN, for coding. A new training system was

developed for Census 2000 to create an effective training mechanism combining examples from the I&O coding procedures with the principles of coding I&O. The interactive training software had a built-in help system that allowed the coders to look up information covered during their training.

The first part of the clerical coding process was called “residual coding” (the residual from the autocoder process). For the clerical I&O coding, a computer-assisted coding system similar to the one used in 1990 was designed. This new computer system displayed the questionnaire responses to the I&O items, the employer name list (ENL) for each geographic area, and I&O indexes. A new feature was a help system that contained the I&O coding procedures and flow charts. The clerical staff converted the questionnaire response descriptions to codes by comparing these descriptions to entries in the automated *Alphabetical Index of Industries and Occupations*. For the industry code, these coders also referred to the ENL. This list, prepared from the American Business Index, contained the names of business establishments and their North American Industry Classification System (NAICS) designation. The ENL converted the individual company’s NAICS designation to census codes (see below for a description of the classification system used in Census 2000 industry coding), thereby facilitating coding and maintaining industry classification comparability.

The occupations of people in the Armed Forces were coded along with the civilian population in 2000, as opposed to being coded separately as they were in 1990. These written descriptions from Military Census Reports or Shipboard Census Reports were also referred to the clerical staff in NPC. The clerical staff converted these entries in the military index by military specialty occupations code or military title. If a military occupation had the same occupational title as its civilian equivalent, the same process mentioned above was used for civilian coding, and these codes were then converted to population census equivalents.

The last step in the coding process was problem referral coding. During the referral coding process, the referralists researched responses that neither the autocoder system nor the residual coders were able to code. The problem referralists were the last decision makers in the coding process. These referralists used other research methods and materials to assist in assigning I&O codes. These materials included the *NAICS Manual*, the *Standard Occupational Classification (SOC) Manual*, the Dun and Bradstreet directories, and other online, electronic reference files. All cases that remained uncoded until this final stage were coded.

Classification systems for coding. The industry classification system used for Census 2000 consisted of 265 industry categories, classified into 14 major industry groups. Since 1940, the industrial classification was based on the *Standard Industrial Classification (SIC) Manual*. The Census 2000 classification was developed from the 1997 North American Industry Classification System (NAICS) published by the U.S. Office of Management and Budget, Executive Office of the President. NAICS was an industry description system that grouped establishments into industries based on the activities in which they were primarily engaged.

The NAICS differed from most industry classifications because it was a supply-based, or production-oriented, economic concept. Census data, which were collected from households, differ in detail and nature from those obtained from establishment surveys. Therefore, the census classification systems, while defined in NAICS terms, did not reflect the full detail in all categories.

The NAICS showed a more detailed hierarchical structure than that used for Census 2000. The expansion from 11 divisions in the SIC to 20 sectors in the NAICS provided groupings that were meaningful and useful for economic analysis. Various statistical applications that previously sampled or published at the SIC levels faced problems with the coverage for 20 sectors instead of 11 divisions. These statistical programs requested an alternative aggregation structure for production purposes, which was approved and issued on May 15, 2001, in the clarification Memorandum No. 2, “NAICS Alternate Aggregation Structure for Use by United States Statistical Agencies.” Several census data products used the alternative aggregation, while others used more detail.

The occupational classification system used during Census 2000 consisted of 509 specific occupational categories for employed people arranged into 23 major occupational groups. This classification was developed based on the *Standard Occupational Classification (SOC) Manual: 2000*,

which included the 23 major occupational groups divided into 96 minor groups, 449 broad groups, and 821 detailed occupations. For Census 2000 tabulations with occupation as the primary characteristic, several levels of occupational detail were shown.

Some occupational groups were related closely to certain industries. Operators of transportation equipment, farm operators and workers, and health care providers accounted for major portions of their respective industries of transportation, agriculture, and health care. However, the industry categories included people in other occupations. For example, people employed in agriculture included truck drivers and bookkeepers; people employed in the transportation industry included mechanics, freight handlers, and payroll clerks; and people employed in the health care industry included security guards and secretaries.

Editing and allocation. There was a computer edit and allocation process. The edit program first determined whether a respondent was in the universe that required an industry and occupation code. The codes for the three items—industry, occupation, and class of worker—were checked to ensure their validity and edited for their relation to each other. Invalid and inconsistent codes were either blanked or changed to consistent ones.

If at least one of the three codes was blank after the edit, a code was allocated from a “similar” person based on other items, such as age, sex, education, residence, and weeks worked. If all of the work experience and income data for a respondent were also blank, all these economic items were allocated from one other person for whom the census already had all the necessary data.

Comparability. Comparability of industry and occupation data was affected by a number of factors, primarily the systems used to classify the questionnaire responses. For both the industry and occupation classification systems, the basic structures were generally the same from 1940 to 1970, but changes in the individual categories limited comparability of the data from one census to another. These changes were needed to recognize the “birth” of new industries and occupations, the “death” of others, the growth and decline in existing industries and occupations, and the desire of analysts and other users for more detail in the presentation of the data. Probably the greatest cause of incomparability was the movement of a segment of a category to a different category in the next census. Changes in the nature of jobs and respondent terminology, and refinement of category composition, made these movements necessary. The 1990 occupational classification system was essentially the same as that used for the 1980 census. However, the industry classification had minor changes between 1980 and 1990 that reflected changes to the SIC.

In Census 2000, both the industry and occupation classifications experienced major revisions to reflect changes to the NAICS and the SOC. The conversion of the census classifications in 2000 meant that the 2000 classification systems were not directly comparable to the classifications used in the 1990 census and earlier.

Other factors that affected data comparability over the decades included the universe to which the data referred (in 1970, the age cutoff for labor force was changed from 14 years to 16 years); the wording of the industry and occupation questions on the questionnaire (for example, important changes were made in 1970); and improvements in the coding procedures (the ENL technique was introduced in 1960). How the “not reported” cases were handled was also a factor. Prior to 1970, they were placed in the residual categories “industry not reported” and “occupation not reported.” In 1970, an allocation process was introduced that assigned these cases to major groups. In Census 2000, as in 1980 and 1990, the “not reported” cases were assigned to individual categories. Therefore, the 1980, 1990, and Census 2000 data for individual categories included a number of people who were tabulated in a “not reported” category in previous censuses.

The following publications contain information on the various factors affecting comparability and are particularly useful for understanding differences in the industry and occupation information from earlier censuses: U.S. Bureau of the Census, *Changes Between the 1950 and 1960 Occupation and Industry Classifications With Detailed Adjustments of 1950 Data to the 1960 Classifications*, Technical Paper No. 18, 1968; U.S. Bureau of the Census, *1970 Occupation and Industry Classification Systems in Terms of Their 1960 Occupation and Industry Elements*, Technical Paper

No. 26, 1972; and U.S. Bureau of the Census, *The Relationship between the 1970 and 1980 Industry and Occupation Classification Systems*, Technical Paper No. 59, 1988. For citations for earlier census years, see the 1980 Census of Population report, PC80-1-D, *Detailed Population Characteristics*.

The 1990 census introduced an additional class of worker category for “private not-for-profit” employers, which was also used for Census 2000. This category was a subset of the 1980 category “employee of private employer,” so there are no comparable data before 1990. Also in 2000, employees of foreign governments, the United Nations, etc., were classified as “private not-for-profit” rather than “federal government” as in the 1970, 1980, and 1990 censuses. While in theory there was a change in comparability, in practice, the small number of U.S. residents working for foreign governments made this change negligible.

Comparability between the statistics on industry and occupation from Census 2000 and statistics from other sources was affected by many of the factors described in the “Employment Status” section. These factors were primarily geographic differences between residence and place of work, different dates of reference, and differences in counts because of dual job holdings. Industry data from population censuses covered all industries and all kinds of workers, whereas data from establishments often excluded private household workers, government workers, and the self-employed. Also, the replies from household respondents could have differed in detail and nature from those obtained from establishments.

Occupation data from the census and data from government licensing agencies, professional associations, trade unions, etc., may not have been as comparable as expected. Organizational listings often included people not in the labor force or people devoting all or most of their time to another occupation; or the same person may have been included in two or more different listings. In addition, relatively few organizations, except for those requiring licensing, attained complete coverage of membership in a particular occupational field.

Question 30. Work Experience

30 a. **LAST YEAR, 1999, did this person work at a job or business at any time?**
 Yes
 No → *Skip to 31*

b. **How many weeks did this person work in 1999?**
Count paid vacation, paid sick leave, and military service.
Weeks

c. **During the weeks WORKED in 1999, how many hours did this person usually work each WEEK?**
Usual hours worked each WEEK

Since 1940, the census has included questions on the number of weeks worked during the preceding year. The 1980 question added an inquiry about the usual number of hours worked per week in the previous year. The Census 2000 question included this addition, but changed the wording of Question 30a. It capitalized the words “LAST YEAR”; substituted the words “at any time” for “even for a few days,” which the census had used since 1960; dropped the qualifier “paid” before “job or business”; and omitted the words “or farm.” Questions 30b and 30c were virtually identical to their 1990 counterparts.

The components of this item constituted the battery of questions on work experience. Question 30a (worked last year) instructed people who had worked during the previous year to answer the questions on weeks and hours worked. The number of weeks worked in the previous year (30b) and usual hours worked per week (30c) served, among other uses, as qualifiers for the income and earnings data (see Questions 31 and 32). Because all income-related information in the census referred to the calendar year before the census was taken (1999), the information on weeks worked and usual hours worked per week in the previous year was necessary to estimate weekly and hourly earnings and to take into account differences in weeks and hours worked when analyzing income and earnings data by various subgroups of the population, such as race and sex. If the hours worked each week varied considerably, the respondent was instructed to report an approximate average of the number of hours worked per week.

Coding. No coding was required.

Editing and allocation. The responses to Questions 30a, b, and c were edited for consistency among themselves and with the income, industry, occupation, class-of-worker, employment status, and year-last-worked items. Missing entries were allocated a value from a person with similar characteristics, in conjunction with allocation for missing entries to Items 27 to 31.

Questions 31 and 32: Income and Total Income

Question 31. Income

31 INCOME IN 1999 — Mark the "Yes" box for each income source received during 1999 and enter the total amount received during 1999 to a maximum of \$999,999. Mark the "No" box if the income source was not received. If net income was a loss, enter the amount and mark the "Loss" box next to the dollar amount.

For income received jointly, report, if possible, the appropriate share for each person; otherwise, report the whole amount for only one person and mark the "No" box for the other person. If exact amount is not known, please give best estimate.

a. Wages, salary, commissions, bonuses, or tips from all jobs — Report amount before deductions for taxes, bonds, dues, or other items.

Yes Annual amount — Dollars
\$ | | | , | | | .00

No

b. Self-employment income from own nonfarm businesses or farm businesses, including proprietorships and partnerships — Report NET income after business expenses.

Yes Annual amount — Dollars
\$ | | | , | | | .00 Loss

No

31 c. Interest, dividends, net rental income, royalty income, or income from estates and trusts — Report even small amounts credited to an account.

Yes Annual amount — Dollars
\$ | | | , | | | .00 Loss

No

d. Social Security or Railroad Retirement

Yes Annual amount — Dollars
\$ | | | , | | | .00

No

e. Supplemental Security Income (SSI)

Yes Annual amount — Dollars
\$ | | | , | | | .00

No

f. Any public assistance or welfare payments from the state or local welfare office

Yes Annual amount — Dollars
\$ | | | , | | | .00

No

g. Retirement, survivor, or disability pensions — Do NOT include Social Security.

Yes Annual amount — Dollars
\$ | | | , | | | .00

No

h. Any other sources of income received regularly such as Veterans' (VA) payments, unemployment compensation, child support, or alimony — Do NOT include lump-sum payments such as money from an inheritance or sale of a home.

Yes Annual amount — Dollars
\$ | | | , | | | .00

No

Question 32. Total Income

32 What was this person's total income in 1999? Add entries in questions 31a–31h; subtract any losses. If net income was a loss, enter the amount and mark the "Loss" box next to the dollar amount.

Annual amount — Dollars

None OR \$ | | | , | | | .00 Loss

Every census since 1940 has included questions about income. The 1990 census and Census 2000 asked two questions about income, one of which had eight parts concerning eight different income categories, for a total of nine inquiries. Each category asked if the respondent had received income from a specific source in the previous year and, if so, to write in the amount from that source in the response box. Question

31 covered types of income for people 15 years and older, while Question 32 asked for total income—the sum of all the parts in Question 31.

The 2000 and 1990 questions about total income were identical. However, there were a few significant changes in the income-category question (Question 31 in Census 2000). The 2000 categories omitted a separate category for farm self-employment income, placing such income in the remaining category of self-employment income (31b). The 2000 item also separated Supplemental Security Income (SSI) from other public assistance or welfare payments. These comprised a single category (31f) in 1990 and included Aid to Families with Dependent Children (AFDC). In 2000, SSI constituted its own category (31e), and AFDC payments were dropped. “Any public assistance or welfare payments from the state or local welfare office” constituted category 31f. The remaining categories for 2000 were identical to those in the 1990 questionnaire.

One other important difference between 2000 and 1990 concerned the level of total reportable income. Census 2000 was the first census to allow more than 6 digits in total income, allowing up to \$5,299,992. Prior to Census 2000, the total was capped at \$999,999.

Part a of Question 31 (wages, salary, commissions, bonuses, or tips from all jobs) measured total money earnings received for work performed as an employee during the previous calendar year. Part b (Question 31) included net money income (gross receipts minus expenses) from one’s own business or farm business, professional enterprise, or partnership. Gross receipts included the value of all goods sold and services rendered. Expenses included such items as costs of goods purchased, rent, heat, light, power, depreciation charges, wages and salaries paid, and business taxes (not personal income taxes).

Part c measured property income. It included interest on savings or bonds, dividends from stockholdings or mutual funds, net royalties, net income from rental properties, receipts from boarders or lodgers, and periodic income from estates and trusts. Part d included social security pensions, survivors’ benefits, and permanent-disability insurance payments made by the Social Security Administration (before deductions for medical insurance) and Railroad Retirement benefit checks from the U.S. government. Medicare reimbursements were not to be included.

Part e included SSI payments made by federal or state welfare agencies to low-income people who were 65 years or older or were blind or disabled. Part f included general welfare or public assistance payments. It did not include separate payments received for hospital or other medical care (payments to vendors).

Part g (retirement, survivor, or disability pensions) first appeared in 1990 and was continued in 2000. Part h asked respondents to report periodic income not covered in the previous categories; for example, workers’ or unemployment compensation, contributions received periodically from people not living in the household, military-family allotments, net gambling winnings, veterans’ (VA) payments, alimony, or child support.

Coding. None was required for these items.

Editing and allocation. Income was a write-in entry on Census 2000 questionnaires. These write-ins were captured and converted to electronic data through the use of an automated optical character recognition (OCR) system, as were all Census 2000 write-in responses. Income ranges were established for each income item as a means of determining reasonableness. If a captured OCR value was outside of its predesignated reasonableness range, the item was referred to a keyer for manual entry.

After data capture, there was still the possibility for several types of errors in reporting income. Some of the more common types of error included misread characters, misidentification of an income source, reporting subannual amounts such as monthly or weekly values, double reporting, or not reporting income at all.

All captured income amounts went through an elaborate set of computer edits to reduce reporting errors and improve accuracy. These edits made sure reported amounts were consistent with basic demographic characteristics such as age, education, job information, and work experience. For example, if a person reported an amount as self-employment income, but was listed as a private wage and salary worker, the self-employment amount was shifted to wages and salary. Also, individual amounts were checked against a reported total value to check for missing or double-counted components.

Missing income information was allocated through the use of elaborate hot-deck matrices. This procedure allocated responses to people with missing income information by using the answers reported from people with the same demographic characteristics.

Poverty Status in 1999

The poverty data were derived from answers to long-form questionnaire Items 31 and 32, the same questions used to derive income data, and from responses to Items 1 and 2, which gave the number of people in the household and each one's relationship to the householder. The Census Bureau's poverty definition was designed to be the official *statistical* poverty measure—not an eligibility requirement for any specific program. The Social Security Administration (SSA) developed the original poverty definition in 1964, which federal interagency committees subsequently revised in 1969 and 1980. The U.S. Office of Management and Budget's Directive 14 prescribed this definition as the official poverty measure for federal agencies to use in their statistical work.

Derivation of the current poverty measure. The original poverty index provided a range of income cutoffs adjusted by such factors as family size, sex of the family head, number of children under 18 years old, and farm-nonfarm residence. At the core of this definition of poverty was the economy food plan, the least costly of four nutritionally adequate food plans designed by the U.S. Department of Agriculture. Based on the Department of Agriculture's 1955 survey of food consumption, it was determined that families of three or more persons spent approximately one-third of their income on food. The poverty level for these families was, therefore, set at three times the cost of the economy food plan. For smaller families and persons living alone, the cost of the economy food plan was multiplied by factors that were slightly higher in order to compensate for the relatively larger fixed expenses of these smaller households. Annual revisions of these SSA poverty cutoffs were based on price changes of the items in the economy food budget.

The poverty thresholds were revised annually to allow for changes in the cost of living as reflected in the Consumer Price Index. The poverty thresholds were the same for all parts of the country—they were not adjusted for regional, state, or local variations in the cost of living. For a detailed discussion of the poverty definition, see U.S. Census Bureau, Current Population Reports, Series P-60, No. 210, *Poverty in the United States: 1999*.

How the Census Bureau determined poverty status. In determining the poverty status of families and unrelated individuals in 1999, the Census Bureau used 48 thresholds (income cutoffs) arranged in a two-dimensional matrix. The matrix consisted of family size (from one person to nine or more people) cross-classified by the presence and number of family members under 18 years old (from no children present to eight or more children present). Unrelated individuals and two-person families were further differentiated by age of the reference person (under 65 years old and 65 years and older).

To determine a person's poverty status, the person's total family income was compared with the poverty threshold appropriate for that person's family size and composition (see table below). If the total income of that person's family was less than the threshold appropriate for that family, then the person was considered poor, together with every member of his or her family. If a person was not living with anyone related by birth, marriage, or adoption, then the person's own income was compared with his or her poverty threshold.

Table 3-2.
Poverty Threshold in 1999 by Size of Family and Number of Related Children Under 18 Years

[In current dollars]

Size of family unit	Related children under 18 years								
	None	One	Two	Three	Four	Five	Six	Seven	Eight or more
One person (unrelated individual)									
Under 65 years	8,667								
65 years and over	7,990								
Two people									
Householder under 65 years	11,156	11,483							
Householder 65 years and over	10,070	11,440							
Three people	13,032	13,410	13,423						
Four people	17,184	17,465	16,895	16,954					
Five people	20,723	21,024	20,380	19,882	19,578				
Six people	23,835	23,930	23,436	22,964	22,261	21,845			
Seven people	27,425	27,596	27,006	26,595	25,828	24,934	23,953		
Eight people	30,673	30,944	30,387	29,899	29,206	28,327	27,412	27,180	
Nine people or more	36,897	37,076	36,583	36,169	35,489	34,554	33,708	33,499	32,208

Individuals for whom poverty status was determined. Poverty status was determined for all people except those living in institutions, those in military group quarters or college dormitories, and unrelated individuals under 15 years old. These groups also were excluded from the numerator and denominator when calculating poverty rates. They were considered neither “poor” nor “nonpoor.”

Comparability. The poverty definition used in the 1980 census and later differed slightly from the one used in the 1970 census. Three technical modifications were made to the definition used in the 1970 census:

1. Beginning with the 1980 census, the Census Bureau eliminated any distinction between thresholds for “families with a female householder with no husband present” and all other families. The new thresholds—which applied to all families regardless of the householder’s sex—were a weighted average of the old thresholds.
2. The Census Bureau eliminated any differences between farm families and nonfarm families, and between farm and nonfarm unrelated individuals. In the 1970 census, the farm thresholds were 85 percent of those for nonfarm families, whereas in 1980 and later, the same thresholds were applied to all families and unrelated individuals regardless of residence.
3. The thresholds by size of family were extended from seven or more people in 1970 to nine or more people in 1980 and later.

These changes resulted in a minimal increase in the number of poor at the national level. For a complete discussion of these modifications and their impact, see U.S. Census Bureau, Current Population Reports, Series P-60, No. 133, *Characteristics of the Population Below the Poverty Level: 1980*.

With respect to poverty, the population covered in the 1970 census was almost the same as that covered in the 1980 census and later. The only difference was that in 1980 and after, unrelated individuals under 15 years old were excluded from the poverty universe, while in 1970, only those under age 14 were excluded. The limited poverty data from the 1960 census excluded all people in group quarters and included all unrelated individuals regardless of age. It was unlikely that these differences in population coverage would have had significant impact when comparing the poverty data for people since the 1960 census.

100 Percent Housing Question

Vacancy Status

This item, classifying vacant units in 2000, was first used in 1940. The 1960 form added a separate category for units held for migratory workers. This category was combined with the 1970 “seasonal” item and with the 1980 “held for occasional use” category. The 1980 term “year-round, occasional use” was combined with “seasonal/migratory” and became “for seas/rec/occ” (for seasonal, recreational, and occasional use) in 1990. For Census 2000, this item was present only on the enumerator forms (D-1E and D-2E).

In the “Interview Summary” section of the questionnaire, the enumerator marked the box for “vacancy status” for every questionnaire for which he or she entered “vacant, regular” or “vacant, usual home elsewhere” in Item A. The enumerator reported the status of the vacant unit as of Census Day in Item C by asking a reliable respondent, such as a rental agent, building manager, or neighbor. Vacant units offered for rent *or* for sale were classified as “for rent,” while the “for sale only” units were limited to those lacking a rental option.

Enumerators were to enter “Rented or sold, not occupied” if any money had been paid or agreed upon but the new owner or renter had not yet moved into the unit.

“For seasonal, recreational, or occasional use” included the following types of vacant units: those intended for occupancy during only certain seasons of the year, such as beach cottages, hunting and ski cabins, etc.; those for weekend or other occasional use throughout the year; shared-ownership or time-sharing condominiums; and those held for herders, loggers, fish packers, and other workers not employed in farm work.

“For migrant workers” included vacant units intended for migratory workers employed in farm work during the crop season. (Work in a cannery, freezer plant, or seed-processing plant was *not* considered to be farm work.)

“Other vacant” included unoccupied units not falling into any of the above categories, such as those held for (1) settlement or an estate, (2) occupancy by a caretaker or janitor, or (3) personal reasons of the owner or renter.

Editing and allocation. The computer compared Item C (vacancy status) with Questions 46 (contract rent) and 51 (value). For “vacant-regular units,” any entry in C was accepted if both Questions 46a and 51 were blank. Where C and 46a showed no entry but a response was indicated for Question 51, C was edited to “for sale only.” Where C and Question 51 were blank but a response was indicated for Question 46a, C was edited to “for rent.” Where all three items were blank, C was allocated from a preceding vacant unit. For “vacant-usual home elsewhere units,” any entry in C was accepted; blank C was edited to “for seas/rec/occ.” For occupied units, blank C was accepted; any entries made for C were blanked.

Question 33. Tenure

- 33** Is this house, apartment, or mobile home —
- Owned by you or someone in this household with a mortgage or loan?
 - Owned by you or someone in this household free and clear (without a mortgage or loan)?
 - Rented for cash rent?
 - Occupied without payment of cash rent?

Data from this question provided the count of owner- and renter-occupied units basic to most housing tabulations and analyses. The responses revealed the extent to which the U.S. population attained the goal of widespread home ownership and the degree of geographic, ethnic, and racial variation in owner- and renter-occupied units.

The 2000 tenure question was essentially the same as the 1990 question, except the 2000 question added “mobile home” to “house” and “apartment” as a type of dwelling. Tenure was the only housing characteristic in Census 2000 that was collected for all occupied housing units. The previous census (1990) had included seven housing questions that were asked of the residents of all occupied housing units.

In 1890, 1900, and 1910, census enumerators asked all respondents about home or farm ownership, liens, mortgages, and rentals. The 1920 and 1930 censuses asked similar questions but dropped the reference to farm ownership. Until 1940 these few items about home ownership were

included among the other population data that enumerators collected. However, on August 11, 1939, following several years of severe economic depression, Congress approved a separate, greatly expanded housing census. The 1940 census, therefore, was the first to collect data on occupied and unoccupied dwellings separate from population data. All subsequent demographic censuses have included a separate housing inquiry that contained items about tenure. National legislation concerning community development block grants, mortgage revenue bonds, and housing assistance programs required information on tenure.

Coding. None was required for these items.

Editing and allocation. On the 100 percent form, any entry in tenure was accepted. If blank, tenure was allocated from a preceding occupied unit.

For sample questionnaires, tenure was compared with contract rent, value, and mortgage questions to ensure that the data were consistent; for example, when a unit had a tenure of “owned without a mortgage” and it had several entries for mortgage data, the computer software would change tenure to “owned with a mortgage.” When tenure was blank, the computer program compared responses to this question with those of contract rent, value, and mortgage. If tenure was “owned without a mortgage” and “mobile home installment loan” (Question 53a) was checked and an entry was made in “mobile home loan,” (Question 53b) tenure was changed to “owned with a mortgage.” Vacant units were not in the universe covered by the tenure question.

Sample Housing Questions

Question 34. Units in Structure

- 34** Which best describes this building? *Include all apartments, flats, etc., even if vacant.*
- A mobile home
 - A one-family house detached from any other house
 - A one-family house attached to one or more houses
 - A building with 2 apartments
 - A building with 3 or 4 apartments
 - A building with 5 to 9 apartments
 - A building with 10 to 19 apartments
 - A building with 20 to 49 apartments
 - A building with 50 or more apartments
 - Boat, RV, van, etc.

Data from this item provided a physical description of the national housing inventory and were used extensively in cross-classification and analysis. Legislation concerning low-income home energy assistance required the use of units-in-structure (type of dwelling) data.

The 1940 census was the first to include an item describing the type of dwelling. Every subsequent census has contained this inquiry. The 1980, 1990, and 2000 questions were nearly identical. The 1980 item offered a “boat, tent, van, etc.” option, which the 1990 item referred

to simply as “other.” Additionally, the 1990 question substituted the word “apartments” for “family.” The 2000 question retained this substitution, but replaced the 1990 “other” category with a choice (“boat, RV, van, etc.”) similar to 1980’s “boat, tent, van, etc.” The 2000 item also eliminated “trailer” from “a mobile home or trailer,” leaving “a mobile home” as the response option.

Editing and allocation. In the regular computer edit, any response was accepted. Blanks were allocated from a preceding unit, with the exception of vacants, which were allocated from the preceding unit that was not a boat, RV, van, etc.

Question 35. Year Built

- 35** About when was this building first built?
- 1999 or 2000
 - 1995 to 1998
 - 1990 to 1994
 - 1980 to 1989
 - 1970 to 1979
 - 1960 to 1969
 - 1950 to 1959
 - 1940 to 1949
 - 1939 or earlier

This item provided data on the age of the nation’s housing stock. Such information was useful in identifying areas of growth as well as areas needing rehabilitation or renewal. Safety programs, such as those assessing the hazards of lead paint exposure, also used these data. Federal legislation concerning energy policy, home mortgages, community development block grants, public housing, housing discrimination, and homeowners’ insurance required the use of “year built” information.

Every census since 1940 has included this item, though the range of years presented as answer options has shifted accordingly with each successive census. The 2000 item eliminated a “don’t know” answer option that had been presented for the first time in 1990, thus requiring respondents to choose from one of the specified date ranges.

Editing and allocation. Occupied and vacant units were considered in separate computer edits. For occupied units, Question 35 was compared with Question 36 (year householder moved into unit). In general, entries for Question 35 were accepted as long as the unit was not reported as being built after the householder moved in. Blanks were allocated from a preceding unit with similar tenure and time of householder’s moving in. For vacant units, entries were accepted, and blanks were allocated from previous units with similar structure type and vacancy status.

Question 36. Year Householder Moved In

- 36** When did this person move into this house, apartment, or mobile home?
- 1999 or 2000
 - 1995 to 1998
 - 1990 to 1994
 - 1980 to 1989
 - 1970 to 1979
 - 1969 or earlier

Data from this question provided measures of population transience and community stability that were useful to a number of planning and relief agencies as well as to policy makers in several fields. For example, local agencies were able to track the migration of elderly or minority people, and emergency management agencies gauged population displacement caused by hurricanes or other natural disasters. In other areas of national concern, such as establishing fair market rents and administering housing voucher allocation programs,

governing legislation required the use of “year moved in” information.

Every census since 1960 has included this item, although the 1960 and 1970 censuses placed it among the population questions rather than in the housing portion of the questionnaire. In those censuses, it was asked of all respondents. Beginning in 1980 the census shifted this item to the housing section. The 2000 item resembled the 1980 and 1990 items, except that the year ranges in the answer options shifted accordingly, and the 2000 question also included mobile homes as well as the housing options of “house or apartment” that had been presented since 1960.

Editing and allocation. The computer program compared entries for Question 4 (age of the householder) for consistency. For occupied units, where a householder’s age was less than 20 years and the response to Question 36 fell into the 1980 through 2000 categories, that response was accepted; where the answer to 36 was earlier than 1980, that answer was not accepted, and a new response was allocated from a preceding unit with similar age and tenure. Any entry for a householder 20 to 29 years old with a move-in date from 1970 or later was accepted; any combination before 1960 was allocated from a preceding unit. Any response to Question 36 for a householder 30 years and older was accepted; blanks were allocated from a preceding unit with similar age and tenure. Vacant units were not part of the universe for this question. Blank responses to Question 36 were accepted; any entries made were blanked.

Question 37. Number of Rooms

- 37** How many rooms do you have in this house, apartment, or mobile home? Do NOT count bathrooms, porches, balconies, foyers, halls, or half-rooms.
- | | |
|----------------------------------|--|
| <input type="checkbox"/> 1 room | <input type="checkbox"/> 6 rooms |
| <input type="checkbox"/> 2 rooms | <input type="checkbox"/> 7 rooms |
| <input type="checkbox"/> 3 rooms | <input type="checkbox"/> 8 rooms |
| <input type="checkbox"/> 4 rooms | <input type="checkbox"/> 9 or more rooms |
| <input type="checkbox"/> 5 rooms | |

Every census since 1940 has collected data on the number of rooms in a housing unit. In combination with information about the number of people residing in the unit, this item allowed for living space estimates and for calculations of the number of people per room in a particular dwelling. Such data were useful to housing policy makers and planners and were required or mandated by federal legislation concerning community development block grants, housing voucher allocations, and other housing grant programs.

The 2000 question was similar to the corresponding question in the prior three censuses. “Mobile home” was added to the “house or apartment” wording of the 1980 and 1990 censuses, which had differed from the “living quarters” wording of the 1970 item.

Editing and allocation. See Question 38 (number of bedrooms) for a description of the joint edit and allocation for rooms and bedrooms.

Question 38. Number of Bedrooms

38 How many bedrooms do you have; that is, how many bedrooms would you list if this house, apartment, or mobile home were on the market for sale or rent?

- No bedroom
- 1 bedroom
- 2 bedrooms
- 3 bedrooms
- 4 bedrooms
- 5 or more bedrooms

Every census since 1960 has included an item on the number of bedrooms in a housing unit. The 1960, 1970, and 1980 questions asked respondents to count “rooms used mainly for sleeping even if used for other purposes.” The 1990 Question used a different definition, asking respondents, “How many bedrooms would you list if this house or apartment were on the market for sale or rent?” (“Or mobile home” was added in 2000.) Answer options ranged from “no bedroom” to “5 or more.” This information provided measures of household size and cost; also, in combination with other data, such as number of people per household, it offered a means of assessing housing adequacy and crowding. Legislation concerning low-income housing tax credits and housing vouchers required information on number of bedrooms per housing unit.

nation with other data, such as number of people per household, it offered a means of assessing housing adequacy and crowding. Legislation concerning low-income housing tax credits and housing vouchers required information on number of bedrooms per housing unit.

Editing and allocation. The computer program compared the entries for Questions 38 and 37 (rooms) for consistency. In general, the unit had to have at least one more room in total than the number of bedrooms, and any unit with three or more rooms was expected to have at least one bedroom. Data for blanks or unacceptable entries in Questions 37 and/or 38 were allocated from preceding units with the same number of rooms and type of structure.

Question 39. Complete Plumbing Facilities

39 Do you have COMPLETE plumbing facilities in this house, apartment, or mobile home; that is, 1) hot and cold piped water, 2) a flush toilet, and 3) a bathtub or shower?

- Yes, have all three facilities
- No

Prior to 1980, the census had inquired about plumbing facilities such as flush toilets and piped water as separate items. The 1980, 1990, and 2000 items combined these facilities as a single item. The 1980 question allowed for two possible “yes” answers, one for one’s own household and one for another household if it also was using the plumbing facilities; also, the question allowed two “no” answers,

one of which covered the situation of having some but not all three plumbing facilities in the household.

This question provided data crucial for assessing the quality of housing. Such data were also useful in programs involving public health, contaminated ground water, and seniors’ eligibility for housing repair and other services. Legislation covering housing voucher allocations and other assistance programs required the use of information on plumbing facilities.

Editing and allocation. Any response to Question 39 was accepted; blanks were allocated from a preceding unit with the same units-in-structure and tenure pattern.

Question 40. Complete Kitchen Facilities

40 Do you have COMPLETE kitchen facilities in this house, apartment, or mobile home; that is, 1) a sink with piped water, 2) a range or stove, and 3) a refrigerator?

- Yes, have all three facilities
- No

As with the question on plumbing facilities, the question on kitchen facilities was used in combination with other information to assess the quality of housing. Such information was widely used in housing and other assistance programs, like Meals on Wheels, and was required by legislation covering the Housing Voucher Allocation Program. The 1940 census first inquired about kitchen facilities with questions about

water supply and type of refrigeration (“mechanical,” “ice,” “other,” or “none”). The 1950 census added choices for electrical or gas refrigeration and also an item on the kitchen sink (“shared,” “exclusive use,” or “none”). The next census, in 1960, inquired whether a household had a home food freezer separate from the refrigerator.

The 1970 housing census reflected the continuing diffusion of home technologies as well as the popular perception that a rising economic tide in the 1960s had “lifted all boats.” Some items in 1970 (not part of the kitchen facilities question) covered dishwashers, battery-operated radios, and UHF (ultra-high frequency) television reception. The 1970 census first combined the three facilities (a sink with piped water, a range or stove, and a refrigerator) in a single question, and subsequent censuses have retained that format.

Editing and allocation. Any response to Question 40 was accepted, and blanks were allocated from a preceding unit with the same units-in-structure and tenure pattern.

Question 41. Telephone Service in Housing Unit

41 Is there telephone service available in this house, apartment, or mobile home from which you can both make and receive calls?

- Yes
 No

The primary interest in this question was assessing access to telephone communications by low-income groups and the elderly. Lack of telephone service was an indicator of poverty and of social isolation. The Communications Act of 1934 required the use of this information. Telecommunications and marketing firms also used it. Censuses from 1980 on

also asked for respondents’ telephone numbers in another section of the questionnaire in case census enumerators or other personnel needed to call for clarification of particular answers.

Inquiries about telephone use have tried to take into account varying patterns of telephone possession and use, as well as changes in phone technology. The 1960 census first asked about telephone access only, wording its inquiry, “Is there a telephone on which people who live here can be called?” The 1970 census adopted essentially the same wording, which assessed telephone availability but not necessarily telephone possession. For example, household members may have had no phone but might have used a nearby pay phone, or a neighbor’s phone, on a regular basis, even to receive calls. Conversely, the 1980 and 1990 questions asked, “Do you have a telephone in your living quarters?” (“house or apartment” in 1990) assessing telephone possession without asking whether the phone worked.

The 2000 question clarified previous ambiguities by asking, “Is there telephone service available in this house, apartment, or mobile home from which you can both make and receive calls?” If the household possessed a landline phone, it would have to be operative for this question to be answered “yes.” On the other hand, if the respondent used only a cell phone, no landline connection would be required for a “yes” answer to this question, and phone service would not depend on telephone hardware permanently located in the household. However, no instruction booklet that explained the meaning of telephone service was available to respondents in 2000. The data suggest that some respondents who relied on cell phones alone indicated that their houses, apartments, or mobile homes did not have telephone service.

Editing and allocation. For occupied units, the computer accepted any response to Question 41; blanks were allocated from a preceding occupied unit. Vacant units were not in the universe for this question.

Question 42. Fuel Used Most for House Heating

42 Which FUEL is used MOST for heating this house, apartment, or mobile home?

- Gas: from underground pipes serving the neighborhood
 Gas: bottled, tank, or LP
 Electricity
 Fuel oil, kerosene, etc.
 Coal or coke
 Wood
 Solar energy
 Other fuel
 No fuel used

Data about household fuel use were helpful in evaluating energy needs and forecasting energy use. Fuel type also provided a safety and quality-of-life measure since equipment used with certain fuels may have presented specific risks. Legislation concerning energy policy and low-income energy assistance required the use of house heating-fuel information.

The 1940 and 1950 censuses asked two separate questions about the principal fuel used for heating and cooking. The 1960, 1970, and 1980 censuses

asked these questions and added one about the fuel most used for heating water. The 1990 and 2000 questions asked only about the fuel used most for heating the house or apartment (or mobile home, in 2000), omitting the items about fuel used for heating water and cooking. Additionally, these last two censuses included “solar energy” as an answer option. In 1980, 1990, and 2000, separate questions about the cost of electricity, gas, oil, coal, kerosene, wood, and other fuels provided an indirect measure of household fuel consumption.

Editing and allocation. For occupied units, any response to Question 42 was accepted, and blanks were allocated from a preceding unit with the same units-in-structure and tenure pattern. Vacant units were not in the universe for Question 42.

Question 43. Vehicles Available

43 How many automobiles, vans, and trucks of one-ton capacity or less are kept at home for use by members of your household?

None

1

2

3

4

5

6 or more

Information about the number of passenger cars, vans, and trucks available per household was useful in developing transportation policies and in planning future transportation needs. Such information became even more important as more regions experienced major traffic congestion and air pollution problems. Legislation concerning federal highway funds, mass transit grants, air quality, and metropolitan planning required the use of data on vehicles available per household.

The 1960 census first asked about passenger automobiles “owned or regularly used” by people in a household, with answer options from “none” up to “three or more” cars. The 1970 census asked an essentially identical question, including the instruction from 1960 to count any company cars kept at home. The 1980 census changed the wording of the question from automobiles “owned or regularly used” to “kept at home for use” and omitted the instruction to count company cars kept at home. This census also added a question about the number of “vans or trucks of one-ton capacity or less” kept at home for use by members of the household, but in both questions—about cars and about vans or trucks—the answer options of the previous censuses were retained (“none” to “three or more”).

The 1990 and 2000 questions combined the vehicle types into one question and expanded the answer options from “none” to “7 or more” in 1990 and from “none” to “6 or more” in 2000. The question wording in both censuses was otherwise identical.

Editing and allocation. For occupied units, any response to Question 43 was accepted, and blanks were allocated from a preceding unit with the same units-in-structure and tenure pattern. Vacant units were not in the universe for Question 43.

Question 44. Value Screener and Farm Residence

44 Answer ONLY if this is a ONE-FAMILY HOUSE OR MOBILE HOME — All others skip to 45.

a. Is there a business (such as a store or barber shop) or a medical office on this property?

- Yes
 No

b. How many acres is this house or mobile home on?

- Less than 1 acre → Skip to 45
 1 to 9.9 acres
 10 or more acres

c. In 1999, what were the actual sales of all agricultural products from this property?

- | | |
|---|---|
| <input type="checkbox"/> None | <input type="checkbox"/> \$2,500 to \$4,999 |
| <input type="checkbox"/> \$1 to \$999 | <input type="checkbox"/> \$5,000 to \$9,999 |
| <input type="checkbox"/> \$1,000 to \$2,499 | <input type="checkbox"/> \$10,000 or more |

The census gathered data on the monetary value of the nation's one-family housing properties, screening for possible distorting factors such as the presence of a business or a medical office on the property. The census also separated one-family, nonfarm housing properties from one-family houses on farms (income-producing) and, since 1980, inquired about total agricultural sales from such properties. Legislation like the Smith-Lever Act and the Fair Housing Act required the use of data on property values and farm residences.

The 1940 housing census was the first to screen for a business in the housing unit. The 1950 census added an item about acreage. The 1970 census screened for single-family properties on 10 acres or more, as well as for the presence of a "commercial

establishment or medical office." The 1980 census asked two questions about properties on 10 acres or more: one (Question H10a and b) in connection with a commercial establishment or a medical office and another (H15a and b) in reference to total agricultural sales from the property during the previous year. This was the first census to inquire about such sales from a residential property. Item H15a in 1980 also included for the first time an inquiry about acreage between 1 and 10 acres.

The 1990 census and Census 2000 also inquired about residential property acreage, the presence of a business or a medical office on the property, and total agricultural income during the previous year. Some wording differed from prior censuses. For example, "business (such as a store or barber shop)" was used instead of "commercial establishment." However, the 1990 census, like the 1980 census, asked two separate, two-part questions about acreage, one in connection to a business or medical office and another in connection to total agricultural sales.

The 2000 inquiry combined these items in a three-part question about a business or medical office (44a), acreage (44b), and total agricultural sales (44c). Additionally, mobile homes and one-family homes were both included in the question, whereas prior censuses had screened out mobile homes and trailers. These data, in combination with data about estimated property value (Question 51), afforded an accurate assessment of the value of the nation's one-family housing stock, as well as the number of smaller farms usually referred to as "family farms."

Editing and allocation. The edit program compared all three parts of this with the response to Question 34 (units in structure). For sample questionnaires, Question 44b (acreage) was also compared with 44c (farm residence). In the regular edit for Questions 44a (commercial establishment), b, and c, any entry was accepted if Question 34 was a mobile home or a one-family house; for nonresponse, Questions 44a, b, and c were allocated from a preceding unit.

Question 45. Costs of Utilities and Fuels³²

45 What are the annual costs of utilities and fuels for this house, apartment, or mobile home? *If you have lived here less than 1 year, estimate the annual cost.*

a. Electricity

Annual cost — Dollars

\$ | | | | .00

OR

- Included in rent or in condominium fee
 No charge or electricity not used

b. Gas

Annual cost — Dollars

\$ | | | | .00

OR

- Included in rent or in condominium fee
 No charge or gas not used

c. Water and sewer

Annual cost — Dollars

\$ | | | | .00

OR

- Included in rent or in condominium fee
 No charge

d. Oil, coal, kerosene, wood, etc.

Annual cost — Dollars

\$ | | | | .00

OR

- Included in rent or in condominium fee
 No charge or these fuels not used

Utility and fuel costs are important components of overall shelter costs for both homeowners and renters. From 1940 (when data on fuel and utility costs were first collected) through 1970, the census asked only renters about these expenditures. The 1980 census included homeowners as well, inquiring about “the costs of utilities and fuels for your living quarters.” The answer options preserved the distinction between renters and homeowners by including the choice, “included in rent or no charge,” following the inquiry about electricity, gas, water, and other fuels (oil, coal, kerosene, wood, etc.). As in 1990, the 2000 item instructed people who had occupied the house, apartment, or mobile home for less than a year to estimate the annual utility and fuel costs.

Editing and allocation. For occupied units, if the first part (which asked about amount) of each component indicated a response, but the second part (which asked about inclusion) did not, the amount was compared with the upper limit (e.g., the upper limit for electricity and gas was \$7,500; for oil, coal, etc., it was \$7,000; and for water, \$5,000). Any amount within the limits was accepted; any amount outside the limits was blanked and a value allocated from a preceding unit, by units in structure and (excluding Item 45c) fuel type. If both amount and inclusion entries

were made, the inclusion section was blanked. Where no amount was noted and either inclusion in rent or no charge for the utility was shown, that response was accepted. If neither an amount nor an exclusion was specified, both were allocated from a preceding unit, by units in structure and (excluding Question 45c) fuel type.

Table 3-3.
Upper Range Limits for Questions 46a, 47b, 48b, 49, 50, 52, and 53b

Question	Amount (in dollars)
46a. Contract rent	4,000
47b. Mortgage payment	11,000
48b. Second mortgage payment	11,000
49. Real estate taxes	22,500
50. Insurance	6,000
52. Condominium fee	1,750
53b. Mobile home cost	20,000

³² This question (utilities and fuel costs), together with Questions 47 (mortgage costs), 48 (second mortgage and home equity loans), 49 (real estate taxes), 50 (fire, hazard, and flood insurance), 52 (condominium fee), and 53 (mobile home costs), constitutes a category of items called “selected monthly owner costs.” Combining these items with income creates a new category, “selected monthly owner costs as a percentage of household income,” that can be used to measure housing affordability and excessive shelter costs. The concept of selected monthly owner costs applied only to owner-occupied units. The equivalent concept for renters was gross rent. Legislation covering areas such as low-income home energy assistance, low-income housing tax credits, and housing voucher allocations requires the use of monthly shelter cost data.

Question 46. Monthly Rent, Meals Included in Rent

46 Answer **ONLY** if you **PAY RENT** for this house, apartment, or mobile home — All others skip to 47.

a. What is the monthly rent?

Monthly amount — Dollars

\$ | | | | | .00

b. Does the monthly rent include any meals?

- Yes
 No

The census defined monthly rent as contract rent, that is, the amount agreed to or contracted for, regardless of any furnishings, utilities, or services that may have been included in the rent. Every census since 1940 has included an inquiry about specific contract rent, though in 1960 the census collected these data from large cities only and from a 25 percent sample elsewhere. In 1960, enumerators wrote in a monthly rental amount that was later coded. In 1970, respondents wrote in a monthly rental figure then filled in a circle corresponding to 1 of 14 dollar amount options ranging from “less than \$30” to “\$300 or more.” The 1980 census omitted writing in a figure and expanded the number of monthly amount range options to 24 (from “less than \$50” to “\$500 or more”). The 1990 census offered 26 such options (from “less than \$80” to “\$1,000 or more”) and added a new item inquiring whether the monthly rent included meals. This item applied to “congregate housing,” or units with meal plans included in the rent.

Census 2000 continued the inquiry about meals, but eliminated the numerous options for ranges of monthly rental amounts and returned to the use of a write-in rental figure for “this house, apartment, or mobile home.” Legislation concerning housing voucher allocations and fair market rents required the use of information on monthly rents.

Census 2000 continued the inquiry about meals, but eliminated the numerous options for ranges of monthly rental amounts and returned to the use of a write-in rental figure for “this house, apartment, or mobile home.” Legislation concerning housing voucher allocations and fair market rents required the use of information on monthly rents.

Editing and allocation. The computer compared responses to Question 46a with those to Question 33 (tenure) and, on the enumerator form, Item C (vacancy status). Residents of owner-occupied units were not required to answer Question 46. For both renter-occupied and vacant-for-rent units where the Question 33 entry was any response other than “occupied without payment of cash rent,” any response to Question 46a was accepted unless its value was less than the monthly income or it was above the upper range limit. When there was no response, Question 46a was allocated from a preceding unit with the same units-in-structure pattern, renter tenure for occupied units, and vacant-for-rent status for vacant units.

For renter-occupied units paying cash rent and vacant-for-rent units, any response to Question 46b was accepted. Owner-occupied units, no-cash rental units, and vacant units not for rent weren’t in the universe for Question 46b.

Question 47. Mortgage Status, Monthly Payment, Taxes, and Insurance Included in Monthly Mortgage Payment

47 Answer questions 47a–53 if you or someone in this household owns or is buying this house, apartment, or mobile home; otherwise, skip to questions for Person 2.

a. Do you have a mortgage, deed of trust, contract to purchase, or similar debt on THIS property?

Yes, mortgage, deed of trust, or similar debt
 Yes, contract to purchase
 No → Skip to 48a

b. How much is your regular monthly mortgage payment on THIS property? Include payment only on first mortgage or contract to purchase.

Monthly amount — Dollars

\$ | | | | | .00

OR

No regular payment required → Skip to 48a

c. Does your regular monthly mortgage payment include payments for real estate taxes on THIS property?

Yes, taxes included in mortgage payment
 No, taxes paid separately or taxes not required

d. Does your regular monthly mortgage payment include payments for fire, hazard, or flood insurance on THIS property?

Yes, insurance included in mortgage payment
 No, insurance paid separately or no insurance

The 1890 census first included an item about mortgages, asking whether a home was “free from mortgage encumbrance.” Every subsequent census inquired about mortgage status. The 1940 census also asked about the existence of second mortgages and for the specific dollar value(s) of the mortgage(s). In 1950 the census asked for the existence of “any mortgage (or trust)” but did not ask for the dollar amount.

The 1980 census asked a five-part mortgage-status question. The first part concerned the existence of a “mortgage, deed of trust, contract to purchase, or similar debt on *this* property?” The second asked about any “second or junior mortgage”; the third, about the total amount of all monthly mortgage payments; the fourth, about whether that amount included real estate taxes; and the fifth part asked whether the amount included fire and hazard insurance premiums. The instructions for this question in 1980 excluded condominiums and mobile homes; these were included in the instructions for 1990. The 1990 question (H23a–d) consisted of four, not five, parts because the item on second or junior mortgages was asked as a separate question

(see below). This required modification of the wording in Item H32c (1980) asking for the total amount of all monthly mortgage payments, such that the corresponding item in 1990 (H23b) asked only for the “regular monthly mortgage payment.” Additionally, 1990 Item H23d added flood insurance premiums to fire and hazard insurance payments. The 2000 question was identical to the 1990 question, except for the preliminary instruction that included mobile homes.

Editing and allocation. The answer to Question 47a (mortgage status) was accepted if the answer was “no” (not mortgaged) and there were no amounts for first mortgage payment (47b) or second mortgage payment (48b), even if the response to Question 53a (mobile home installment loan) was “yes.” The answer was also accepted if it was “yes, mortgage, deed of trust, or similar debt” and there was an amount or no regular payment answered in either of the mortgage payment questions (47b or 48b).

If the response to Question 47a was blank or “no” and there was an amount in mortgage payment (47b or 48b), Question 47a was edited to “yes, mortgage, deed of trust, or similar debt.”

If Question 47a was answered “yes, mortgage, deed of trust, or similar debt,” but 47b was blank or above the upper range limit (see the table preceding Question 46), the mortgage payment (47b) was allocated from the preceding mortgaged owner-occupied unit by unit type and value.

A similar procedure for mortgaged units was used to edit and allocate Questions 47c, inclusion of real estate taxes in mortgage payment, and 47d, inclusion of insurance in mortgage payment.

In all other mortgaged-unit cases, the computer edited and allocated the responses to Questions 47a through 47d in conjunction with the second mortgage items (48a and b) and 53a and b (mobile home installment loan and mobile home cost). This was done because of the close relationship between these items when a property was mortgaged. In these cases, all items were allocated from a preceding mortgaged owner-occupied unit by unit type and value.

Question 48. Second Mortgage, Home Equity Loan

48 a. Do you have a second mortgage or a home equity loan on THIS property? Mark all boxes that apply.

Yes, a second mortgage
 Yes, a home equity loan
 No → Skip to 49

b. How much is your regular monthly payment on all second or junior mortgages and all home equity loans on THIS property?

Monthly amount — Dollars

\$ | | | | | .00

OR

No regular payment required

Starting in 1990, this item was asked separately from the question on primary mortgage, in recognition of the increasing popularity of home equity loans as a means of financing such expenditures as home improvements and college tuition. The 2000 question (Part a) omitted the reference to “junior mortgage” and asked respondents to specify the type of loan by checking “yes” if they had a second mortgage; “yes” if they had a home equity loan; or “no” if they had neither. The previous census had grouped both forms of loans together and asked only if respondents had either of them, or none. Part b of the 2000 question, asking about total loan amounts, was identical to Part b of the 1990 question, including the reference to “junior mortgages” that Part a of the 2000 questionnaire had dropped.

Editing and allocation. In most circumstances, Questions 48a and 48b were edited and allocated in conjunction with the mortgage items (Questions 47a through d). See “Editing and allocation” under Question 47 for the procedures covering these situations.

If Question 48b (second mortgage payment) was blank or above the upper range limit (see the table preceding Question 46), the second mortgage payment was allocated from the preceding mortgaged owner-occupied unit by unit type and value.

Question 49. Real Estate Taxes

49 What were the real estate taxes on THIS property last year?

Yearly amount — Dollars

\$ | | | | | .00

OR

None

The 1980 census was the first to ask for the amount of real estate taxes paid on the respondent’s household property. The wording of the question and the answer options remained unchanged in the corresponding 1990 census and Census 2000 questions. However, in 1990 the preliminary instructions included mobile homes and condominiums, which the 1980 question had specifically excluded. Preliminary

instructions for the 2000 question also included mobile homes, but used the word “apartment” instead of “condominium.”

Editing and allocation. See Question 51 (value of property) for a discussion of the joint edit and allocation of real estate taxes and property value.

Question 50. Fire, Hazard, and Flood Insurance

50 What was the annual payment for fire, hazard, and flood insurance on THIS property?

Annual amount — Dollars

\$ | | | | | .00

OR

None

The 1980 census was the first to ask about the “annual premium for fire and hazard insurance on THIS property.” The corresponding questions in the 1990 census and Census 2000 changed the word “premium” to “payment” and used all-capitals instead of underscoring to emphasize “THIS property.” The 2000 write-in answer referred to “annual” rather than “yearly” amount, as in 1990, but in every other respect the 1990 and 2000 questions were identical.

Editing and allocation. For owner-occupied units with an amount in Question 50, this amount was verified with the upper range limit (see the table preceding Question 46), and accepted if within those limits. If outside those limits, or if Question 50 was blank, a value was allocated from the preceding owner-occupied unit by unit type and value.

Question 51. Value of Property

51 What is the value of this property; that is, how much do you think this house and lot, apartment, or mobile home and lot would sell for if it were for sale?

- | | |
|---|---|
| <input type="checkbox"/> Less than \$10,000 | <input type="checkbox"/> \$90,000 to \$99,999 |
| <input type="checkbox"/> \$10,000 to \$14,999 | <input type="checkbox"/> \$100,000 to \$124,999 |
| <input type="checkbox"/> \$15,000 to \$19,999 | <input type="checkbox"/> \$125,000 to \$149,999 |
| <input type="checkbox"/> \$20,000 to \$24,999 | <input type="checkbox"/> \$150,000 to \$174,999 |
| <input type="checkbox"/> \$25,000 to \$29,999 | <input type="checkbox"/> \$175,000 to \$199,999 |
| <input type="checkbox"/> \$30,000 to \$34,999 | <input type="checkbox"/> \$200,000 to \$249,999 |
| <input type="checkbox"/> \$35,000 to \$39,999 | <input type="checkbox"/> \$250,000 to \$299,999 |
| <input type="checkbox"/> \$40,000 to \$49,999 | <input type="checkbox"/> \$300,000 to \$399,999 |
| <input type="checkbox"/> \$50,000 to \$59,999 | <input type="checkbox"/> \$400,000 to \$499,999 |
| <input type="checkbox"/> \$60,000 to \$69,999 | <input type="checkbox"/> \$500,000 to \$749,999 |
| <input type="checkbox"/> \$70,000 to \$79,999 | <input type="checkbox"/> \$750,000 to \$999,999 |
| <input type="checkbox"/> \$80,000 to \$89,999 | <input type="checkbox"/> \$1,000,000 or more |

Inquiries about property value first appeared in 1890 on a supplementary schedule for mortgaged farms and homes. Questions included the market value of the farms or homes and whether they were mortgaged. Censuses in 1920, 1930, 1940, and 1950 made similar inquiries, though the 1950 item included a clarification for respondents that “value” meant what the property “would sell for” if it were for sale. Subsequent censuses adopted this same definition in instructions to respondents. In the 1960 census, ten value categories ranging from “less than \$5,000” to “\$35,000 or more” replaced the earlier write-in entries. The question was asked on a 100 percent basis in large cities and on a 25 percent basis elsewhere. The 1970 census made the

home property value question a 100 percent item (asked of all respondents in all areas) and presented 11 value categories ranging from “less than \$5,000” to “\$50,000 or more.”

The 1980 and 1990 census also asked this question of all respondents and specified that condominium units were to be included as home properties. The 1980 question presented 24 value categories ranging from “less than \$10,000” to “\$200,000 or more,” whereas the 1990 question presented 26 categories from “less than \$10,000” to “\$500,000 or more.” The 2000 question was asked on a sample basis. It presented 24 value categories with the same floor but a higher ceiling, at “\$1,000,000 or more,” reflecting the continuing appreciation in housing prices during the latter decades of the century. The 2000 item also specified the inclusion of “mobile home and lot,” and substituted the word “apartment” for “condominium” in the instructions.

Editing and allocation. Value of property and real estate taxes were edited jointly in 2000. The edit was based on the correlation between the two based on Questions 34 (units in structure) and 44b (size of lot/number of acres). The tax rate was computed in percentile distributions for each state. For owned units and vacant-for-sale units, value and/or taxes, if missing, were assigned according to the tax rate in that state. Vacant-for-sale units, renter-occupied units, and vacant units other than those for sale were not in the universe for property value or for real estate tax.

Question 52. Monthly Condominium Fee

52 Answer ONLY if this is a CONDOMINIUM —

What is the monthly condominium fee?

Monthly amount — Dollars

\$ | | , | | .00

The 1990 census first asked condominium owners about the monthly condominium fee, preceded by the instruction, “Answer ONLY if this is a CONDOMINIUM.” Census 2000 also inquired about condominium fees, adopting the same wording and instruction as in the 1990 question. The Census 2000 item was somewhat flawed since the census

did not include a question on whether the unit was a condominium. As a result, it was not possible to check on whether the fee amount entered was actually for a condominium.

Editing and allocation. For owner-occupied units, any response to Question 52 was accepted. Renter-occupied units and vacant units were not in the universe for Question 52. Blanks were allocated from a preceding owned unit by unit type.

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Chapter 4: The Partnership and Marketing Program

INTRODUCTION

At the dawn of the twenty-first century, the U.S. Census Bureau faced its most daunting mission ever—counting the largest, most mobile and diverse population in the nation’s history and halting a 20-year trend of declining participation in the census.¹ Experts estimated that the initial response rate for Census 2000 would be 61 percent, or about 73 million responses out of an estimated 120 million households. Such a response rate would require the Census Bureau to contact approximately 47 million households during the nonresponse follow-up phase—historically the most labor- and cost-intensive element of decennial census operations.²

During previous censuses, the Census Bureau relied on public service announcements to promote the census, but these announcements did not reach a broad enough audience to prove effective in raising the level of public awareness about the census.³ As a result, for Census 2000, the Census Bureau undertook an ambitious integrated marketing strategy that included paid advertising, direct mail, media relations, promotions and special events, and partnerships to educate people about the census, motivate them to return questionnaires, and encourage cooperation with enumerators.⁴

THE 1990 CENSUS OF POPULATION AND HOUSING

Following the 1990 census, the Census Bureau commissioned several studies comparing the advantages and disadvantages of paid versus pro bono advertising campaigns. The two most notable studies—by Vitt Media and Gilbreath Communications Inc.—analyzed the pro bono advertising experience of the 1990 census and made suggestions for improved awareness and response for Census 2000. Both reports strongly recommended a paid advertising campaign.

Vitt Media

Vitt Media, an independent contractor chosen to assess the campaign and offer improvements following the 1990 census, found several developments that prompted the Census Bureau to reevaluate its advertising and promotion campaigns and to study a broader advertising and promotion strategy. Factors contributing to this need for reevaluation included the steadily declining response rates since the first mailout/mailback census in 1970 (the 1990 census witnessed a 10 percent drop in mail response and an increased undercount when compared to the 1980 census), the likelihood that people exposed to public service announcements (PSAs) would be more likely to return their questionnaires than those who had not,⁵ and studies showing that PSAs were being aired at less-than-optimal times for the greatest viewership.⁶

¹ The number of residents who filled out and returned their census forms by mail declined steadily from the 1970 to the 1990 censuses. In 1970, the mailback response rate was 78 percent of households. For the 1980 census, that rate fell to 75 percent. The 1990 census saw a continuation of the downward trend, with a final mailback response rate of 65 percent.

² W. Sherman Edwards and Michael J. Wilson, *Evaluations of the Census 2000 Partnership and Marketing Program*, Topic Report No. 6, TR-6 (Washington, DC: U.S. Census Bureau, 2004), p. 1.

³ In 1990 the Census Bureau received the equivalent of \$65 million in pro bono advertising. The Census Bureau paid approximately \$3 million to produce and distribute the ads.

⁴ U.S. Census Bureau, “Census 2000 Operational Plan Using Traditional Census-Taking Methods,” January 1999, pp. IV–1.

⁵ PSAs did not reach targeted hard-to-count populations in a strategic manner. Awareness of the census was lower for Blacks and members of other racial minorities than it was for Whites.

⁶ An audit of the 1990 media campaign found that 60 percent of the U.S. population received 91 percent of the advertising campaign’s impact, while 40 percent received an impact of only 9 percent. Vitt Media International, “1990 Census Campaign Media Audit, February ’90 through May ’90,” undated.

In an evaluation of the 1990 census, Charles Jones, associate director for Decennial Census, noted that one inherent weakness of a pro bono campaign is that the client has no control over when the advertisements will air and, therefore, which audiences messages will reach.⁷ Vitt Media's study concurred, concluding that a lack of control over PSA placement prevented the mass media⁸ campaign from attaining saturation level.⁹

As a result of its evaluation, Vitt Media recommended paid advertising be used in future censuses. Using the success of the U.S. Department of Defense's "Be All You Can Be" paid advertising campaign as an example, Vitt Media noted that congressional support and funding for paid advertising in 2000 would increase the probability of success for this strategy.¹⁰

Gilbreath Communications Inc.

In summer 1995, the Census Bureau contracted with Gilbreath Communications Inc. to assess further the feasibility of conducting a paid advertising campaign during Census 2000. Like the Vitt Media report, Gilbreath's analysis indicated that relying solely upon pro bono advertising to promote Census 2000 would limit exposure dramatically.

The analysis also indicated that reliance upon pro bono advertising would complicate efforts to customize the campaign for specific audiences. Gilbreath noted that television and radio audiences differed widely based upon race, ethnicity, region, and age and that airing PSAs during non-peak hours served no group adequately. Furthermore, an increasing number of nonprofit organizations were competing for PSA slots. Therefore, the inadequate saturation of markets evident during the 1990 campaign would be more pronounced during Census 2000.

Given pro bono advertising's drawbacks, Gilbreath proposed an extensive advertising campaign covering a 6-month period that included mainstream and minority newspapers and magazines, national and local television and radio advertising, outdoor posters, trailers attached to feature motion pictures, and public transit and Internet advertising. Gilbreath estimated the cost for buying this time at \$136 million and production costs at between \$3.8 million and \$5 million.¹¹

The research conducted by Gilbreath Communications and Vitt Media convinced the Census Bureau to conduct a 3- to 4-month campaign featuring public awareness activities in the months prior to Census Day and motivational messages during the mail return and nonresponse follow-up periods. The Census Bureau estimated the cost of such a campaign to be approximately \$100 million to \$125 million, of which 80 to 90 percent would be used to buy advertising time and space from hundreds of media outlets.¹²

DEVELOPING COOPERATIVE VENTURES (PARTNERSHIPS)

1995 Census Test

While the tests that the Census Bureau conducted between 1992 and 1994 were used to study the effects of individual changes to the census questionnaires (see Chapter 2, "Planning the Census"), the agency still needed to determine how the changes would work in aggregate. The 1995 test allowed the Census Bureau to study: (1) new uses of sampling and estimation, (2) new procedures to reduce the undercount, (3) new avenues for greater cooperation, (4) new uses of technology, and (5) new methods for collecting long-form data (see Chapter 2, Table 4, "Fundamental Changes and the 1995 Census Test").

⁷ Charles D. Jones, "Taking the Census: Lessons from 1990," *Proceedings of the 1991 Annual Meeting of the Population Association of America*, March 1991.

⁸ Meriam-Webster Online Dictionary defines the term "mass media" as "a medium of communication (as newspapers, radio, or television) that is designed to reach the mass of the people."

⁹ Vitt Media International, *1990 Census Campaign Media Audit*, February 1990 through May 1990.

¹⁰ Vitt Media International.

¹¹ For more information, see Gilbreath Communications Inc., "Advertising Research (Paid vs. Non-Paid): Preliminary Report," February 29, 1996.

¹² Aguirre International, "Communications and Motivation Strategies," May 1994; Karen Wheelless, "Evaluation of the 1990 Census Outreach and Promotions Campaign," U.S. Census Bureau, January 31, 1995; Aguirre International, "Census 2000—Advertising Research and Development," December 15, 1997.

The above five categories of change were based on the Census Bureau's basic strategies for conducting Census 2000. These strategies (building partnerships, simplifying forms and response procedures, using technology intelligently, and increasing the use of statistical methods) were at the center of its efforts to redesign the census.¹³

Four sites (three urban and one rural) were initially proposed for the 1995 census test. Of these four, three were chosen: Oakland, California; Patterson, New Jersey; and a grouping of six parishes—De Soto, Red River, Bienville, Jackson, Natchitoches, and Winn—in northwest Louisiana.¹⁴

To evaluate its proposed partnership program, the Census Bureau planned to form partnerships with other federal agencies; with state, local, American Indian tribal, and Alaska Native village governments; and with private and nonprofit organizations.¹⁵ “Partner” organizations were to collaborate with the Census Bureau to plan enumeration activities, develop and review address lists, recruit people to work on the census, and design and implement outreach and promotional activities.¹⁶ The goal of the partnerships program in the 1995 test was to determine the best approach and procedures for including local governments in the Local Update of Census Addresses (LUCA) program,¹⁷ administrative record acquisition, and outreach and promotion.

The test yielded four significant positive results concerning the partnership program. First, it led to improvements in the data in the master address file (a list of every living quarters nationwide). Second, it provided an opportunity for the Census Bureau to procure, use, and process a variety of federal, state, and local administrative records. These files demonstrated a need for improved standards for machine-readable file structures and for address sources. Third, it built cooperative relationships between the Census Bureau and local residents who distributed promotional posters and flyers and used their familiarity with the local area to promote census awareness and participation. Finally, it secured cooperation and assistance from local officials that otherwise might not have been obtained.

While the successes of the 1995 test's partnership program were encouraging, several aspects needed improvement. Specifically, the Census Bureau needed to:

- Find better ways to reach, communicate with, and support local governments.
- Pay greater attention to educating local governments and organizations about the Census Bureau and its purpose.
- Provide better instruction, training, and reference materials.
- Develop better standards on file structure and address sources when collecting administrative records.
- Provide local officials with compatible file formats and better maps to enable them to participate more effectively in the LUCA program.

¹³ U.S. Census Bureau, Decennial Management Division, 1995 Census Test Results Memorandum Series, Nos. 1–54, 1995–1996.

¹⁴ New Haven, CT, was proposed as a third urban site, but was dropped due to budgetary constraints before the test began. U.S. Census Bureau, Decennial Management Division, 1995 Census Test Results Memorandum Series, Nos. 1–54, 1995–1996.

¹⁵ U.S. Census Bureau, Decennial Management Division, 1995 Census Test Results Memorandum Series, Nos. 1–54, 1995–1996.

¹⁶ U.S. Census Bureau, “1995 Census Test Evaluation Frame Cooperative Ventures: Outreach and Promotion,” undated.

¹⁷ The addresses provided by the Census Bureau are confidential according to Title 13 of the U.S. Code. The agency offered local officials an opportunity to participate in address list review as part of the LUCA program in response to Public Law 103–430, the Census Address Improvement Act of 1994. For more information, see Chapter 11, “Legal Issues.”

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- Ensure that critical work was completed on time and support regional offices in their efforts (such as collecting administrative records), which required processing a large number of diverse files (see Chapter 2, “Planning the Census”).¹⁸

Working Group on Cooperative Ventures

At the June and September 1994 meetings of the Decennial Census Advisory Committee, members recommended that the Census Bureau consider creating a formal cooperative effort with state, local, and tribal governments during the planning and implementation of Census 2000. The suggestion resulted in the formation of the Working Group on Cooperative Ventures to explore how the Census Bureau should implement the recommended expanded partnership effort.¹⁹

The working group was composed of 21 members representing various national government associations, a national minority association, the State Data Center Steering Committee, the 1995 census test site areas, and the Census Bureau.

The group’s final report presented guidelines for partnerships the Census Bureau might undertake. It also identified activities that the Census Bureau might use to enter into closer association with state, local, and tribal governments. These activities included address list development, administrative records coverage improvement, outreach and promotion, enumeration planning and assistance, recruiting, and postcensus activities.²⁰

Partnerships Steering Committee and Partnerships Council

In March 1995, the Census Bureau announced the formation of two committees—the Partnerships Steering Committee and the Partnerships Council. The missions of these committees were to formalize and coordinate the Census Bureau’s partnership efforts.

The Partnerships Steering Committee consisted of Census Bureau executive staff members and senior managers and was charged with defining the partnership program, setting policy, and developing a comprehensive approach for undertaking partnerships efforts.

The Partnerships Council, composed of management staff with experience in and knowledge of the various program areas, addressed partnership issues, drafted policy recommendations for Partnerships Steering Committee consideration, and provided guidance as needed in program-specific areas.²¹

Coordination Team for Intergovernmental Programs and Policies (CTIPP)

CTIPP provided an ongoing forum for dissemination of information concerning all partnership efforts within the Census Bureau. The CTIPP set guidelines and principles for establishing Census Bureau partnerships and reviewed partnership agreements to ensure they met accepted standards.²²

Advisory Committees

The Secretary of Commerce’s Decennial Census Advisory Committee. The Decennial Census Advisory Committee (DCAC) was established in 1991, with a charter providing seats for 40 organizations.²³ As planning for the census progressed, additional organizations were invited

¹⁸ U.S. Census Bureau, “1995 Census Test Evaluation Frame Cooperative Ventures: Outreach and Promotion,” undated. See also U.S. Census Bureau, Decennial Management Division, 1995 Census Test Results Memorandum Series, Nos. 1–54, 1995–1996.

¹⁹ U.S. Census Bureau, “Final Cooperative Ventures Working Group Report,” April 18, 1995.

²⁰ Edwin B. Wagner, Jr., “Partnerships,” presented at the 2000 Census Advisory Committee Meeting, December 7–8, 1995, pp. 2–6.

²¹ *Ibid.*, p. 5.

²² LaVerne Vines Collins, “Options Paper on Cooperative Ventures with State, Local, and Tribal Governments,” U.S. Census Bureau, March 8, 1994, and U.S. Census Bureau, “Intergovernmental Census Cooperative Ventures Principles,” November 1, 1994.

²³ Following Census 2000, the committee’s charter was changed to allow it to help the Census Bureau prepare for the 2010 Census and the American Community Survey. The committee was renamed to reflect its status as an ongoing committee, becoming the Decennial Census Advisory Committee.

to participate. Membership consisted of national organizations representing local, county, and state governments, and of associations serving minority and special populations, such as veterans, those with privacy concerns, the disabled, seasonal migrant farm workers, and the homeless. In addition, the DCAC included 16 ex officio members from the Postmaster General's office and the Census Bureau's oversight committee in the U.S. House of Representatives.

The DCAC primarily focused on research and design issues related to the decennial census and offered recommendations directly to the U.S. Secretary of Commerce. The committee provided a perspective from the data user community as well as a broad, national-level perspective on issues relating to special populations and to state, local, county, and tribal populations. Initially, the committee met quarterly but that was reduced to semiannually as the volume of Census 2000 data products began to dwindle.²⁴

The Census Race and Ethnic Advisory Committees. Five race and ethnic advisory committees (REACs)—African American, American Indian and Alaska Native, Asian, Hispanic, and Native Hawaiian and Other Pacific Islander—advised the Census Bureau on decennial census issues. The charter for each committee provided for nine members.²⁵

The Census Bureau created the first of its REAC groups—the African American Advisory Committee—in 1970. The current committees have been in place since 1980, with the exception of the Asian Advisory Committee and the Native Hawaiian and Other Pacific Islander Advisory Committee, which were created from the existing Asian and Pacific Islander Committee in 2000 as a result of revisions to OMB Statistical Directive No. 15.²⁶

REAC members came from academia and nonprofit, tribal leadership, and community-based organizations. The committees generally met semiannually, with each meeting lasting 2 or 3 days. Special meetings were conducted to brief committee members on the advertising, promotion, and partnership efforts for Census 2000, and the committees played important advisory roles in the review of creative concepts for advertising art, themes, and text that targeted specific race and ethnic groups, particularly hard-to-enumerate populations.

The Census Advisory Committee of Professional Associations. The Census Advisory Committee of Professional Associations consisted of 36 members chosen by the Secretary of Commerce from nominees presented by the Director of the Census Bureau. The committee represented the following organizations: the American Marketing Association, the Population Association of America, the American Statistical Association, and the American Economic Association.

The committee advised the Census Bureau on issues involving the decennial census as well as on nondecennial issues, including the economic census and other demographic and economic surveys and research. Committee meetings were generally held semiannually, supplemented by special meetings covering specific topics.²⁷

DIVISION OF LABOR FOR PLANNING AND IMPLEMENTATION

The Partnership and Marketing Steering Group (PMSG) was established to address issues related to the implementation of partnerships, paid advertising, media relations, and promotions/special events for Census 2000. The steering group was chaired by the Decennial Management Division and included representatives from the divisions involved in Census 2000 partnership and marketing activities. The group established policy guidelines and protocols that ensured the coordination and integration of marketing and partnership activities across all components of the program.²⁸

²⁴ U.S. Census Bureau, "Decennial Census Advisory Committee (DCAC)," February 3, 2005, <<http://www.census.gov/cac/www/CommitteeInfo.html#DCAC.html>> (June 9, 2005).

²⁵ U.S. Census Bureau, "Race and Ethnic Advisory Committees (REAC)," February 3, 2005, <<http://www.census.gov/cac/www/CommitteeInfo.html#DCAC.html>> (June 9, 2005).

²⁶ U.S. Office of Management and Budget Statistical Directive No. 15, "Standards for Maintaining, Collecting, and Presenting Federal Data on Race and Ethnicity," Washington, DC, October 30, 1997.

²⁷ U.S. Census Bureau, "Committee of Professional Associations (CACPA)," February 3, 2005, <<http://www.census.gov/cac/www/CommitteeInfo.html#DCAC.html>> (June 9, 2005).

²⁸ U.S. Census Bureau, "Census 2000 Partnership and Marketing Program—Program Master Plan," Census 2000 Information Memorandum No. 59, June 6, 2000, p. ii.

Under the PMSG's guidance, successful implementation of the Census 2000 Partnership and Marketing Program required collaboration among several Census Bureau offices, both at the agency's headquarters and in the field, as shown in Table 4-1.

Table 4-1.
Division of Labor

Function	Office or contractor responsible for implementation
Program management	Decennial Management Division
National partnership development	Field/Partnership and Data Services Program, Customer Liaison Office, Public Information Office, Congressional Affairs Office, Census 2000 Publicity Office, Director's Office, 21st Century Expo Group (contractor), ²⁹ Sykes Communications (contractor) ³⁰
Regional partnership development	Field/regional census centers
Paid advertising	Census 2000 Publicity Office, Young & Rubicam (contractor)
Media relations	Public Information Office, field/regional census centers
Promotions/special events	Census 2000 Publicity Office, field/regional census centers, Decennial Management Division, Geography Division, Scholastic Inc. (contractor), ³¹ Cohn & Wolfe (contractor) ³²
Communication and region support	Field Directorate (Partnership and Data Services Program), National Processing Center

SAMPLING AND DUAL-TRACK PLANNING

In the fall of 1997, the threat of a stalemate between the congressional leadership and the Clinton administration in the debate over the use of statistical sampling was resolved by a compromise in the fiscal year 1998 U.S. Department of Commerce appropriations bill that President Clinton signed into law.³³ The legislation allowed the Census Bureau to continue to plan for the use of sampling, but required it to plan for a census without sampling for nonresponse follow-up and statistical adjustment as well. Thus, the Census Bureau was required to undertake dual-track planning.³⁴

The law also sought to provide an opportunity for expedited judicial review of the legality and/or constitutionality of using sampling methods to produce population figures for apportionment or redistricting purposes. Additionally, the statute established a Census Monitoring Board to oversee

²⁹ Under the supervision of the PDSP, the 21st Century Expo Group was contracted to establish and maintain partnerships with 150 national nongovernmental organizations. (A number of staff members at 21st Century Expo worked on the 1990 census outreach and promotion program and therefore already had established relationships with many of these organizations.)

³⁰ Sykes Communications was contracted to develop partnerships with 100 Fortune 500 corporations and 100 companies in smaller markets whose customers were among the historically undercounted populations.

³¹ Scholastic Inc. worked with Young & Rubicam to prepare and distribute Census in Schools program materials for students, teachers, and parents and included editorials and announcements in teacher editions of classroom magazines and articles in Scholastic classroom magazines.

³² Cohn & Wolfe developed the Census 2000 public relations campaign. For more information, see the Integrated Marketing Strategy section in this chapter.

³³ Public Law 105-119, 105th Congress, 1st Session. (1997), Departments of Commerce, Justice, and State, the Judiciary and Related Agencies Appropriations Act of 1998.

³⁴ In late November 1997, Congress passed H.R. 2267, the Commerce, Justice, State Appropriations Act, and it was signed by President Clinton. The President originally vetoed H.R. 2267; however, he agreed to sign it after a compromise regarding the issue of Census 2000 was worked out between the administration and the House of Representatives. See Chapter 11, "Legal Issues," for more information. In the compromise language of H.R. 2267, the House allowed for the possibility of bringing a lawsuit in federal district court (to be heard by a three-judge panel, at least one of whom was a circuit judge) by either of the two Houses of Congress, individual representatives, or senators, and any resident of a state whose congressional representation could be changed as a result of the use of a statistical method to determine that state's population. In addition, it allowed for a particular lawsuit to be filed by the Speaker, "on behalf of the House of Representatives." Furthermore, H.R. 2267 allowed for any party to such a lawsuit to appeal the district court ruling directly to the U.S. Supreme Court, bypassing the U.S. Court of Appeals.

the planning and conduct of Census 2000. As part of the compromise, but not contained in the text of the enacted legislation, the Census Bureau was required to modify its plans for the 1998 Dress Rehearsal to include one site at which methods for use in a nonsampling census would be tested³⁵ (see Chapter 2, “Planning the Census”).

INTEGRATED MARKETING STRATEGY

As noted, the Census 2000 Partnership and Marketing Program (PMP) was an integrated communications effort designed to increase awareness of Census 2000 and boost response rates. The strategy was developed and coordinated by the Census Bureau’s Communications Directorate and consisted of five elements: (1) direct mail, (2) advertising, (3) promotions and special events, (4) media relations, and (5) partnerships. The Census Bureau conducted PMP activities in three phases (excluding the planning phase): (1) education, (2) motivation, and (3) nonresponse follow-up.

The education phase, implemented between November 1999 and January 2000, was designed to familiarize the public with the census and educate it about its purposes. Included were national television, radio, newspaper, and magazine advertising aimed at those target audiences that were least likely to respond.

The motivation phase was launched in January and concluded in April 2000. It utilized English and non-English print and broadcast media, as well as the Internet, to motivate the population to participate in Census 2000. The primary message was “This is your future. Don’t leave it blank.” (see Table 4-3 for additional population-specific taglines).

The nonresponse follow-up communications phase started shortly before the Census Bureau started nonresponse follow-up operations, and it concluded in June 2000. The advertising messages during this phase stressed the importance of cooperating with enumerators and targeted the population through a variety of media, including radio, television, newspapers, and magazines.³⁶

Prior to Census Day, the PMP focused on building awareness that Census Day was approaching and the census product would benefit the community. During the mailout/mailback phase of census questionnaire distribution, the campaign sought to motivate people to return their questionnaires promptly to increase the initial mail response rates. Finally, the PMP encouraged cooperation with census enumerators during the operation that followed up with nonresponding households and reminded people that the census was not over.

DECISION TO USE PAID ADVERTISING

The Census Bureau concluded that the 6-month campaign proposed in the Gilbreath Communications Inc. report was both too long and too expensive. Census Bureau executives decided instead to use a 3- to 4-month campaign that combined public awareness in the months prior to Census Day with motivational messages during the mail return and nonresponse follow-up periods. The estimated cost of the campaign was approximately \$100 million, of which 80 percent to 90 percent was to be earmarked for buying advertising time and space from hundreds of media outlets.

To become informed about the tasks ahead, the Census Bureau studied the advertising campaigns of the U.S. Marine Corps, the National Guard, the U.S. Postal Service, and the U.S. Bureau of Engraving and Printing, among others. In addition, it consulted with the American Association of Advertising Agencies and the Advertising Research Foundation prior to issuing a request for proposals.³⁷

³⁵ For a more detailed account of the provisions of Public Law 105-119 representing the compromise on the sampling issue and the outcome of the court cases pertaining to sampling, see Chapter 11, “Legal Issues.”

³⁶ W. Sherman Edwards and Michael J. Wilson, *Evaluations of the Census 2000 Partnership and Marketing Program*, Census 2000 Topic Report No. 6, TR-6 (Washington, DC: U.S. Census Bureau, 2004), p. 2.

³⁷ U.S. Census Bureau, “Selection of Young & Rubicam and Their Partner Agencies for Census 2000 Advertising Campaign,” October 13, 1999, pp. 2–3.

Acquisition Team

The Census Bureau selected staff with experience in the decennial census, marketing, field operations, and contracting as well as specialists in writing and managing contracts. These staff members came from the Census Bureau, other federal agencies, and the private sector.³⁸

Development of Request for Proposals

The timetable for writing, approving, and issuing the final request for proposals (RFP) was as follows:

- November 22, 1996—The notice of a draft statement of work was published in the *Commerce Business Daily* and sent to more than 500 prospective bidders nationwide for comment and possible interest.
- December 1996—The draft statement of work was mailed to approximately 500 advertising agencies requesting input prior to the release of the final RFP.
- February 28, 1997—A presolicitation conference was held at Census Bureau headquarters; 245 people representing 159 companies attended.
- May 13, 1997—The RFP was issued.
- June 26, 1997—Proposals were due.³⁹

Selection Process

The Census Bureau organized a group of third-party advisors with expertise in government contracting, advertising, and outreach to minority audiences to assist in the contractor selection process. The advisors were present for the final contractor oral presentations and were briefed by the technical evaluation team.⁴⁰

The Census Bureau used formal procedures for source selection, including the designation of a source selection official and the establishment of a Source Selection Evaluation Board.⁴¹ A Source Selection Plan outlined the entire process used for the acquisition and included technical evaluation, cost evaluation, and acquisition components.⁴² This ensured scrutiny of the acquisition process and recommendations of the cost and technical teams by the Census Bureau.⁴³

The Census Bureau received 11 proposals during the solicitation period and, basing its decision on cost and past performance measures, the technical evaluation team selected four firms to make oral presentations. These were conducted from August 26 through August 29, 1997. Representatives from each firm were allotted 2 hours to present their basic approach to conducting the national campaign by explaining the creative and media plans contained in the technical proposals submitted, addressing the specific tasks to be performed during the campaign, proposing a detailed plan to measure campaign performance and effectiveness through the capture of campaign statistical data, and planned campaign cost containment measures.⁴⁴

³⁸ Ibid., pp. 3–4.

³⁹ U.S. Census Bureau, “Background/History of Contract,” undated, p. 3.

⁴⁰ Eleven technical evaluations were conducted from June 30, 1997, through July 28, 1997. U.S. Census Bureau, “Selection of Young & Rubicam and Their Partner Agencies for Census 2000 Advertising Campaign,” October 13, 1999, pp. 3–4.

⁴¹ See *Commerce Acquisitions Manual: Source Selection Procedures*, Office of Procurement and Management, U.S. Department of Commerce, May 1989.

⁴² The Acquisition Plan was approved by the U.S. Department of Commerce on April 24, 1997. The department’s Contracted Services Review Board approved the Census Bureau’s request to contract for a paid advertising campaign on April 18, 1997.

⁴³ U.S. Census Bureau, “Advertising Services for Census 2000: Acquisitions Plan,” Washington, DC, April 27, 1997.

⁴⁴ U.S. Census Bureau, “Selection of Young & Rubicam and Their Partner Agencies for Census 2000 Advertising Campaign,” October 13, 1999, p. 4.

The representatives were instructed to include in the presentation time a 30-minute question and answer period to explain the benefits of the proposed campaign approach in terms of a realistic return on investment. They were also instructed to present a customized approach to reaching two target groups—single African American and single Hispanic U.S.-born males.

At the conclusion of each presentation, the evaluation team convened to discuss the presentation and to score specific aspects of the proposed campaign. Final cost and technical reports for each were presented to the Source Selection Evaluation Board for review.

The Source Selection Evaluation Board reviewed the reports compiled by the Census Bureau’s advisors following the oral and creative presentations conducted in August 1997. On September 17, 1997, the board recommended awarding the contract to Young & Rubicam Inc (Y&R), and briefed the Census Bureau’s source selection official (Paula Schneider). A legal review to determine if there was adequate support to recommend Y&R in the Source Selection Evaluation Board’s report was concluded on September 23, 1997. The Census Bureau’s source selection official rendered her final decision to select Y&R on September 25, 1997.⁴⁵

YOUNG & RUBICAM (Y&R)

On October 10, 1997, the Census Bureau officially announced the award of the Census 2000 advertising contract to Y&R and a consortium of four partner agencies:⁴⁶

- The Bravo Group (a Y&R subsidiary), with expertise in reaching Hispanic populations.
- Mosaica, succeeded by Kang & Lee,⁴⁷ targeted Asian, emerging European, and Arabic-speaking populations.
- J. Curtis, succeeded by Chisholm-Mingo, targeted African American audiences and emerging African and Caribbean populations.
- A Native American–owned company, g&g, developed advertising for the American Indian and Alaska Native population.⁴⁸

The Census Bureau also contracted with Young & Rubicam of Puerto Rico, a subsidiary of Y&R, to develop and implement the paid advertising campaign for Puerto Rico. Creative concepts and Spanish dialects were tailored for the Puerto Rican culture and language. Young & Rubicam, Miami, conducted the advertising campaign for the Island Areas.⁴⁹

Focus Groups and Market Research

Y&R hired the Maya Group to conduct research that would evaluate the advertising for its ability, across all ethnic target groups, to capture attention, appeal to target audiences, communicate strategic messages, and involve and motivate residents to cooperate in the census process. More than 15 race and ethnic groups were included in the research effort. Individually targeted campaigns focused on American Indians and Alaska Natives, Hispanics, Asians, and African Americans. Another component, “Diverse America,” targeted all U.S. residents 18 years and older who used English-language media. In addition, Y&R researched and reported on a category called “emerging markets,” which consisted of population groups, such as Nigerians, Jamaicans, Ghanaians, and Haitians, that had experienced significant recent growth.

⁴⁵ Ibid., pp. 4–6.

⁴⁶ “Census Bureau Announces Award of Census 2000 Advertising Contract,” U.S. Department of Commerce News, Press Release, CB97–C.26 (Revised), October 10, 1997.

⁴⁷ Kang & Lee was merged with Mosaica; the expanded company took the name of Kang & Lee.

⁴⁸ In addition to partnering with these four firms, Y&R had the most aggressive subcontracting plan for hiring all categories of small, small and disadvantaged, and woman-owned firms, which Y&R estimated to be approximately \$87 million of the advertising contract. Y&R’s goal was to spend 40 percent (\$35 million) of subcontract dollars with small businesses, 32 percent (\$27 million) with small and disadvantaged firms, and 2 percent (\$1.6 million) with woman-owned businesses. Y&R’s plan was approved and praised by the Office of Small and Disadvantaged Business Utilization on September 10, 1997.

⁴⁹ Kenneth Meyer, “Draft Decision Memo for Dr. Prewitt,” undated, and correspondence between Young & Rubicam Inc. and U.S. Census Bureau, June 14, 1999.

The Maya Group conducted qualitative and quantitative research throughout the country in March and April 1999 to test and refine messages for Census 2000. The company recruited more than 1,700 individuals representing the various target markets across the U.S. and the Pacific Island Areas to view and respond to potential print concepts and television ads. Smaller focus group discussions were held following the viewings. While this research revealed a number of barriers to census participation (including confidentiality concerns, language barriers, and mistrust of government), it indicated that one of the Census Bureau's biggest challenges would be to counter the feeling of many participants that the census was not relevant to them or their communities. The solution was for the ads to focus on the benefits of participating in the census for both individual respondents and their communities.⁵⁰

Market Segmentation

Each component of the Census 2000 Partnership and Marketing Program (PMP)—direct mail advertising, partnerships, promotions and special events, media relations, and direct mail—was new, expanded, or significantly modified from 1990. The paid advertising campaign was based on a “likelihood to respond model” of the U.S. population, called the “Likelihood Spectrum.TM” The Likelihood SpectrumTM was an audience segmentation model with specific actions targeted at specific segments of the population. Y&R took as a proxy measure for this likelihood the number of civic activities in which an individual participated: most likely to respond were those participating in five or more civic activities, undecided or passive were those with one to four activities, and least likely were those with no civic activities. For the most-likely-to-respond segment, the approach called for extensive use of the national media. The national media plan was supplemented with additional select national media for the undecided/passive group, including Sunday and late night programming. For the least-likely-to-respond segment, Y&R planned additional advertising, including daytime television and out-of-home advertising.

The Y&R campaign was further segmented by race and ethnic group, in particular targeting traditionally difficult-to-enumerate populations: African Americans, Hispanics, Asians, American Indians/Alaska Natives, and Native Hawaiians and other Pacific Islanders. The primary slogan for the campaign, selected to promote beliefs of personal and community benefits and stimulate return of the census form, was: “This is your future. Don’t leave it blank.” Research had indicated that the benefits message was the most persuasive. There were variations of this slogan for different race and ethnic groups.⁵¹

Although the dress rehearsal was not designed to be a full test of the advertising campaign, it was an opportunity to test creative concepts and review Census Bureau procedures. Upon being awarded the contract, Y&R and its partners immediately began developing the advertising campaign to be tested in the Census 2000 Dress Rehearsal. Building upon the marketing activities of the 1980 and 1990 censuses, the Census 2000 promotion program consisted of direct mail, targeted community outreach, traditional public relations, and special events. The program was more comprehensive and better integrated than previous Census Bureau efforts.⁵²

The Census Bureau selected three sites for the Census 2000 Dress Rehearsal—Sacramento, California; the city of Columbia, South Carolina, and 11 surrounding counties; and the Menominee American Indian Reservation in Wisconsin. The combination of a large urban site, a small

⁵⁰ Young & Rubicam Inc., “Advertising Research,” Vols. 1–3, April 1999; U.S. Census Bureau, “Questions and Answers, Advertising Campaign for Census 2000 for Census 2000 Agency Partners,” 1999; and U.S. Census Monitoring Board, “Report to Congress,” October 1, 1999.

⁵¹ Young & Rubicam Inc., “Technical Proposal,” Vol. No. 1, Response to Solicitation No. 52-SOBC-7-00002, June 26, 1997, pp. 3–12; Young & Rubicam Inc., “Census 2000: National Advertising Strategy Review,” March 19, 1998; and Young & Rubicam Inc., “Overview of Census 2000 Advertising Program,” October 26, 1998.

⁵² W. Sherman Edwards and Michael J. Wilson, *Evaluations of the Census 2000 Partnership and Marketing Program*, Topic Report No. 6, TR-6 (Washington, DC: U.S. Census Bureau, 2004), pp. 1–3.

city-suburban-rural site, and an American Indian Reservation site provided a comprehensive testing environment for refining planned Census 2000 methodology and reflected characteristics the Census Bureau believed would provide a good operational test of Census 2000 procedures and systems.⁵³

The Census Bureau began preparing for the dress rehearsal during the summer of 1996 by working with local officials and community-based organizations in each of the three sites and beginning to plan and build the various infrastructures needed for the dress rehearsal. These activities included refining the geographic database, building and refining the address list, and working with community and tribal organizations to plan outreach and promotion efforts.

The Dress Rehearsal Advertising Campaign

Components of the paid advertising campaign planned for Census 2000 were implemented in all three dress rehearsal sites.⁵⁴ The campaign was designed to increase awareness of the Census 2000 Dress Rehearsal among both the general public and hard-to-reach minority subgroups. The marketing strategy included advertisements delivered through print media, radio, television, out-of-home media (billboards, bus shelters, posters, mobile billboards, and advertisements on shopping carts and in beauty salons, convenience stores, and check-cashing establishments), and a special school-based public information campaign.⁵⁵

Advertising began the first week of March 1998 and continued (for some media) until the last week in June. The Census Bureau contracted with Westat to conduct a telephone survey of residents at these sites by telephone before and after the campaign to measure their awareness of the dress rehearsal. Within each sample household, the person who usually opened the mail for that household was interviewed.

The advertising campaign sought to increase awareness of the dress rehearsal by at least 30 percent—a goal consistent with the results of the 1990 Outreach Evaluation Survey.

Although an evaluation of the campaign concentrated specifically on the efforts of paid advertising for the dress rehearsal, local partnership program activities, and receipt of a prenotice letter, census form, and reminder postcard were designed to enhance awareness. In addition, both before and during the campaign, there was national media coverage of the debate over sampling for Census 2000 (see Chapter 11, “Legal Issues”). This coverage may have increased awareness of the census as well.⁵⁶

Census 2000 Dress Rehearsal Evaluation

The Census Bureau hired Westat to evaluate the dress rehearsal using a pre- and postcampaign survey design to conduct random digit dial (RDD) telephone interviews with households in Sacramento, CA, and the Columbia, SC, metropolitan area. The limited number of households in Menominee, WI, precluded its inclusion in the evaluation.⁵⁷

Precampaign surveys were conducted at both sites in February and March 1998, prior to the major advertising buildup for the dress rehearsal. Westat completed 565 interviews in Sacramento, with a response rate of 25 percent. Westat completed 817 interviews in South Carolina, with a response rate of 28 percent.⁵⁸

⁵³ “CA, WI, SC Selected for Census 2000 Dress Rehearsal,” U.S. Department of Commerce News, Press Release, CB96-O.15, July 29, 1996.

⁵⁴ The Census 2000 Dress Rehearsal’s advertising campaign on the Menominee Indian Reservation was not included in the evaluations of the advertising campaign because of the size of its population.

⁵⁵ U.S. Census Bureau, “Census 2000 Dress Rehearsal Evaluation Summary,” August 1999, pp. 11–12.

⁵⁶ *Ibid.*, pp. 47–52.

⁵⁷ W. Sherman Edwards and Michael J. Wilson, *Evaluations of the Census 2000 Partnership and Marketing Program*, Topic Report No. 6, TR-6 (Washington, DC: U.S. Census Bureau, 2004), pp. 3–4.

⁵⁸ U.S. Census Bureau, “Census 2000 Partnership and Marketing Evaluation-D1,” December 4, 2001, p. 3.

Postcampaign surveys were conducted by Westat from April to June 1998 (after the replacement questionnaire had been mailed⁵⁹) as the advertising campaign was winding down. Westat completed 1,504 interviews in Sacramento, with a 54 percent response rate. Westat completed 1,506 interviews in South Carolina, with a 64 percent response rate.⁶⁰

The evaluation of the advertising campaign at the South Carolina and Sacramento, California, sites found that:

- Advertising increased awareness about the census. In Sacramento, the percent of residents who had seen or heard anything recently about the census rose from 28 percent before the campaign to 80 percent after it. In South Carolina, the percentage increased from 29 percent before the campaign to 89 percent after. This increase in awareness surpassed the 30 percent level set as the goal for the paid advertising campaign.⁶¹
- Awareness was highest among non-Hispanic Whites and those with higher levels of education and income. However, large proportions of targeted groups often coincident with low income and low education individuals and targeted race and ethnic groups were also found to have heard of the campaign.
- Television was the most effective medium, reaching 62 percent of respondents in Sacramento and 68 percent at the South Carolina site. Television also reached larger proportions of each of the targeted subgroups than any other medium.
- Among media other than television, magazines were the least effective, reaching 13 percent of the population in Sacramento and 16 percent in South Carolina.
- There was a positive relationship between reported advertising exposure and level of census knowledge, even when controlling for other factors, such as race/ethnicity, income, and education. This relationship was particularly pronounced for populations containing Asians, and Native Hawaiians and Pacific Islanders in Sacramento. However, non-Hispanic Whites continued to have significantly higher levels of census knowledge after the campaign compared to the target race and ethnic groups.
- Level of civic participation and expectation of the form before it arrived were both found to be strongly associated with the likelihood of mailing back the form.⁶²

The dress rehearsal also examined the effectiveness of the Be Counted program (see below), which provided a means for persons to be included in the census who may not have received a census questionnaire, believed they were not included on one, or had no usual address on Census Day at which to be counted.

During the dress rehearsal at the three sites, a total of 2,379 Be Counted forms were returned. Of these, 1,523 were eligible to be included in the census. From these forms, a total of 1,707 persons were enumerated who would not otherwise have been included in the Census 2000 Dress Rehearsal.⁶³

The General Accounting Office also issued a report on the Census 2000 Dress Rehearsal in July 1998. The report indicated that staffing and completion of field operations in the dress rehearsal appeared to have been successful, but that mail response rates remained problematic and local partnerships had limited successes.⁶⁴

⁵⁹ In mailout/mailback areas (see Chapter 5, “Data Collection”), the mail implementation strategy consisted of four items: (1) an advance letter informing households of the census and delivery of the census questionnaire, (2) an initial questionnaire, (3) a reminder postcard, and (4) a replacement questionnaire, which was sent to all addresses in the mailout/mailback universe shortly before Census Day, regardless of whether a household had returned the initial questionnaire or not.

⁶⁰ U.S. Census Bureau, “Census 2000 Partnership and Marketing Evaluation-D1,” December 4, 2001, p. 3.

⁶¹ Factors, other than advertising, may have affected awareness, including mailout of dress rehearsal questionnaires during the awareness period studied.

⁶² Edwards and Wilson and U.S. Census Bureau, “Census 2000 Partnership and Marketing Evaluation-D1,” December 4, 2001.

⁶³ *Ibid.*

⁶⁴ General Accounting Office, “Preliminary Observations on the Results to Date of the Dress Rehearsal and the Census Bureau’s Readiness for 2000,” July 30, 1998.

CENSUS 2000 PAID ADVERTISING

Anticipating that its Census 2000 advertising campaign would be of interest to various media outlets, the Census Bureau held a “launch event” on October 27, 1999, at the Ronald Reagan Building and International Trade Center in Washington, DC. The event offered the media an opportunity to preview the specific elements of the advertising campaign and served to highlight the Census Bureau’s stated commitment to conducting a thorough, fair, and accurate census.

The theme of the event—“Everybody Counts!”—underscored the inclusive nature of the event. Event speakers included then-Secretary of Commerce William Daley; Director of the Census Bureau Kenneth Prewitt; Under Secretary for Economic Affairs Robert Shapiro; Representatives Dan Miller (R-FL) and Carolyn Maloney (D-NY); and Chief of Partnership and Data Services Branch Brenda August. Young & Rubicam (Y&R) gave a video presentation of the advertising campaign, and exhibit booths provided further information on the advertisements and the public relations outreach programs.⁶⁵

Census 2000 Advertising Phases

As noted earlier, the Census Bureau’s integrated marketing strategy for Census 2000 was delivered in three operational phases: (1) education, (2) motivation, and (3) nonresponse follow-up.

The education phase (November 1999 to January 2000) was designed to familiarize some segments of the public with the census and educate them about its purposes. It included national television, radio, newspaper, and magazine advertising aimed at the segment of the general public least likely to respond.

The motivation phase (January to April 2000) utilized English and non-English print and broadcast media, as well as the Internet, to motivate the population to participate in Census 2000. The primary message of this phase was to participate in Census 2000 by mailing back a census form—“This is your future. Don’t leave it blank.”

The nonresponse follow-up phase began shortly before the Census Bureau started nonresponse follow-up operations and concluded in June 2000. The advertising messages during this phase stressed the importance of cooperating with enumerators and targeted the population through radio and television advertising.⁶⁶

Media Buying Strategy

Y&R targeted general and specific non-English speaking and hard-to-enumerate populations in its media-buying strategy.⁶⁷

The strategy exposed all segments of the population to Census 2000 advertising during a three-stage campaign. The first stage, conducted between November 1999 and January 2000, served to educate the public about the importance of the coming census and to prepare the population for the questionnaire mailout. The second stage, conducted between late February and the end of March 2000, reminded households to return their questionnaires, reinforced previous messages concerning the importance of census participation, and made households aware that nonresponse follow-up operations would seek completed questionnaires from nonrespondent households. The final stage, which concluded in June 2000, coincided with the beginning and end of nonresponse follow-up operations.⁶⁸

⁶⁵ “Census 2000 to Launch Largest-Ever Outreach Campaign,” U.S. Department of Commerce News, Press Release, CB99-CN.52, October 25, 1999.

⁶⁶ W. Sherman Edwards and Michael J. Wilson, *Evaluations of the Census 2000 Partnership and Marketing Program*, Topic Report No. 6, TR-6 (Washington, DC: U.S. Census Bureau, 2004), p. 2.

⁶⁷ *Ibid.*, pp. 2–3.

⁶⁸ *Ibid.*

Census 2000 Logo

The Census 2000 logo was chosen following focus-group testing conducted in Charleston, WV, (October 9, 1996) and Baltimore, MD, (October 17, 1996). The logo appeared on all printed Census 2000 advertising, promotional products, and mailings, including the census questionnaires, cover letters, and envelopes.⁶⁹

Variations of the logo also were created for other population groups as specified in Table 4-2.

Table 4-2.
Census 2000 Logos⁷⁰

Product/service	Target audience	Language(s)	Agency primarily responsible
U.S. Census 2000 (red and white)	Diverse America ⁷¹ and African American	English	Y&R
Census 2000 (red and white)	Hispanic (stateside)	English	Bravo Group
Censo 2000 (yellow and black)	Hispanic (Puerto Rico)	Spanish	Y&R Puerto Rico
Census 2000 (circular feather motif; red and black)	American Indian and Alaska Native	English	g&g
U.S. Census 2000 (standard logo with brief in-language definition of the census)	Asian	English logo followed by a statement in at least eight Asian languages.	Kang & Lee
U.S. Census 2000 (standard logo with brief in-language definition of the census)	Polish-, Russian-, and Arabic-speaking	English logo with brief statement underneath in Polish, Arabic, Russian, and other languages as determined.	Kang & Lee

Census 2000 Tagline

Throughout Census 2000, the tagline “This is your future. Don’t leave it blank.” was used for the general advertising campaign. The Census Bureau tweaked the tagline to make it relevant to various target audiences. Similar advertising messages were created for the minority campaigns (see Table 4-3).⁷²

Table 4-3.
Census 2000 Taglines

Slogan	Target audience	Language	Agency primarily responsible
“This is your future. Don’t leave it blank.”	Diverse America	English	Y&R
“This is our future. Make yourself count.”	Hispanic	Spanish	Bravo Group
“Generations are counting on this. Don’t leave it blank.”	American Indian and Alaska Native	English	g&g
“Census 2000. Your answers determine your future. Don’t leave it blank.”	Asian	Chinese, Japanese, Tagalog, Korean, Vietnamese	Kang & Lee
“This is our future. Don’t leave it blank.”	African American	English	Chisholm-Mingo

⁶⁹ U.S. Census Bureau, “United States Census 2000 Style Guide,” 1999.

⁷⁰ Ibid.

⁷¹ Referred to all audiences that consumed English-language media.

⁷² Research indicated that one of these six languages was spoken well enough in 99 percent of the households to avoid linguistically isolating respondents.

Table 4-3.
Census 2000 Taglines—Con.

Slogan	Target audience	Language	Agency primarily responsible
"This is your future. Make yourself count." ⁷³	Puerto Rico	Spanish	Y&R Puerto Rico
"This is your future. Don't leave it blank."	Arabic-speaking	Arabic	Kang & Lee
"This is your future. Don't leave it blank."	Polish-speaking	Polish	Kang & Lee
"This is your future. Don't leave it blank."	Russian-speaking	Russian	Kang & Lee

An early education campaign launched in November 1999 targeted households least likely to respond. The message in the early education campaign explained the census's importance to individuals, what it consisted of, and how federal money was allocated according to census figures.

Advertising also was designed to accompany the Census Bureau's nonresponse follow-up operations, using the advertising message: "It's not too late. Cooperate when somebody comes to your door." This campaign targeted geographic areas with the highest rates of nonrespondent households.⁷⁴

Cost of the Media Campaign

Table 4-4 shows the cost of the paid media campaign for Census 2000 subdivided by target market.

Table 4-4.
Paid Media Expenditures for Census 2000 by Target Market⁷⁵

Target market	Expenditure (in dollars)	Percent of total
Diverse America	57,915,896	52.6
African American/Black emerging markets	17,020,901	15.5
Hispanic	18,886,479	17.2
Asian	10,016,100	9.1
Emerging markets	1,508,400	1.4
Hawaii	146,800	0.1
American Indian/Alaska Native	2,803,800	2.5
Puerto Rico	1,298,300	1.2
Island Areas	421,500	0.4
Total	110,018,176	100.0

Table 4-5 summarizes media expenditures by type of medium purchased.

Table 4-5.
Net Expenditures by Media Type⁷⁶

Media type	Total expense (in dollars)	Percent of total expense
National		
Television	53,087,925	48.3
Radio	10,344,852	9.4
Magazines	5,346,265	4.9
Newspapers	3,875,009	3.5

⁷³ The Puerto Rico tagline had been "Don't Leave Your Future Blank." It was changed to "This is your future. Make yourself count." to coincide with the stateside Hispanic tagline.

⁷⁴ U.S. Census Bureau, "Style Guide for Census 2000 Taglines," January 28, 2002, <<http://www.census.gov/dmd/www/tagstyle.html>> (June 9, 2005).

⁷⁵ U.S. Census Bureau, "Total Actualized Net Expenditures—Planned vs. Actual," undated.

⁷⁶ Ibid.

Table 4-5.
Net Expenditures by Media Type⁷⁶—Con.

Media type	Total expense (in dollars)	Percent of total expense
Local		
Television	11,534,063	10.5
Radio	14,628,420	13.3
Magazines.....	179,228	0.2
Newspapers	7,463,003	6.8
Out of home	2,754,330	2.5
Miscellaneous.....	805,081	0.7
Total	110,018,176	100.0

Census 2000 “Fine Arts” Posters

As in past censuses, the Census Bureau printed and distributed a series of “fine arts” posters targeting specific race and ethnic groups. For Census 2000, the Census Bureau’s Race and Ethnic Advisory Committees (REACs) chose artwork from the Smithsonian’s Museum of American Art.⁷⁷

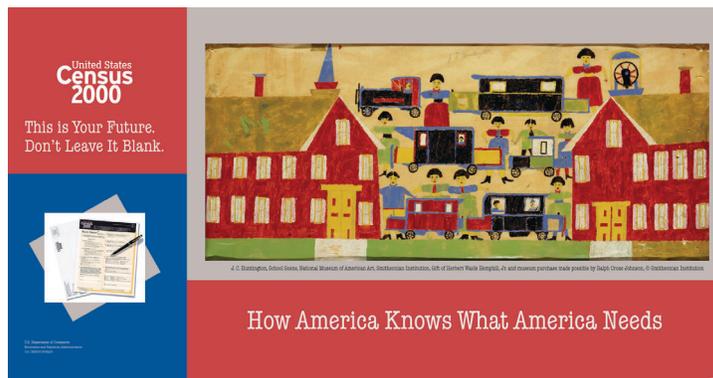
The following 13 fine arts posters, representing specific race, ethnic, and population groups, were printed and distributed to Census 2000 partners. Modified versions of the descriptions that accompany images of the posters on the Census Bureau Web site at <<http://www.census.gov/dmd/www/advposters.html>> also follow. Some poster images are not included below because of usage rights.

▪ **African American: *Family*, by Romare Bearden**

African American artist Romare Bearden was born in North Carolina, raised in Harlem and Pittsburgh, and became an artist after earning a degree in mathematics at New York University. In 1935, he drew political cartoons for the Baltimore *Afro-American*.

During the civil rights movement, Bearden was a social worker in Harlem and encouraged many young Black artists to continue their work. His innovative use of collage earned him numerous awards and honors, including the National Medal of Arts. His own childhood memories inspired *Family*, the collage on wood selected for the Census 2000 poster. The work served as the model for a ceramic tile wall mural for a federal building in Queens, NY.

The U.S. General Services Administration Art-in-Architecture Program transferred this model to the Smithsonian Institution’s National Museum of American Art.⁷⁸



▪ **Rural America: *School Scene*, by J.C. Huntington**

J.C. Huntington reportedly was a retired railroad worker who lived in Sunbury, PA, in the 1920s. *School Scene*, the artwork selected for the Census 2000 poster, was created using enamel paint and pencil on paper. The Smithsonian Institution’s National Museum of American Art obtained this work through a gift of Herbert Waide Hemphill Jr. and a museum purchase made possible by Ralph Cross Johnson.⁷⁹

⁷⁷ Jennifer Marks and Judith Waldrop, e-mail correspondence, U.S. Census Bureau, December 2–3, 2004.

⁷⁸ U.S. Census Bureau, “Census Marketing: Posters,” February 14, 2000, <<http://www.census.gov/dmd/www/advposters.html>> (May 31, 2005).

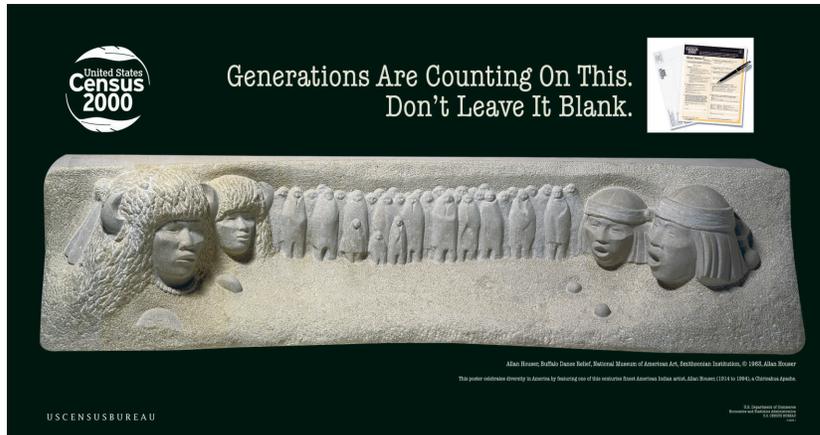
⁷⁹ *Ibid.*

▪ **Public Libraries: *The Library*, by Jacob Lawrence**

Jacob Lawrence is the first African American artist to be inducted into the American Academy of Arts and Letters. Lawrence was born in Atlantic City, NJ. At age 15 he decided to become a painter and attended formal art classes at the 135th Street branch of the New York Public Library.

The Library, the artwork selected for the Census 2000 poster, recalls childhood visits to the public library where Lawrence spent many hours reading, attending performances and lectures, and seeing art exhibitions. Lawrence used the library to conduct research for several of his paintings, including his renowned series *The Migration of the Negro*.

The Library, a tempera on fiberboard, was a gift of S.C. Johnson & Son Inc. to the Smithsonian Institution's National Museum of American Art.⁸⁰



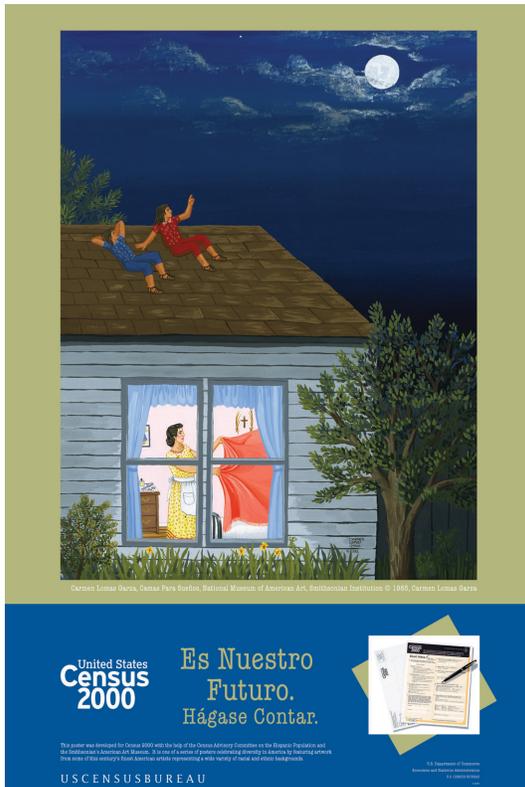
▪ **American Indian: *Buffalo Dance*, by Allan Houser**

Allan Houser, a member of the Chiricahua Apache tribe, was the first Native American to receive the country's highest art award, the National Medal of Arts. Just before his death in 1994, his sculpture of an American Eagle became the first gift crafted by an American Indian given to a foreign head-of-state, the

Emperor of Japan. Houser's work can be seen at the United Nations in New York City, the British Royal Collection, and in countless private, corporate, and museum collections. *Buffalo Dance*, the artwork chosen for the Census 2000 poster, presents costumed dancers and singers performing a New Mexican pueblo ceremony. It was purchased through the Alice Rossin Colquitt Fund, Frank E. Everett, and the Smithsonian Collections Acquisition Program for the Smithsonian Institution's National Museum of American Art.⁸¹

⁸⁰ Ibid.

⁸¹ Ibid.

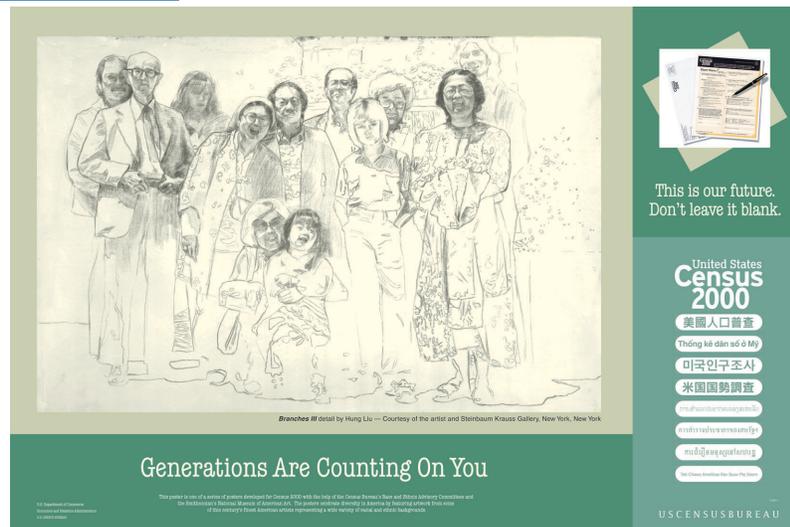


▪ **Hispanic: *Camas para Sueños*, by Carmen Lomas Garza**

Carmen Lomas Garza was a member of the national Hispanic American task force created by the National Endowment for the Arts. She was also a recipient of grants from the National Endowment for the Arts and California Arts Council. Most of her paintings celebrate childhood memories of growing up in Kingsville, TX. The selection for the Census 2000 poster, *Camas para Sueños* or *Beds for Dreams*, was inspired by youthful conversations with her sister and their desire to become artists. This gouache on paper was purchased through the Smithsonian Collections Acquisition Program for the National Museum of American Art.⁸²

▪ **Asian: *Branches III*, by Hung Liu**

Born in China in 1948, Hung Liu was sent to the countryside for “proletarian reeducation” during the Cultural Revolution. After teaching at the Central Academy of Fine Art in Beijing, she was accepted into the Graduate Program in Visual Arts at the University of California. She has taught in the art department at Mills College in Oakland, CA.



Hung Liu is a two-time recipient of a National Endowment for the Arts Painting Fellowship, as well as many other awards. The artwork chosen for the Census 2000 poster, *Branches III*, is the third panel in a triptych (an artwork in three parts). As a whole, this artwork tells the story of an Asian American family over three generations. The third generation is depicted in this final panel. The artwork can be found at the Steinbaum Krauss Gallery in New York City.⁸³

⁸² Ibid.

⁸³ Ibid.



▪ **Alaska Native: *Raven The Creator*, by John Hoover**

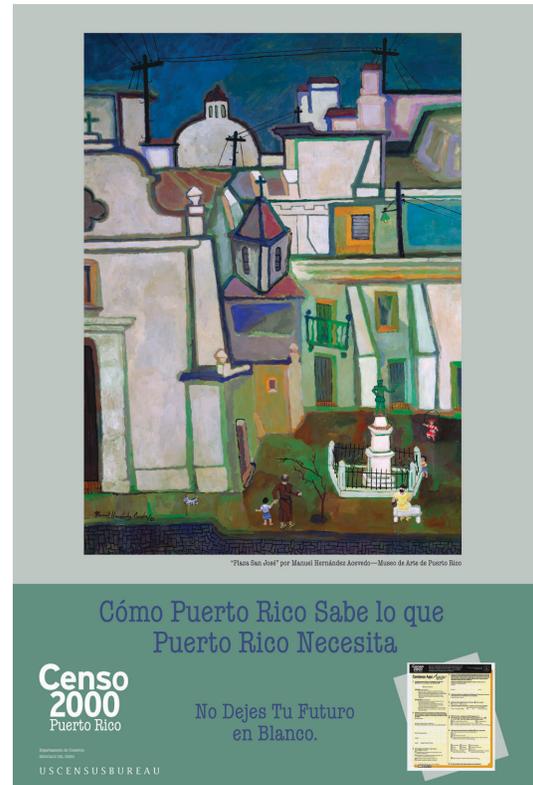
John Hoover, an Aleut, was born in Cordova, AK. While largely self-taught, he has studied art with Leon Derbyshire in Seattle and has exhibited internationally. In the sculpture chosen for the Census 2000 poster, *Raven The Creator*, Hoover has added elements from the different legends about the Raven. Stars dangle from the Raven’s beak, the sun and the moon hang from each wing. The human figures in his claws are formed to resemble the triptych icons used by the Orthodox faithful throughout the Aleut regions. The human face in the belly of the Raven represents Mother Earth. The face at the back of the head of the Raven is symbolic of the many transformations made by Raven. *Raven the Creator* is owned by the Alaska Native Heritage Center in Anchorage.⁸⁴

▪ **Puerto Rico: *Plaza San José*, by Manuel Hernández Acevedo**

Manuel Hernández Acevedo completed his education through the fourth grade and then went to work as a shoemaker, an apprentice sign painter, and cook. While working at the Workshop for Graphic Arts of the Community Education Division for the Department of Public Instruction, he was inspired by other artists at the studio. His favorite scenes were of streets and houses of old San Juan in which the viewer can appreciate strange little details, like fence posts, overhead power wires, and small kites. *Plaza San José*, the artwork selected for the Census 2000 poster, is in the collection of the new Museo de Arte de Puerto Rico in San Juan.⁸⁵

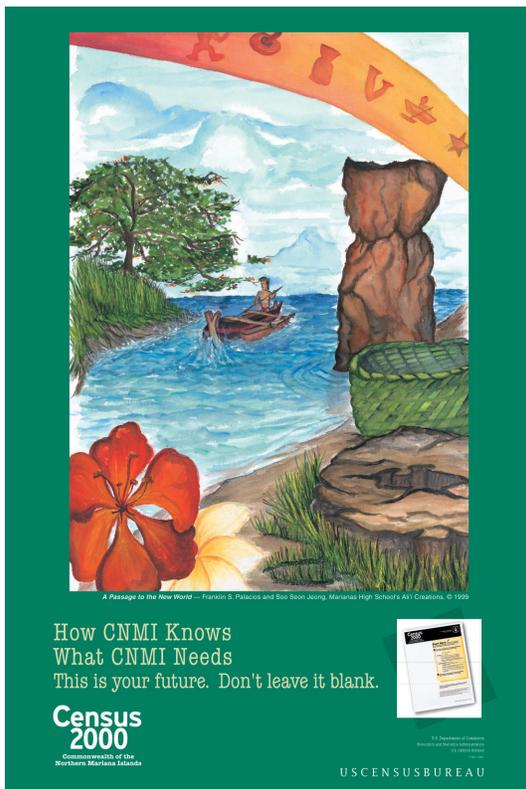
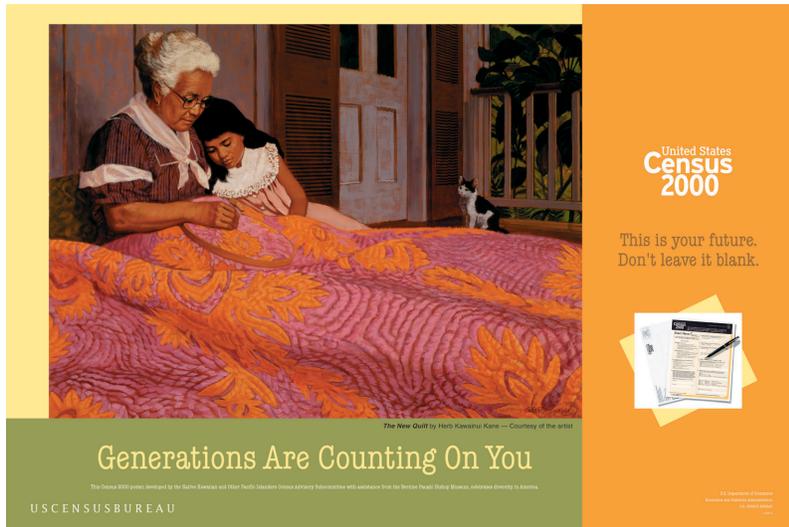
⁸⁴ Ibid.

⁸⁵ Ibid.



▪ **Pacific Islander: *The New Quilt*, by Herb Kawainui Kane**

Herb Kawainui Kane is an artist-historian and author with special interest in Hawaii and the South Pacific. Born in 1928, he was raised in Hawaii (Waipio Valley and Hilo) and in Wisconsin. He holds a master's degree from the Art Institute of Chicago and the University of Chicago. In 1984, he was elected a Living Treasure of Hawaii. In the 1987 "Year of the Hawaiian Celebration," he was one of 16 persons chosen as Pookela (Champion). From 1988 to 1992, he served as a founding trustee of the Native Hawaiian Culture and Arts Program, a federal program at Bishop Museum. He is the 1998 recipient of the Bishop Museum's Charles Reed Bishop Medal. *The New Quilt*, the work selected for a Census 2000 poster, shows traditional Pacific Island quilt making, using a breadfruit design.⁸⁶



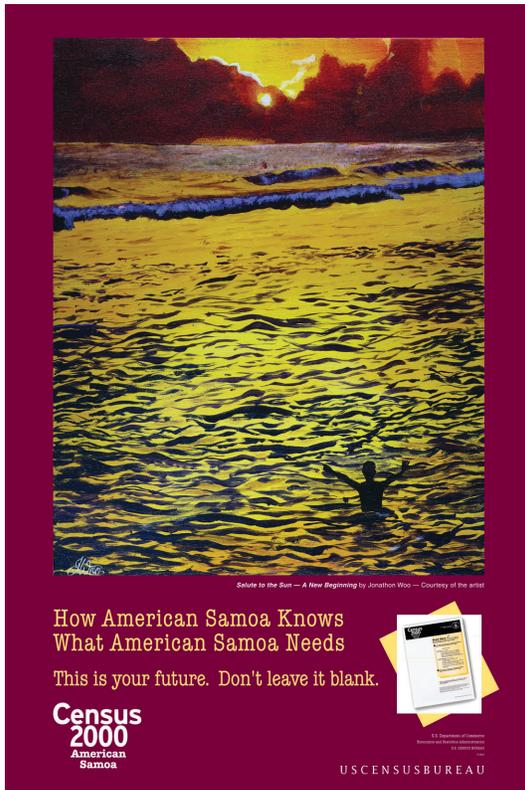
▪ **Northern Mariana Islands: *Passage to the New World*, by Frank S. Palacios and Soo Seon Jeong**

For its Census 2000 poster, the Commonwealth of the Northern Mariana Islands chose artwork by two students from Marianas High School's award-winning art club, Ali'i Creations. In *Passage to the New World*, Franklin S. Palacios and Soo Seon Jeong blend many things unique to the Northern Mariana Islands, including indigenous flowers, the Carolinian canoe, and the Latte Stone. The Carolinian canoe is a tribute to the Carolinian people, who are known for their navigational skills. The Latte Stone represents the Chamoro people, who carve these stones to use as supporting beams for their homes.

Both artists were high school seniors when they collaborated on their pieces. At the time, Soo Seon Jeong intended to travel to Korea and Japan to learn about ancient artists. Frank Palacios planned to continue his art studies in college and develop his own unique style. Their artwork was awarded the Governor's Choice Award in 1999.⁸⁷

⁸⁶ Ibid.

⁸⁷ Ibid.

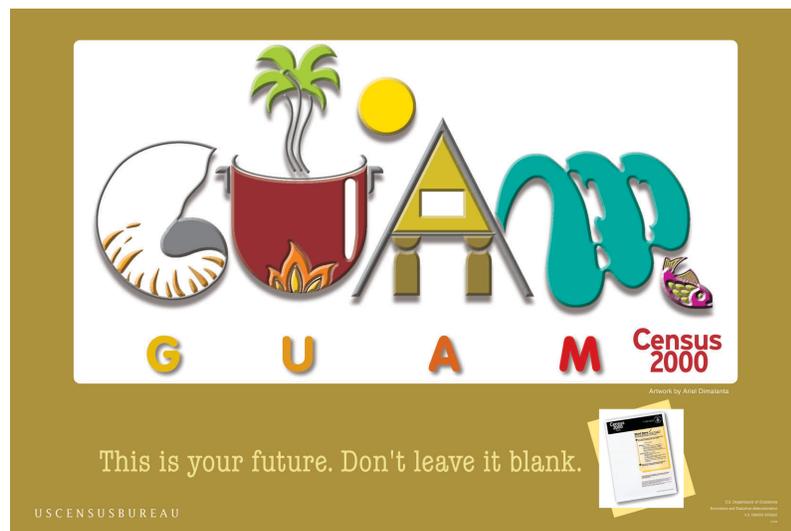


▪ **American Samoa: *Salute to the Sun—A New Beginning*, by Jonathon Woo**

Jonathon Woo was born in American Samoa in 1978. He graduated from the American Samoa Community College in 1999 with an associate arts degree with an emphasis on art. He created *Salute to the Sun—A New Beginning* while he was a student at Arizona State University. He planned to specialize in animation. *Salute to the Sun—A New Beginning* was selected for the Census 2000 poster for American Samoa. It celebrates his homeland as it enters the new millennium.⁸⁸

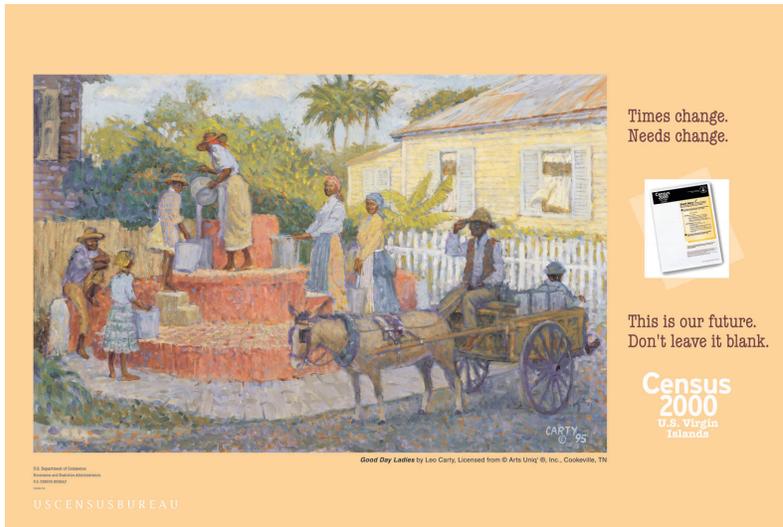
▪ **Guam: *Guam*, by Ariel Dimalanta**

Ariel Dimalanta is an award-winning graphic designer and creative director with more than 25 years of experience. He was born in Tamuning, Guam, raised off-island, schooled in California art colleges, and professionally honed on Guam. He began his career as a graphic artist for the *Pacific Daily News* in 1973. Dimalanta was president and creative director of his own multimedia graphic design company on Guam when his design, *Guam*, was selected for Guam's Census 2000 poster. The artwork is filled with symbols of the islands.⁸⁹



⁸⁸ Ibid.

⁸⁹ Ibid.



▪ **U.S. Virgin Islands:
Good Day Ladies, by
Leo Carty**

Leo Carty thrives on studying the heritage of Black people living in the Virgin Islands and portraying their lifestyles at the turn of the century. Beautiful and historical buildings on the islands provide a rich cultural backdrop for his scenes. The artwork selected for the Census 2000 poster for the Virgin Islands, *Good Day Ladies*, is a good example of Carty's trademark style.⁹⁰

DIRECT MAIL

In developing the direct mail campaign for Census 2000, the Census Bureau was guided by the expertise of the country's direct mail community, which stressed attractive graphics; colors that stood out; clear, crisp language; unique packaging; and research conducted on variants of the 1990 census questionnaire.⁹¹

The 1990 census forms were designed primarily to reduce processing costs. However, because these neglected customer needs, they may have cost the agency in terms of reduced response rates. The development process for Census 2000 forms began in 1991 at the Social and Economic Sciences Research Center (SESRC) at Washington State University. Planners concluded that substituting the user friendly forms could improve overall response rates by about 43 to 76 percent in test situations.⁹²

At SESRC's recommendation, the Census Bureau implemented a program of mailing advance letters, respondent-friendly questionnaires, reminder/thank you postcards, and replacement questionnaires.⁹³ The questionnaire included a statement informing respondents that their responses were required by law.⁹⁴

Census mail pieces, including the advance letter, questionnaire, and reminder postcard, were sent directly to U.S. households to inform them of the upcoming census and to encourage their response. The mail implementation strategy involved multiple contacts and was based on research showing that as the number of contacts increased, so did respondents' willingness to participate. Although not part of the advertising campaign, the mailing pieces were designed to be user-friendly, and they incorporated icons and messages about the benefits of the census that were intended to improve response. Advertisements incorporated images of the questionnaire to increase its familiarity to the public.⁹⁵

⁹⁰ Ibid.

⁹¹ W. Sherman Edwards and Michael J. Wilson, *Evaluations of the Census 2000 Partnership and Marketing Program*, Topic Report No. 6, TR-6 (Washington, DC: U.S. Census Bureau, 2004), pp. 2–3.

⁹² The Social and Economic Sciences Research Center at Washington State University is a provider of survey research services. It is the largest university-based survey research center in the Pacific Northwest and conducts approximately 50 survey-related projects a year, most of which involve mail, telephone, or other self-administered questionnaires.

⁹³ While the Census Bureau wanted to send a targeted second mailing of questionnaire to nonrespondents, this operation was dropped because the direct mail industry could not process the address list fast enough to send them out.

⁹⁴ U.S. Census Bureau, "Decennial Marketing Plan (Draft): How Can Marketing Increase Respondent Cooperation in the Decennial Census and What Are Its Limitations," December 2, 1996, pp. 4–5.

⁹⁵ See research by Two Twelve Associates Inc. and Dr. Don Dillman, Washington State University, described in Chapter 2, "Planning the Census."

PROMOTIONS AND SPECIAL EVENTS

How America Knows What America Needs (HAKWAN)

The How America Knows What America Needs (HAKWAN) promotion was divided into three components. '90 Plus Five challenged the highest elected officials in communities to become participants in the campaign and commit to helping their communities increase initial response rates by 5 percent over the 1990 mailback response rate. Both the Because You Count component and later, Quality Counts, urged communities' highest elected officials to promote cooperation with census takers and explained operational activities that occurred during these phases of the HAKWAN campaign.

To aid HAKWAN participants, the Census Bureau developed a tool kit consisting of materials officials could use to promote the campaign at the grassroots level. The tool kits included such items as media announcements, speech inserts, and "op-ed" articles. Tool kits were updated as needed. A Web site allowed participants to download tool kit materials and receive other information about the progress of Census 2000.⁹⁶

Census 2000 Road Tour

The goals of the Census 2000 Road Tour were to generate local and regional interest, to educate the public about the importance and benefits of census participation, and to garner local press coverage. From February 15 through April 15, 2000, 12 customized Census 2000 mobile headquarters buses toured more than 125 major media markets. Regional directors, headquarters staff, and two contractors (Cohn & Wolfe Public Relations and B.M. Productions) planned the route for each bus through one or two census regions, with stops in key markets and exhibits in such high traffic areas as transit stations, special events, town centers, and malls. The audio and video exhibits focused on the history and importance of the U.S. census. Printed materials were made available for distribution to visitors.⁹⁷

TeamFed

An interdivisional team of Census Bureau staff (organized in February 1999) implemented various programs to generate interagency enthusiasm about the Census 2000 effort. TeamFed identified the following five main areas in which government agencies could help in the Census 2000 campaign:

- Promotion of Census 2000.
- Assistance in recruiting census workers.
- Provision of waivers for income earned from working on the census for those receiving benefits through means-tested programs.
- Provision of space for testing and training.
- Provision of emergency equipment or space support when needed by local census offices.

As a result of a new Clinton administration policy allowing federal employees to work on the Census 2000 campaign in addition to their noncensus federal employment, Commerce Secretary William Daley encouraged the heads of departments and agencies to assist the Census Bureau in recruiting people to work on Census 2000. Federal agencies named a representative (usually from the agency's human resources staff) who helped the Census Bureau's human resources and field offices recruit federal employees for the Census 2000 campaign.

⁹⁶ U.S. Census Bureau, "Census 2000 Public Relations Analysis Report," pp. 21–32.

⁹⁷ U.S. Census Bureau, "Census 2000 Road Tour: Executive Summary," undated (ca. 1999); U.S. Census Bureau, "Regional Partnership Report: Portrait of America," FLD/00-PR2, Washington, DC, March 2001, p. 16.

After naming agency representatives, TeamFed managers created a timeline through April 2000 showing assigned activities to be completed. The Census Bureau provided promotional materials, fact sheets, drop-in articles, and speakers to assist agencies in carrying out these activities and programs.

Working with individual agencies enabled TeamFed to distribute Census 2000 posters, insert relevant information in agency newsletters and paycheck stubs, recruit census workers from within the federal government, and provide waivers for income earned from working for those receiving benefits through means-tested programs.

The Census Bureau also partnered with the U.S. Economics and Statistics Administration (ESA) on some institutional outreach programs. In this arrangement, the Census Bureau's communications directorate took over after the ESA started the programs. President Clinton did his part by delivering a radio address, along with publishing a Census 2000 proclamation. A "Census Day" Congressional Concurrent Resolution was also introduced in the U.S. House of Representatives, with U.S. Senate concurrence.⁹⁸

Census in Schools

Scholastic Inc., under contract to the Census Bureau, designed the Census in Schools project to teach students what a census was and why it was important to participate. It was expected that upon learning about the census, the children would share what they had learned with their parents or caregivers.

Census in Schools packages were sent to nearly 2 million educators by the end of March 2000. Each package contained a hands-on project, which introduced elementary and secondary students in schools across the nation to Census 2000. Also included were a 24-page teaching guide for teachers (*Making Sense of Census 2000*) and a 4-page handout for each student. The teaching guide for Grades K–4, for example, included three lessons for Grades K–2 and three lessons for Grades 3–4. Teaching kits were printed in English, and the take-home activities were available in English, Spanish, Chinese, Vietnamese, Korean, and Tagalog.⁹⁹

In addition to *Making Sense of Census 2000* teaching guides, the Census in Schools program created and distributed 45 million handouts containing census-related activities to elementary and middle school students, and Census 2000 kits were distributed to principals (in the United States, Puerto Rico, and Island Areas), adult education and English as a second language programs, and Head Start centers.

To complement these materials, Census in Schools designated March 13 to 17, 2000, as "Teach Census Week." During that week, Count von Count, from the Public Broadcasting System's *Sesame Street*, appeared at a press conference in Washington, DC, promoting participation in the census. Many schools held Census 2000 rallies, featuring children singing "I Count," the Census 2000 song.¹⁰⁰

Public Service Announcements (PSAs)

Throughout Census 2000, the Census Bureau was challenged with creating new ways to educate the public on the importance of the census and the benefits that participation would mean for communities. Taking into consideration the effectiveness of the paid advertising campaigns used in Census 2000, the Census Bureau wanted to target celebrities who would capture the attention of the public.

⁹⁸ U.S. Census Bureau, "Census 2000 Public Relations Analysis Report," pp. 39–41.

⁹⁹ *Ibid.*, p. 42.

¹⁰⁰ In addition to the national "Teach Census Week" activities, individual school systems organized their own promotional activities. Such activities included the design and placement of a Census 2000 billboard in Pinson, AL, by Rudd Middle School students. (Two students, their principal, and a social studies teacher were promoted as "Census Heroes" by the Secretary of Commerce at the National Press Club in Washington, DC, for their efforts.) Other schools included Census 2000 articles in their student newspapers. Staff from the student newspaper at Choctawhatchee High School, Fort Walton Beach, FL, developed and distributed a Census 2000 newspaper and distributed it to 19,000 kindergarten through sixth-grade students in their community. See U.S. Census Bureau, "Census in Schools Highlights," <<http://www.census.gov/dmd/www/hilites.html>> (November 17, 2005).

Given the widespread popularity and patriotism associated with baseball in the United States, the Census Bureau sought a strategic partnership with Major League Baseball and *Sports Illustrated* to encourage the public's participation in the census. Major League Baseball All-Stars Barry Bonds (San Francisco Giants), Ivan Rodriguez (Texas Rangers), and Derek Jeter (New York Yankees) were chosen because of their "role model" images to deliver a public service announcement (PSA) that appealed to the diverse audience the Census Bureau needed to reach.

The PSAs, which specifically addressed the issue of confidentiality of the census form, were released during the nonresponse follow-up phase of Census 2000 and complemented other out-reach efforts of the campaign that were already underway.

During the Because You Count component of the campaign, media specialists sought assistance from numerous professional athletic teams and sporting venues around the country in promoting Census 2000. Because the program took place during the playoff period for the National Basketball Association and National Hockey League, a number of teams from both leagues agreed to use the PSAs during their series. Each league's flagship stations broadcast the PSAs, dramatically expanding the audience reach.

In addition to PSAs, the Census Bureau developed audio news releases (ANRs) featuring Barry Bonds and Ivan Rodriguez. The ANRs consisted of two separate interviews with each player. The first, done for the '90 Plus Five component, urged the public to fill out and mail back their questionnaires. The second, for the Because You Count component, stressed the importance of cooperating with census takers. The taped interviews were fed via satellite to 3,200 radio stations nationwide and pitched by media specialists to the prospective markets that each player represented.¹⁰¹

MEDIA RELATIONS

In 1990, a traditional public relations effort was conducted from the Census Bureau's headquarters and resulted in approximately 12,000 telephone contacts from various media outlets. For Census 2000, the process was decentralized, with media specialists assigned directly to field offices where they developed relationships with local media outlets and responded to media inquiries.

The Census Bureau recognized that the media could present news stories critical of Census 2000. The agency tried to encourage the media to disseminate several core messages supporting its out-reach efforts. It set up a series of news conferences and other media events in support of public outreach components of the Census 2000 Partnership and Marketing Program, such as How America Knows What America Needs, the Census 2000 Road Tour, and Census in Schools.

The Census Bureau's Public Information Office (PIO) fielded all media inquiries for the duration of Census 2000. The PIO organized numerous media briefings and made the Director of the Census Bureau available at editorial boards in cities throughout the country. The Director also conducted periodic operational briefings to keep the Washington, DC, press corps up to date. Targeted media outreach ensured that the needs of key reporters were met and facilitated strategic story placements.

The daily "clipping" (provided by a private vendor) included print and broadcast media at the national and local levels and enabled the Census Bureau's Decennial Media Relations Team (DMRT¹⁰²) to identify emerging or breaking news stories that should be emphasized or could cause problems. Once these news stories were identified, an appropriate response strategy was developed.

Targeted media opportunities were organized and overseen by the PIO's DMRT in cooperation with field personnel. For each, the Director of the Census Bureau traveled to a target city where he participated in a series of broadcast and print media interviews.

¹⁰¹ Prepared statement of Kenneth Prewitt, Director, U.S. Census Bureau, before the Subcommittee on the Census, Committee on Government Reform, U.S. House of Representatives, March 8, 2000; U.S. Census Bureau, "Census 2000 Public Relations Analysis Report," pp. 45–47.

¹⁰² The DMRT began as an office within the Census 2000 Publicity Office during the planning phase of the census and moved to the PIO for implementation.

DMRT media specialists began by researching the markets to identify media opportunities. Once these were identified, media specialists contacted the various editors and producers to discuss the possibility of an interview with the Census Bureau Director and explain why such an interview would be of interest to their readers/audience. The DMRT media specialists provided the Director with a full briefing on each scheduled interview and developed a profile of the media outlet and program that included information on the topics to be discussed. Scheduling conflicts at the local level as well as with the Director's office made media trips difficult.

When a media event in the field was planned for the director, the regional staffs spent a considerable amount of time assisting with the planning and implementation. Given the already heavy workloads of the regional staff, it was not always easy for the regions to find the manpower and resources necessary to prepare for a trip by the Director.¹⁰³

Operational Press Briefings

With logistical support from Cohn & Wolfe, operational briefings took place every 2 to 3 weeks in Washington, DC. The briefings were simulcast on the Internet and included a 1-800 call-in number for interested reporters outside the Washington, DC, area.¹⁰⁴

Media Education

Ongoing efforts ensured that the media regularly received the information and materials necessary to cover the Census 2000 story accurately and avoid negative news stories based on inaccurate information. Daily monitoring also helped by providing reporters with correct facts and figures.

Analysis of daily news about Census 2000 operations revealed that print media focused on Census 2000 and the apportionment of the U.S. House of Representatives; resource allocation as a result of Census 2000 data; census confidentiality; civic ceremonies related to Census 2000; the unprecedented outreach efforts used during Census 2000. The analysis found that of all print coverage of Census 2000, 69 percent was positive.¹⁰⁵

Media Training

The perceived intrusiveness of the long form elicited questions from Congress and the media. Census Bureau Director Prewitt anticipated that many of the participants would ask about the controversy, and he prepared for answering questions by participating in media training. The training was taped by a film crew. The media trainer posed as a reporter conducting an interview. Following each interview, Director Prewitt and the media trainer critiqued his performance and made necessary adjustments.¹⁰⁶

Media Relations Results

From October 1999 through September 2000, the television and cable broadcast coverage of Census 2000 reached a potential audience of over 220 million.¹⁰⁷ As Table 4-6 illustrates, the amount of print coverage also was impressive when compared to the same time period during the 1990 census.¹⁰⁸

¹⁰³ U.S. Census Bureau, "Census 2000 Public Relations Analysis Report," pp. 48–49.

¹⁰⁴ *Ibid.*, p. 49.

¹⁰⁵ *Ibid.*, p. 50.

¹⁰⁶ *Ibid.* Similar training was made available to Census Bureau employees who frequently communicated with the public and media regarding Census 2000, the Census Bureau, and other agency censuses and surveys.

¹⁰⁷ The Census 2000 public relations campaign culminated with the release of the final response rates on September 19, 2000. The response rates represented the number of housing units that returned a census questionnaire by mail, Internet, telephone, or Be Counted forms.

¹⁰⁸ "Census 2000 Public Relations Analysis Report," p. 53.

Table 4-6.
Comparison of the 1990 Census and Census 2000 News Articles¹⁰⁹

Month	1989/1990	1999/2000
October	791	2,242
November	906	1,898
December	774	2,077
January	1,009	2,484
February	911	2,030
March	1,848	3,721
April	1,535	4,211
May	1,076	1,807
June	1,029	2,020
July	783	1,956
Total	10,662	24,446

COMMUNICATIONS GUIDE

The duration of Census 2000 and its complex nature encouraged the Census Bureau to make sure that all relevant personnel commenting on Census 2000 stayed “on message” throughout the campaign. To do this, the *Census 2000 Communications Guide* was created as a resource for census officials, ensuring “one message” and one voice for all public and media queries, speeches, and talking points at events across the country. It was used by staff and officials at both the Census Bureau and U.S. Department of Commerce to provide succinct, factual statements about Census 2000 processes and the Census Bureau.

The 2000 guide was much more informative than the 1990 version. The *Census 2000 Communications Guide* was distributed to relevant employees at Census Bureau headquarters and field personnel and to the Department of Commerce in April 2000.¹¹⁰

CRISIS COMMUNICATIONS GUIDE

Census 2000 involved the efforts of hundreds of thousands of people across the country. Given the extent of the effort, the Census Bureau required a framework for addressing potential crises. Developing this framework involved designing sets of procedures and guidelines to be followed in relevant situations. The Census Bureau developed two crisis communications manuals—one for field personnel and one for headquarters personnel—that clearly articulated these procedures and guidelines.

The manuals contained all of the necessary information for responding to a crisis. Along with detailed information on how to recognize a crisis and the proper procedures to follow, the guides explained how to respond to the media and listed contact information for Census Bureau personnel who needed to be informed of the situation. Additionally, key personnel in the field and at headquarters underwent crisis training sessions that included a series of mock on-camera interviews. Based on their performance, the trainer recommended ways to improve interview skills.¹¹¹

CENSUS 2000 PARTNERSHIP PROGRAM

History of the Outreach Program

Formal partnerships started with the 1980 census. The thought was to increase communication among local and national organizations and thereby increase the mail response rates (especially for minority populations).

¹⁰⁹ Ibid., p. 60.

¹¹⁰ Ibid., pp. 54–56.

¹¹¹ Ibid., pp. 57–59.

The 1990 census sought to expand on the earlier partnership program by increasing participation among racial, ethnic, and other special populations that had been undercounted in previous censuses. The 1990 program was very successful in terms of interaction with religious organizations and schools during 1990, but less so among other groups, especially those considered hard to enumerate.¹¹²

Program Planning for Census 2000

The Census Bureau held two conferences to explore the extent to which local and national organizations and governments could assist with Census 2000.¹¹³ These conferences were:

- National Conference of Governments on Census 2000¹¹⁴
- National Conference on Census 2000 Partnerships.¹¹⁵

Planning for the Census 2000 Partnership Program included developing a mission statement, goals, and objectives, as well as a detailed plan of action for the program. The intent was to develop an aggressive, comprehensive program that incorporated the assistance and resources of governmental units, community-based organizations, religious groups, and businesses in conducting an efficient and accurate Census 2000.¹¹⁶ The partnership program would work in conjunction with other components of the integrated marketing strategy (paid advertising, direct mail, promotions and special events, and media relations), to increase awareness about Census 2000 and thereby lift response rates, especially in historically undercounted populations.

Because nongovernmental organizations wield substantial influence over significant portions of the population, especially those with local chapters and affiliates, they were tremendous partnership assets.

The national partnerships were designed to encourage and offer guidance to governmental and nongovernmental organizations that sponsored or supported promotional activities. The Census Bureau partnered with major businesses to promote the census.

At the regional level, the partnership program reflected the Census Bureau's belief that the foundation for broad-based participation in the census must be built at the community level. The program's objective in the regions was to establish partnerships with state, local, and tribal governments; community-based organizations; businesses; and the media. This work was carried out by partnership specialists in the 12 Census Bureau regional offices.¹¹⁷

Program Staffing and Responsibilities

Countrywide, the partnership program employed more than 600 partnership specialists skilled in community outreach, communications, grassroots organizing, and media relations.¹¹⁸ The specialists' overall racial and ethnic diversity mirrored the makeup of the country and brought linguistic skills representing 36 languages. The staff worked throughout the country, but concentrated in

¹¹² Marvin D. Raines, "Partnership Program for Census 2000," presentation for an international trip to South Africa, July 2001, p. 3.

¹¹³ *Ibid.*, p. 3.

¹¹⁴ U.S. Census Bureau, "Final Report of the National Conference of Governments on Census 2000," Washington, DC, April 1997.

¹¹⁵ U.S. Census Bureau, "Proceedings of the 1997 National Conference on Census 2000 Partnerships," Washington, DC, May 1997.

¹¹⁶ Marvin D. Raines, "Partnership Program for Census 2000," presentation for an international trip to South Africa, July 2001, p. 4.

¹¹⁷ *Ibid.*, p. 5.

¹¹⁸ All partnership specialists completed a four-stage training process to ensure that they had the information and skills necessary to speak knowledgeably about Census 2000 operations and to negotiate effective partnerships. The topics covered were: (1) The Census Bureau and Regional Office, (2) Building Partnerships—Preparation for Implementation, (3) Negotiation, Intercultural Communication, and Media Relations, and (4) Regional Quarterly Updates.

areas that had historically low response rates during previous censuses. Partnership specialists and administrative support personnel were managed by a team of two partnership coordinators in most of the regions.¹¹⁹

At the regional level, staffing and activities changed according to the Census 2000 Partnership and Marketing Program (PMP) phases of activity as follows:

- **Planning phase (October 1996 to July 1998).** The Census Bureau began by hiring one partnership specialist per region. This specialist established partnerships with state, local, and tribal governments and invited partners to participate in geographic programs, appoint tribal liaisons, establish Complete Count Committees, and appoint governor's liaisons. During this phase, tasks included developing regional partnership plans; identifying new/emerging populations, partners, and community leaders; assisting governments in establishing Complete Count Committees; supporting recruiting efforts; and working with contractors to ensure coordination and integration of Census 2000's marketing strategy.¹²⁰ By the end of the planning phase in July 1998, the agency had hired about 150 full- and part-time partnership staff to cover the entire country.

- **Education phase (August 1998 to December 1999).** By April 1999, the Census Bureau had hired nearly 400 headquarters and regional partnership staffers, including clerical workers and media specialists, as well as partnership coordinators and team leaders to supervise the growing staff. By the end of the education phase, the entire complement of 690 full- and part-time partnership staff was on board at headquarters and throughout the country.

During the education phase, partnership specialists implemented regional plans; established local partnerships; supported regional census center operations; and identified sites for Be Counted and Questionnaire Assistance Centers.¹²¹

- **Motivation phase (January to April 2000).** During this phase, partnership specialists moved from developing awareness to motivating action. As part of their new responsibility, the specialists stressed the benefits and confidentiality of the census; ensured integration between partnerships and operations; and distributed and encouraged use of materials in schools, in religious organizations, and by other partners.¹²²

- **Nonresponse follow-up (NRFU) phase (May to July 2000).** During this final phase, partnership specialists were responsible for motivating nonrespondents in low response areas and encouraging the public's cooperation with enumerators. Following NRFU and the Accuracy and Coverage Evaluation, partnership specialists implemented the "Thank You" campaign.¹²³

At the national (headquarters) level, the Partnership and Data Services Program staff provided administrative and logistical support, oversaw special initiatives and programs, organized conferences and meetings, developed promotional items, and acted as liaisons to the many programs that were part of the Census 2000 integrated marketing strategy (Census 2000 Road Tour, Census in Schools, etc.).¹²⁴

Media Partnership Specialists

Media partnership specialists were key to the media relations component of the integrated marketing strategy. They facilitated positive and educational coverage by electronic and print media and reinforced marketing messages.

¹¹⁹ Marvin D. Raines, "Partnership Program for Census 2000," presentation for an international trip to South Africa, July 2001, p. 5.

¹²⁰ *Ibid.*, pp. 5–6.

¹²¹ *Ibid.*, pp. 6–7; U.S. Census Bureau, "Census 2000 Partnership Debriefing Report: 1996–2000," June 2001, p. 2; U.S. Census Bureau, "Partnership Report 2000," Vol. 1, pp. 8–9; U.S. General Accounting Office, "2000 Census: Review of Partnership Program Highlights Best Practices for Future Operations," GAO-01-579, August 2001, pp. 10–12.

¹²² Marvin D. Raines, "Partnership Program for Census 2000," presentation for an international trip to South Africa, July 2001, p. 7.

¹²³ *Ibid.*

¹²⁴ *Ibid.*, p. 8.

Census 2000 media partnership specialists also coordinated local media, encouraging Census 2000 coverage in the various news media. They coordinated with the Census Bureau's Public Information Office at headquarters on various media projects and responded to media inquiries about Census 2000.¹²⁵

Types of Partners

The Census 2000 Partnership Program worked with federal, local, and tribal governments; public and private businesses; and religious, civic, youth, and trade organizations in support of Census 2000.¹²⁶ Partners assisted with recruiting, promotion, and data collection support.¹²⁷

Types of Partnership Activities

Complete Count Committees. As in 1990, Census 2000 promotion was aided by the creation of hundreds of privately funded Complete Count Committees, which consisted of elected officials, businesses, social service organizations, and community members. These committees were responsible for developing and implementing census awareness programs in particular locations. The committees sponsored promotional events, provided the Census Bureau with testing and training space for enumerators, and worked with local media to publicize census activities.

The Complete Count Committees stressed the importance of responding voluntarily to the census and reminded the community members of the Census Bureau's commitment to data confidentiality. In materials designed to guide the Complete Count Committees, the Census Bureau encouraged localizing the message by identifying federally funded programs that benefitted a committee's particular community and making sure local residents understood that the data used by such programs came from the Census Bureau.¹²⁸

Governor's Liaison Program. The Governor's Liaison Program created partnerships between state governors and the Census Bureau. Each governor appointed a liaison to serve as the point of contact for all Census 2000 activities. The liaison informed the Census Bureau about state issues, helped resolve problems, publicized the census, and in some cases served as a conduit for establishing State Complete Count Committees.¹²⁹

Tribal Government Liaison Program. The Census Bureau invited each federally recognized American Indian tribal government to designate a tribal liaison to assess the Census Bureau's efforts to get an accurate census on reservations and other tribal areas.¹³⁰

Census 2000 and Congregations. The Census Bureau enlisted the support of religious leaders in communities with historically low participation to spread the word to their congregations about the importance of participating in the census. Part of this effort included development of a public outreach campaign in which religious leaders were provided information kits to help them educate their communities and keep them current on census activities. The kits included the "What Congregations Should Know About Census 2000" brochure and a series of weekly announcements and "drop-in" announcements on Census 2000 activities for bulletins and newsletters.¹³¹

¹²⁵ Ibid., p. 9.

¹²⁶ Ibid., pp. 9–10.

¹²⁷ Ibid., pp. 10–11. Partners were asked to assist with recruiting tasks, including the identification of candidates for census jobs, identifying space for testing and training, and posting recruiting information. Partners assisted with promotional activities that included publicizing the importance of the census, dispelling myths and misconceptions about the census, encouraging participation, organizing local committees to target outreach efforts, conducting/sponsoring Census 2000 events, and producing and distributing census promotional materials. Partners provided data collection support by correcting address lists, identifying unusual housing patterns and hard-to-enumerate areas, telling the Census Bureau where to place Be Counted forms, offering/identifying sites for Questionnaire Assistance Centers.

¹²⁸ U.S. Census Bureau, "Partnership Report," Vol. 1, Washington, DC, 2000, p. 4.

¹²⁹ Ibid., p. 4.

¹³⁰ U.S. Census Bureau, "Tribal Government Liaison Program Handbook," April 1999.

¹³¹ Ibid., p. 44.

Questionnaire Assistance Centers. This program assisted people who had questions about completing the questionnaire, who needed language assistance, or who did not receive a questionnaire¹³² (see Chapter 5, “Data Collection”).

Be Counted Program. After the nonresponse follow-up programs of the 1980 and 1990 censuses, the Census Bureau implemented a campaign called “Were You Counted?” This gave people who believed they had not been counted an opportunity to participate in the census. The Were You Counted campaign printed forms in local newspapers and other media. People believing they had not been counted were encouraged to complete and return a Were You Counted form.¹³³

The Census 2000 “Be Counted” campaign was similar to Were You Counted. Although not as widely distributed as the earlier forms, Be Counted forms in English, Spanish, Chinese, Korean, Tagalog, and Vietnamese were available at approximately 85,000 sites and at Questionnaire Assistance Centers. The Census Bureau printed and distributed about 16 million forms in anticipation of having 1 million completed forms returned.

The Census Bureau made the Be Counted forms available on March 31, 2000, and removed them from the sites on April 17, 2000. These dates coincided with Census Day (April 1, 2000) and the start of the nonresponse follow-up operation. Respondents were able to call a Telephone Questionnaire Assistance number and, if they met certain criteria, could provide their short-form data via telephone interview. Respondents who did not know their census IDs (the bar code number on the mailed questionnaires) could request questionnaires, and Be Counted forms would be mailed to them. Forms received from people with no usual residence were tabulated in the service-based enumeration population (see Chapter 5, “Data Collection”).

The Be Counted campaign was considered a success because it enumerated tens of thousands of people who otherwise would have gone uncounted.¹³⁴

Special Initiatives

The Census 2000 Partnership Program undertook a number of “special initiatives” (i.e., supplemental efforts) to support its regional and national programs. Between January and August 2000, it implemented 14 special initiatives to help the regions expand their outreach to hard-to-enumerate populations and increase mail response.¹³⁵

Natural Disasters Special Initiative (Hurricane Floyd/Flooding Component). With assistance from community leaders as well as business leaders and the Federal Emergency Management Agency, the Natural Disasters Special Initiative identified areas where special enumeration procedures were needed in order to reach victims of natural disasters such as hurricanes, floods, and tornadoes.

In support of this effort, the Census Bureau distributed Census 2000 literature kits in English and Spanish to victims in affected areas, recruited local officials and celebrities, and offered a toll-free telephone number to the regional census center that residents could call to learn more about the special enumeration procedures affecting them as a result of a natural disaster in their area.¹³⁶

Large City and State Special Initiative. Between March and June 2000, the Large Cities and States Special Initiative implemented strategies to improve census knowledge in hard-to-enumerate areas in large cities and states. Materials were made available in eight languages—English, Spanish, Hmong, Laotian, Cambodian, Thai, Russian, and Polish.

¹³² U.S. Census Bureau, “Questionnaire Assistance Centers for Census 2000,” Census 2000 Evaluation No. H.4., June 25, 2003, p. ii.

¹³³ The 1980 “Were You Counted?” evaluation estimated that 62,000 forms, enumerating 140,000 persons, were received. Of these, 71,000 were added to the census after unduplication. In 1990, the Census Bureau received about 352,800 forms, from which about 260,000 persons were added to the census.

¹³⁴ For more information, see Nathan Carter, “Be Counted Campaign for Census 2000: Final Report,” Census 2000 Evaluation No. A.3., September 25, 2002.

¹³⁵ U.S. Census Bureau, “Regional Partnership Report: Portrait of America,” FLD/00-PR2, Washington, DC, March 2001, p. 18.

¹³⁶ *Ibid.*, p. 19.

The Census Bureau, in partnership with city and state employee groups, community and religious organizations, Complete Count Committees, homeless advocates and providers, public facilities, and schools, distributed informational and promotional materials aimed at reducing fear and mistrust of the government and its activities in hard-to-enumerate and urban areas.¹³⁷

Texas Colonias Special Initiative. The Census Bureau created the Texas Colonias Special Initiative in an attempt to increase participation among the linguistically isolated communities, known as “colonias,”¹³⁸ in Southeast Texas and New Mexico. The initiative worked with bilingual representatives from the colonias who were familiar with the living structures and language difficulties associated with the colonias. The initiative also sought to respond to the needs of the growing number of immigrants from Central and South America.

The Texas Colonias Special Initiative was conducted during Census 2000’s update/enumerate and update/leave operations. Organizers hired Spanish-speaking facilitators and enumerators and developed “fotonovelas” (Spanish picture books) that were distributed to colonia inhabitants to ease fears and mistrust of the government.¹³⁹

Central and South American Special Initiative. Between March and June 2000, in an effort to increase census participation among the Central and South American populations, the Census Bureau distributed informational and promotional materials addressing that population’s concerns about data confidentiality and severe mistrust of the government.¹⁴⁰

Urban and Rural American Indians and Alaska Natives Special Initiative. The Urban and Rural American Indians and Alaska Natives Special Initiative developed materials that reached, informed, and motivated American Indians and Alaska Natives who were not living on reservations and were neither participating in nor using American Indian/Alaska Native (AIAN) facilities or agencies.

Between February 25 and March 3, 2000, the Census Bureau (in conjunction with 50 partner organizations) produced and distributed posters and flyers and sponsored workshops that addressed AIAN concerns about data confidentiality and general mistrust of the government, confronted the problem of low levels of literacy among off-reservation AIAN populations, and explained the process of completing the questionnaire (with an emphasis on answering the race question and identifying an enrolled tribe).¹⁴¹

Minority Colleges/Universities and Pan-Hellenic Special Initiative. During the Minority Colleges/Universities and Pan-Hellenic Special Initiative, the Census Bureau sought to inform and motivate students of minority colleges and universities as well as faculty and members of eight national Pan-Hellenic organizations (data indicated approximately 2 million college-educated African Americans affiliated with these fraternities and sororities in the Charlotte, NC, and Atlanta, GA, regions) to participate in the census and encourage others to do so. The Census Bureau reached these populations through community advocacy, various broadcast media, promotional products, and program and curriculum development between March and June 2000.¹⁴²

¹³⁷ *Ibid.*, p. 18.

¹³⁸ “Colonia” is a Spanish term for neighborhood or community. In Texas, “colonia” refers to a residential area along the Texas-Mexico border that may lack basic water and sewer systems, electricity, paved roads, and safe and sanitary housing. Colonias can be found in Texas, New Mexico, Arizona, and California, but Texas has both the largest number of colonias and the largest colonia population. Approximately 400,000 Texans live in colonias. Overall, the colonia population is predominately Hispanic; 64.4 percent of all colonia residents and 85 percent of those residents under 18 were born in the United States. There are more than 1,400 Texas colonias, located primarily along the state’s 1,248 mile border with Mexico.

¹³⁹ U.S. Census Bureau, “Regional Partnership Report: Portrait of America,” FLD/00-PR2, Washington, DC, March 2001, p. 18.

¹⁴⁰ *Ibid.*

¹⁴¹ *Ibid.*, p. 21.

¹⁴² *Ibid.*

Joint Disability Special Initiative. The Census Bureau's Joint Disability Special Initiative was implemented, through a number of national, regional, and local partners,¹⁴³ to educate and motivate noninstitutionalized disabled persons in the Philadelphia, PA, region and the visually impaired in the New York, NY, region between January 24 and June 30, 2000. The Census Bureau and its partners developed posters and postcards as well as Braille questionnaire assistance guides that targeted the disabled and visually impaired. This initiative served as a prototype for similar initiatives implemented in Pennsylvania, Delaware, Maryland, New Jersey, and New York.¹⁴⁴

New York City Metro Transit Authority Special Initiative. To motivate residents and commuters in the New York City area, the Census Bureau and Metropolitan Transportation Authority reproduced Census 2000 placards and posters for placement in approximately 4,500 buses and 3,600 subway cars between March 15 and May 15, 2000.¹⁴⁵

African and Caribbean Immigrant Special Initiative. Through a partnership with approximately 450 local affiliates of national African and Caribbean organizations, the Census Bureau developed informational, instructional, and promotional materials along with motivational and confidentiality messages in African and Caribbean languages (Ahmari, Creole, French, and Ghanian). These materials were distributed between March and July 2000.¹⁴⁶

Joint Partnership Special Initiative on Arab Populations. Partnering with national and local organizations, the Census Bureau developed materials that emphasized the civic responsibility of partnerships in the census and attempted to reduce mistrust of government and ease fears about identifying ethnicity within the Arab immigrant population.

In a three-tiered approach to identifying Middle Eastern partners, the process began with an informational letter that was distributed to more than 1,200 Middle Eastern organizations in the Detroit, Los Angeles, Dallas, New York, and Philadelphia metropolitan areas. Those responding to the letter became candidates to be national and state partners. Finally, Middle Eastern media outlets in these regions received radio and television public service announcements, informational literature, and promotional products.

The initiative on Arab populations was conducted between March and July 2000. Materials were distributed in five languages—Arabic, Armenian, Assyrian, Chaldean, and Syriac.¹⁴⁷

Joint Language Diversity Partnership Special Initiative. The Census Bureau's Joint Language Diversity Partnership Special Initiative targeted audiences in the New York and Los Angeles regions for whom no other outreach efforts existed. It served as the template for other regions to use to reach similar populations.

Approximately 27 languages were represented by this special initiative that assisted populations, through adult education services, cultural programs, the media, and the like, between March and June 2000.¹⁴⁸

Faith-Based Program Support Plan Special Initiative. The Faith-Based Program Support Plan Special Initiative developed and distributed promotional items for religious organizations and other places of worship in support of Census Sabbath¹⁴⁹ and other congregational activities.

¹⁴³ Partner organizations for the Joint Disabilities Special Initiative included the American Association for People With Disabilities; American Council for the Blind; Braille Institute; Lighthouse, Inc.; Lions Club; and National Parent Network on Disabilities.

¹⁴⁴ U.S. Census Bureau, "Regional Partnership Report: Portrait of America," FLD/00-PR2, Washington, DC, March 2001, p. 20.

¹⁴⁵ *Ibid.*, p. 18.

¹⁴⁶ *Ibid.*

¹⁴⁷ *Ibid.*

¹⁴⁸ *Ibid.*, p. 21.

¹⁴⁹ Census Sabbath, conducted March 24 to 26, 2000, was an opportunity for congregations to motivate members to participate in Census 2000 and offer help to those needing assistance with their questionnaires.

Thirty-eight national religious organizations, comprising more than 500,000 faith-based organizations, participated in the Faith-Based Support Plan Special Initiative between March and June 2000.¹⁵⁰

Operation RESPOND Special Initiative. This initiative provided support to Complete Count Committees in the Chicago region to fully implement Operation RESPOND (Reaching Every Single Person on the Nation’s Decennial) as a means of raising the mail response rate throughout the three states of Illinois, Indiana, and Wisconsin.¹⁵¹

Support for Partners

The Census 2000 Publicity Office developed a wide variety of support materials for partners, including fact sheets, manuals, posters, videos, newsletters, drop-in news articles, and promotional items.¹⁵²

In-Kind Support

In-kind contributions supported census outreach and promotion efforts with such partners as Complete Count Committees, religious organizations, schools, local and tribal governments, and various community-based organizations.¹⁵³ While the Census Bureau was prohibited from providing direct cash subsidies to its partners, the agency did contribute rented office space, office supplies and equipment, and local media buys in support of the partnership effort. Partner organizations were encouraged to provide similar contributions, including paying for staff time donated by the partners’ employees. Partner organizations’ in-kind contributions to the Census 2000 Partnership Program were estimated to be worth about \$500 million.¹⁵⁴

Thank You Campaign

The Partnership and Data Services headquarters staff coordinated the Census 2000 Thank You Campaign. For the most part, this campaign consisted of approximately 200,000 thank you certificates and a letter from Census Bureau Director Kenneth Prewitt thanking everyone who had participated in making Census 2000 a great success.

Thank you certificates were hand-delivered to many national organizations and companies who made large contributions to the partnership program through their efforts during the census. In addition, regional offices carried out their own thank you campaigns to thank local partners personally for their contributions to a successful Census 2000.¹⁵⁵

Partnership Program Results

The Census Bureau believes that all the efforts introduced during Census 2000, including the Census 2000 Partnership Program, helped to reverse the downward trend of mail response rates. Additionally, the agency has concluded that these programs contributed to reducing the differential undercount in 2000 from 1990 census levels for all historically undercounted population groups (African Americans, Hispanics, Asians, and American Indians). It is hoped that the impact of these actions will be felt in future censuses and surveys.¹⁵⁶

¹⁵⁰ U.S. Census Bureau, “Regional Partnership Report: Portrait of America,” FLD/00-PR2, Washington, DC, March 2001, p. 44.

¹⁵¹ *Ibid.*, p. 15.

¹⁵² Marvin D. Raines, “Partnership Program for Census 2000,” presentation for an international trip to South Africa, July 2001, p. 14.

¹⁵³ *Ibid.*, pp. 14–15.

¹⁵⁴ *Ibid.*, p. 14. See also, “Census Ads Hit Broad Target,” *Adtrack (USA Today and Harris Interactive)*, April 24, 2000.

¹⁵⁵ *Ibid.*, p. 15.

¹⁵⁶ *Ibid.*, p. 16.

Impact of the Partnership Program

By Census 2000, the Census Bureau had developed partnerships with more than 141,000 organizations involved in a wide range of activities, from Complete Count Committees to community-based organizations.¹⁵⁷

The Census 2000 Partnership Program was the most aggressive, innovative, and inclusive program of its kind in government history. It engaged partners and stakeholders, was customized and localized to address the concerns and challenges of communities “where they were,” and with adequate technology and assistance, took ownership of the census and developed materials and outreach campaigns that program directors felt were the most effective for their constituents.¹⁵⁸

Partnership Program Evaluations

Evaluation of the Census 2000 Partnership and Marketing Campaign. The Census Bureau hired the National Opinion Research Center (NORC) to evaluate the Census 2000 Partnership and Marketing Program by conducting surveys before, during, and after the partnership and paid advertising campaigns had been launched.

The surveys were by telephone and in-person interviews and were oversampled for historically undercounted populations. The survey sample included 10,000 individuals and was conducted during three phases: (1) preadvertising campaign (October to November 1999); (2) during the advertising campaign, prior to mailout (January to March 2000); and (3) during nonresponse follow-up (April to May 2000).¹⁵⁹ Interviews were conducted with the person in each household who generally opened the mail or would have most likely answered the census questionnaire.

The NORC concluded that the Census 2000 Partnership and Marketing Program was generally successful in promoting awareness and intent to participate in the census. NORC also concluded that the program had a limited impact on actual behavior. Nevertheless, NORC recommended that a similar mass media and community-based program be repeated (with some modifications) in 2010.¹⁶⁰

Evaluation of the Survey of Partners. A separate Survey of Partners considered such things as the helpfulness of Census 2000 materials distributed to partners, the types and value of services rendered, and the specific partnership activities conducted.

Data for the evaluation of partners were collected through a self-administered mail survey with a telephone follow-up to a sample consisting of 15,000 organizational partners within federal, state, local, and tribal governments; nongovernmental organizations; media outlets; and businesses.¹⁶¹

RESULTS OF THE CENSUS 2000 PARTNERSHIP AND MARKETING PROGRAM

As noted earlier, the Census Bureau’s goal to halt the decline of the mailback response rate was not only met for Census 2000, it was surpassed. The agency has concluded that the advertising campaign, the public relations effort, and other promotional and community outreach activities made a valuable contribution to increasing the final national mail response rate from 65 percent in 1990 to 67 percent in 2000.¹⁶² More specifically, 13 of the nation’s 15 most populous cities

¹⁵⁷ The numbers of national, state, and local organizations participating in Census 2000 partnerships were as follows: 42,571 community organizations; 32,632 state and local governments; 23,055 businesses; 17,519 religious organizations; 17,375 educational organizations; 1,038 tribal governments; and 6,892 media organizations. See U.S. Census Bureau, “Census 2000 Partnership Debriefing Report: 1996–2000,” June 2001, p. 2.

¹⁵⁸ For more information, see Marvin D. Raines, “Partnership Program for Census 2000,” presentation for an international trip to South Africa, July 2001, p. 17.

¹⁵⁹ *Ibid.*, p. 18.

¹⁶⁰ National Opinion Research Center, “Partnership and Marketing Program Evaluation: Final Report,” July 17, 2002.

¹⁶¹ Marvin D. Raines, “Partnership Program for Census 2000,” presentation for an international trip to South Africa, July 2001, p. 18.

¹⁶² The final national mail response rate was defined as the percentage of housing units that mailed back their questionnaires, filed them over the Internet, completed the form by telephone, or returned a Be Counted form from a Questionnaire Assistance Center, as of December 31, 2000.

equaled or exceeded their 1990 response rates. Fourteen of the 15 most populous counties did the same. Five states and nearly 9,300 other governmental units even surpassed the mark by meeting a Census Bureau challenge to better their 1990 response rates by five or more percentage points.

In addition to the collection of more accurate statistical data as a result of the Census 2000 Partnership and Marketing Program (PMP), field operations also were completed early or on time and for less money than had been budgeted. At the conclusion of Census 2000 operations, a \$305 million surplus was returned to the U.S. Department of Treasury.¹⁶³

Effectiveness of the Integrated Marketing Strategy

By most accounts, Census 2000 was a success. The mail return rate¹⁶⁴ was 74.1 percent, almost identical to that of the 1990 Census, thus ending the declining trend established between 1970 and 1990. The final mail response rate, which includes all mail returns through the end of the year, was 67 percent, well above the expected rate of 61 percent. The nonresponse follow-up effort finished almost 2 weeks ahead of schedule. Finally, in 1990 the net undercount of the U.S. population was estimated at 1.6 percent overall and up to 5 percent for various racial and ethnic groups.¹⁶⁵ Estimates of net coverage for Census 2000 ranged from an overcount of 0.49 percent to an undercount of 0.12 percent. No statistically significant undercount of a racial or ethnic group exceeded 2 percent.¹⁶⁶

PMP evaluation studies were intended to measure the effectiveness of PMP components and activities—to try to attribute the contribution of each to the relative success of Census 2000. The evaluation analysis strategy relied on a simple behavioral model underlying the Young & Rubicam advertising strategy: in order to participate, individuals must first be aware of Census 2000, must have positive attitudes about it, and must be motivated to fill out the Census 2000 form. Attitudes and motivation, in turn, are a function of the information individuals have about the decennial census. The PMP attempted to convey the right message, to the right people, at the right time to convince them to respond to the census.¹⁶⁷

Following the evaluation of the campaign, the Census Bureau drew the following conclusions:¹⁶⁸

- The mandatory notice on the questionnaire's outer envelope had a positive effect on return rates.
- The Census 2000 Partnership Program and the Census in Schools program were relatively successful in reaching out to hard-to-enumerate populations. This was evidenced by the kinds of constituencies active partners reported in the Survey of Partners and by the levels of awareness and use of materials reported in the Census in Schools evaluation survey, although quantifying the program's impact in terms of numbers of individuals reached or increases in participation rates was not possible.
- The campaign dramatically increased awareness of the census among the general population and among certain traditionally hard-to-enumerate race and ethnic groups.
- Print media coverage of Census 2000 was much broader nationally than in 1990 and probably more positive in tone overall.

¹⁶³ U.S. Census Bureau News, "Census 2000 Efficiencies Result in \$305 Million Savings," Press Release CB00-CN.58, September 27, 2000.

¹⁶⁴ A mail return rate is defined as the number of mail returns received before the cutoff date (April 18) for nonresponse follow-up divided by the number of occupied housing units in mailback areas.

¹⁶⁵ W. Sherman Edwards and Michael J. Wilson, *Evaluations of the Census 2000 Partnership and Marketing Program*, Topic Report No. 6, TR-6 (Washington, DC: U.S. Census Bureau, 2004), p. 5.

¹⁶⁶ The Accuracy and Coverage Evaluation (A.C.E.) Revision II is the source of the overcount estimate, while the 0.12 percent undercount estimate comes from demographic analysis. See U.S. Census Bureau, "Technical Assessment of A.C.E. Revision II," March 12, 2003. For a more detailed description of these estimates, see Chapter 10, "Testing, Experimentation, Evaluation, and Coverage Measurement Programs."

¹⁶⁷ W. Sherman Edwards and Michael J. Wilson, *Evaluations of the Census 2000 Partnership and Marketing Program*, Topic Report No. 6, TR-6 (Washington, DC: U.S. Census Bureau, 2004), p. 7.

¹⁶⁸ *Ibid.*, pp. 7–8.

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- Positive attitudes toward the census seemed to increase with participation. The association varied somewhat by race and ethnic group.

The following statements were indirectly supported by the evaluation data or other research as compiled in *Evaluations of the Census 2000 Partnership and Marketing Program*.¹⁶⁹

- Politicians quoted as saying that the long form was an invasion of privacy may have negatively affected return rates for the long form.
- The advance letter probably positively affected response rates.
- The respondent-friendly questionnaire design likely had a positive effect. This effect might have been greater in hard-to-enumerate areas.
- Receipt of the mailout package, particularly the long form, might have increased negative beliefs about the census.
- For the first time in census history, the mail response rate increased over the previous census, from 65 to 67 percent.

At its conclusion, the Census 2000 advertising campaign was ranked as the second most effective campaign of the year according to AdTrack, a *USA Today* consumer poll. The campaign was ranked 53rd in spending among all advertisers for the first half of 2000.¹⁷⁰

InterSurvey/Census Bureau Analysis

Between March 3 and April 13, 2000, Intersurvey surveyed 4,673 households to assess exposure to Census 2000 through advertising, community mobilization, and news stories.¹⁷¹

Intersurvey conducted a second survey, consisting of 1,993 households, during the first week of April 2000 to measure the extent to which the debate over the Census 2000 long-form questionnaire influenced participation.

The Intersurvey evaluation found that:

- Census 2000's promotion and mobilization campaign substantially increased public awareness and knowledge of, and participation in, the census.
- The campaign was particularly effective in the African American and Hispanic communities, as well as in households receiving long-form questionnaires.
- Growing privacy concerns appeared to have had a negative impact on cooperation. Nevertheless, even among those who believed the census was a violation of privacy, people with higher levels of exposure to the Census 2000 marketing campaign were more likely to participate than those concerned about privacy but with a lower level of exposure.
- Public awareness of the controversy over the Census 2000 long-form questionnaire was widespread and may have had an impact on participation.
- Questions on the long-form questionnaire concerning income and physical and mental disabilities were ranked most highly as being too personal for the census to ask, though one-third of the public said that none of the questions on the questionnaire was too personal to ask.¹⁷²

Government Accountability Office's Report

In a report to congressional committees, the U.S. Government Accountability Office (GAO) noted that the Census Bureau's aggressive partnership and marketing campaign was key to the success of Census 2000. Furthermore, according to the GAO, the campaign enabled the Census Bureau to

¹⁶⁹ *Ibid.*, pp. 27–28.

¹⁷⁰ "Census Ads Hit Broad Target," Adtrack (*USA Today* and Harris Interactive), April 24, 2000.

¹⁷¹ Intersurvey, "America's Experience with Census 2000: A Preliminary Report," undated.

¹⁷² *Ibid.*

complete nonresponse follow-up operations more quickly than anticipated because of the higher-than-expected initial mail response rates that reduced the follow-up workload and associated staff requirements and costs of a larger operation.¹⁷³

Gallup Organization/Institute of Social Research at the University of Michigan

The Gallup Organization and the Institute of Social Research at the University of Michigan gathered information on the public's attitudes regarding the census, its uses, trust and privacy issues, the Census Bureau's confidentiality practices, possible data sharing across federal agencies, and finally the willingness to provide social security numbers.

Gallup's telephone surveys of two samples of U.S. households before and after the April 1, 2000, Census Day included: (1) comparisons of the responses to those of similar 1995 and 1996 public surveys commissioned by the Census Bureau to assess long-term attitudinal trends; (2) comparisons between 1999 and 2000 responses examining potential effects the census environment might have had upon public attitudes; and (3) assessment of how exposure to census-related media, as reported by Census 2000 survey respondents, affected their responses. To determine whether attitudes toward the census could be used to predict propensity to respond, the survey requested respondents to provide their addresses. Relationships between respondents' attitudes, demographic information, exposure to census publicity, and response behavior were subsequently determined.

The results of the Gallup Organization's Survey of Privacy Attitudes in 2000 indicated that:

- The public steadily increased its knowledge and awareness of the census, its uses, and laws related to confidentiality practices between 1995 and 2000. The Census 2000 publicity seemed to enhance the public's knowledge of and willingness to cooperate with the census.
- The public's belief that the Census Bureau actually protects data confidentiality had increased, but that the public's trust that the Census Bureau would keep data confidential had not changed, suggesting that census publicity had little or no effect upon public attitudes toward confidentiality.
- There was a small, but statistically significant, decline between 1999 and 2000 in the public's privacy concerns in general. Long-term trends show small increases in public concerns about personal privacy and the loss of control over personal information. The proportion who viewed the census as an invasion of privacy did not change between 1999 and 2000.
- Relationships existed between Census 2000 survey respondents' attitudes and self-reported exposure to census-related media. Those exposed to both positive and negative media were more knowledgeable about the census, considered it more important, and were more likely to endorse an obligation to cooperate with the census than those with no media exposure.

As a result of this evaluation, Gallup and the Institute of Social Research jointly recommended further examination of public attitudes on privacy, confidentiality, and trust in the Census Bureau and more effective tests to address these issues in future publicity efforts.¹⁷⁴

Inspector General's Report

In a September 1999 report, the U.S. Department of Commerce, Office of Inspector General, issued a report following its audit that evaluated the Census Bureau's paid advertising campaign, as well as its partnership program plans, for increasing the mail response rate and reducing the undercount.

¹⁷³ U.S. Government Accountability Office, "2000 Census: Best Practices and Lessons Learned for More Cost-Effective Nonresponse Followup," report to congressional committees, GAO-02-196, February 2002.

¹⁷⁴ Susan Trentham, Laurie Larwood, and Kevin A. Shaw, *Synthesis of Results From the Social Security Number, Privacy Attitudes, and Notification Experiment*, Census 2000 Testing, Experimentation, and Evaluation Program Topic Report (Washington, DC: U.S. Census Bureau, 2003).

The inspector general's report noted that the paid advertising contractor had developed an advertising message that was consistent with the goal of the public awareness campaign. The message was thoroughly researched and tested and met the objectives stated in the contract. The report also noted that the partnership program implemented a comprehensive nationwide program directed at increasing the mail response rate and thereby reducing the undercount. In conclusion, the report "revealed no significant problems, contains no recommendations and requires no action by bureau officials."¹⁷⁵

Monitoring Board's Report

In an April 11, 2001, report to Congress, the Presidential members of the U.S. Census Monitoring Board, though troubled by the continued existence of a differential undercount, especially among minority populations, stated:

[The U.S. Census Bureau Monitoring Board members applaud] . . . the Bureau for the success of Census 2000 and believe that Congress should be pleased with the results of this \$7 billion endeavor. There is no dispute that the Bureau completed the nation's largest peacetime mobilization under budget and on time. Nearly one million persons were hired, 520 temporary local offices were established, an unprecedented paid advertising program was implemented, and more than 140,000 local and national partnerships were formed.¹⁷⁶

EXTERNAL RECOGNITION: AN AWARD-WINNING STRATEGY

Silver Anvil Award of Excellence (Public Relations Society of America)

In March 2001, the Public Relations Society of America selected 87 finalists, including the Census Bureau's How America Knows What America Needs campaign, for its Silver Anvil Competition. The Silver Anvil Competition is the public relations industry's premier awards program.

The Public Relations Society of America presented the Award of Excellence and the Bronze Anvil Award to the Census Bureau for the integrated marketing plan and for two of its components.

David Ogilvy Awards (Advertising Research Foundation)

Young & Rubicam and the Census Bureau were honored as the Grand Winner of the David Ogilvy Research Award for performing the most effective research of all candidates on behalf of the Census 2000 advertising campaign.

Effie Award (American Marketing Association)

The prestigious 2001 Gold Effie Award from the New York American Marketing Association went to Young & Rubicam. Their campaign ("Census 2000. This is your future. Don't leave it blank.") won in the category of government/institutional advertising.

The Effie, introduced by the New York American Marketing Association in 1968, is the only national award that honors creative achievement in meeting and exceeding stated advertising objectives. The results of the 1990 census revealed a significant national population undercount, which the Census Bureau concluded had occurred largely within the nation's multicultural and immigrant populations. Seeking to remedy this for Census 2000, Young & Rubicam developed advertising campaigns to educate and motivate a variety of population groups to participate in Census 2000.

¹⁷⁵ U.S. Department of Commerce, Office of Inspector General, "Public Awareness Campaign Is Meeting Program Objectives," Audit Report No. ESD-11755-9-0001, September 1999.

¹⁷⁶ "U.S. Census Monitoring Board, Presidential Members Report to Congress," April 11, 2001, p. 3.

Telly Awards

Video Zone, part of the Census Bureau's Public Information Office, received three Telly Awards for outstanding video production. The Telly Awards honor excellence in local, regional, and cable TV commercials, as well as nonbroadcast video and TV programming. The three winners produced to support Census 2000 were:

1. *Portrait of America*. Depicted the diversity of America and encouraged participation in Census 2000 as a civic responsibility.
2. *1790: The First Census*. Scenes from the National Archives exhibit on the first census, featuring Paul Revere's entry on the 1790 census schedule, with sound bites from the Census Bureau history staff and other historians.
3. *Science of Quality Counts*. National experts in statistical science explain how the Census Bureau collects and reports quality data. It includes sound bites from former Census Bureau Director Kenneth Prewitt and private-industry statisticians.¹⁷⁷

CONCLUSION

In a March 2001 statement before the Senate Committee on Commerce, Science, and Transportation, Secretary of Commerce Donald L. Evans testified that “the 2000 Census is the most accurate census this nation has ever conducted . . . Census 2000 was an operational success. The Census Bureau met or exceeded its goals . . . This success can be attributed to the Congress' commitment to providing full funding for a number of improvements, including unprecedented outreach programs to groups that historically had the highest undercounts.”

Secretary Evans noted that the multimillion dollar advertising campaign, partnership efforts, Census in Schools program, and development of a user-friendly mailing strategy were responsible for significantly exceeding the expected mail response rate of 61 percent—reaching 65 percent by the start of nonresponse follow-up operations.¹⁷⁸

¹⁷⁷ U.S. Census Bureau, *Census CounterParts*, Vol. 10, No. 5, May 2001, p. 5.

¹⁷⁸ “Prepared statement of Honorable Donald L. Evans, Secretary of Commerce, before the Committee on Commerce, Science, and Transportation, U.S. Senate, March 28, 2001, pp. 1–4.

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Chapter 5: Data Collection

INTRODUCTION

Touted by Secretary of Commerce William Daley as “the largest peacetime mobilization in our nation’s history,” Census 2000 presented the Census Bureau with monumental operational and scientific challenges.¹ Since the United States’ inception in 1787, the nation has continued to grow, and its population has become increasingly diverse. With continued innovation in communications and transportation, technological sophistication has brought complexity as well as convenience to modern life. Throughout U.S. history, however, the fundamental mission of the Census Bureau remains unchanged. The Constitution requires conducting a census every 10 years—the first of these decennial censuses took place in 1790—to determine the apportionment of the seats in the House of Representatives.² Subsequent censuses required delivery of state population counts to the President by December 31 of the census year. By 2000, in addition to its constitutional obligations, the Census Bureau was legally required to provide small-area population data to the legislatures and governors of each state for use in redistricting.³ In order to meet the mounting challenges involved in providing a complete and accurate count of over 281 million residents within 9 months, the Census Bureau implemented an operational plan of which the most expansive and labor-intensive component was field enumeration, more commonly known as the “data collection phase” of census operations.

The Census Bureau used four primary methodologies to collect census data: mailout/mailback, update/leave, update/enumerate, and list/enumerate. The U.S. Postal Service delivered over 92 million Census 2000 questionnaires to approximately 83 percent of the nation’s residences. Respondents were instructed to complete the form and return it by mail. In addition to the questionnaires used in mailout/mailback areas, Census Bureau enumerators personally delivered approximately 22 million questionnaires to homes that did not have house-number, street-name addresses (mostly in rural and remote areas), which represented about 17 percent of the nation’s housing units.⁴ During the update/leave operation used primarily in rural areas, questionnaires with preprinted address labels were hand-delivered to every housing unit on the address list. Existing housing units not listed on the address register also required questionnaires, but these were hand-addressed and added to the address register by the enumerators. For update/enumerate, staff updated the address list and maps during their enumeration rounds in areas where housing units may not have had city-style mailing addresses. Census 2000’s list/enumerate methodology was an all-in-one operation used in sparsely populated areas of the country, including remote Alaskan villages. During this operation, census enumerators canvassed their assigned areas listing addresses within those areas on blank address register pages, locating the addresses on census maps (map spotting), and conducting interviews to collect census information for each address.

The objective of Census 2000 nonresponse follow-up was to obtain completed questionnaires from households in the mailback areas that had not responded by mail, the Internet, or via a Telephone Questionnaire Assistance interview. As the largest and most expensive phase of Census

¹ U.S. Census Bureau, Decennial Media Relations, “Census Bureau Begins to Recruit Hundreds of Thousands of Workers for Census 2000,” *U.S. Census Bureau News*, Press Release CB00-CN.02, January 5, 2000, available online at <http://www.census.gov/Press-Release/www/releases/archives/census_2000/000624.html>. Accessed August 3, 2005.

² It should be noted that while Article 1, Section 2 of the U.S. Constitution requires that a census be conducted, early censuses were conducted by U.S. marshals initially under the direction of the Secretary of State and later of the Secretary of the Interior. It was not until 1902 that the Census Bureau was established as a permanent institution by an act of Congress.

³ See Public Law 94-171, December 23, 1975.

⁴ “Nearly 100 Million Census 2000 Questionnaires in the Mail, Census Workers Delivering the Rest,” *U.S. Census Bureau News*, Press Release CB00-CN.24, March 13, 2000.

2000 operations, the nonresponse follow-up workload contained 42,372,965 housing units representing 35.6 percent of the 119,090,016 housing units in mailback areas eligible for follow-up. During nonresponse follow-up an enumerator interviewed one or more of the members of each household or a knowledgeable proxy respondent to gather information.

To meet the challenges presented by data collection and its requisite quality assurance programs, the Census Bureau built an expansive nationwide infrastructure. Field enumeration required the coordination of 12 regional census centers responsible for overseeing the activities conducted at 520 local census offices and a variety of Be Counted and Questionnaire Assistance Centers.

ORGANIZATION

Census 2000 data collection was the responsibility of the U.S. Census Bureau's Field Division (FLD). The FLD established a hierarchy of offices that were responsible for activities in smaller geographic areas. The FLD delegated tasks to its regional offices, regional census centers, census field offices, local census offices, Accuracy and Coverage Evaluation regional offices, and numerous Be Counted and Questionnaire Assistance Centers located throughout the United States.⁵

Regional Census Centers (RCCs)

To administer the decennial census, the Census Bureau established 12 regional census centers (RCCs) that were separate from the Census Bureau's 12 permanent regional offices (ROs). RCCs were located in Atlanta, Boston, Charlotte, Chicago, Dallas, Denver, Detroit, Kansas City, Los Angeles, New York, Philadelphia, and Seattle (Figure 5-1). These offices, each of which maintained a staff of approximately 135 employees (some of which were from the permanent ROs), were responsible for managing all census field collection operations and address listing through a network of census field offices and local census offices. RCCs also produced address maps and coordinated the Local Update of Census Addresses (LUCA) program.

The regional director headed both the RO and the corresponding RCC. While RO jurisdictions regularly crossed state boundaries in order to serve broad metropolitan areas—except for California, New Jersey, and New York, which were split along county lines—RCC jurisdictions were confined to whole states. Some precensus operations required an RCC to work with agencies that served areas outside the area assigned to it; for these programs, and in agreement with other affected RCCs, the official RCC boundaries were ignored (also see the section below regarding pseudo-LCOs). For Census 2000, responsibility for data collection in Puerto Rico was transferred from the New York RCC to the Boston RCC.⁶

The RCCs officially opened between December 1997 and March 1998. The FLD closed the RCCs as they completed their Census 2000-related map production operations. The process lasted from early September 2001 through early January 2002. When they completed their tasks, permanent Census Bureau staff members who had been assigned to an RCC returned to their respective work units. However, some RCCs retained part of their space for geographic operations, for clean up of residual geographic problems, and for work on Count Question Resolution. The latter activities continued well into 2003.⁷

Accuracy and Coverage Evaluation Regional Offices (ACEROs)

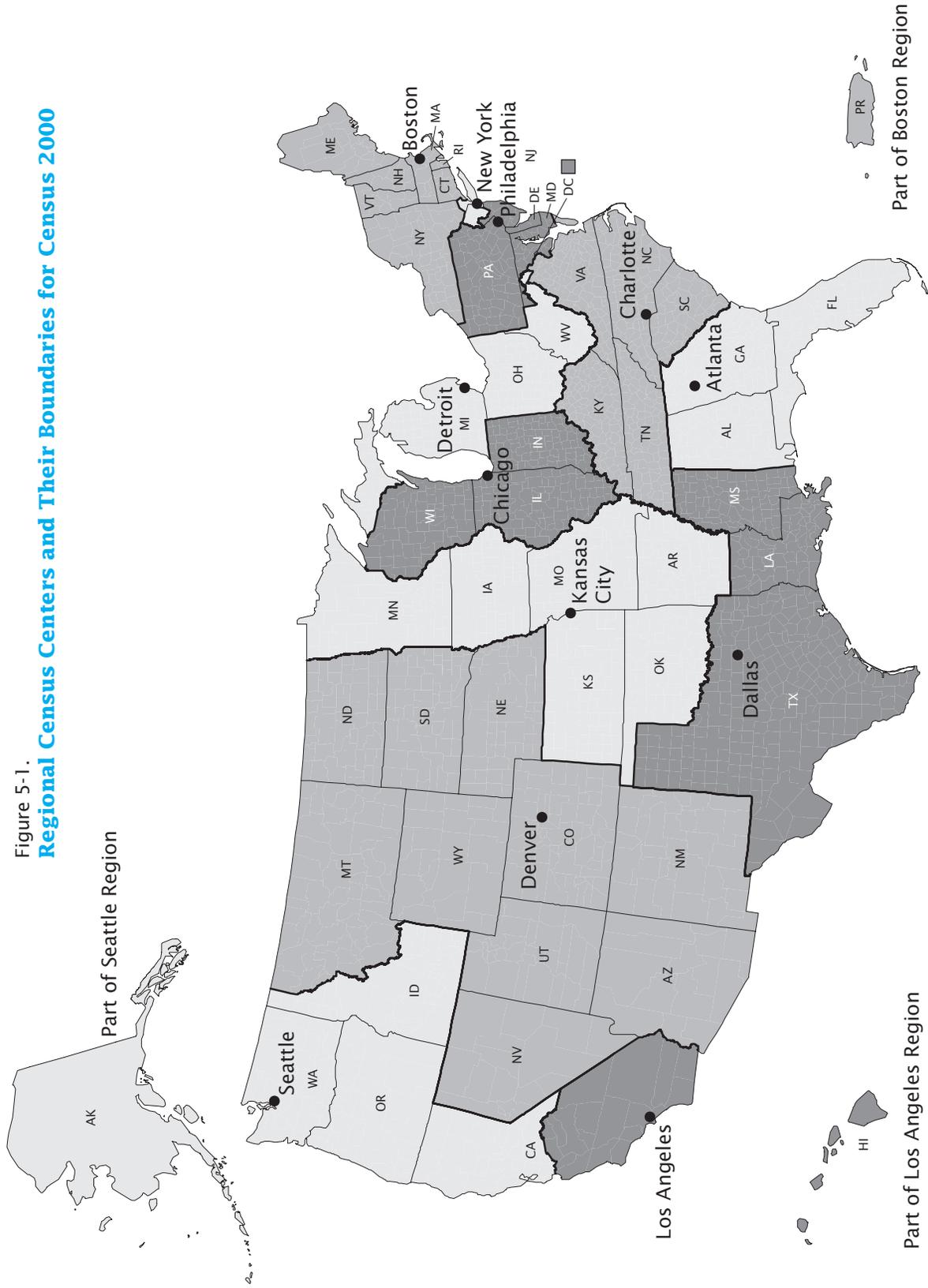
An expansion of field operations for Census 2000 included Accuracy and Coverage Evaluation regional offices (ACEROs). Tasked with completing the necessary data collection for the independent post-enumeration survey, called the Accuracy and Coverage Evaluation (A.C.E.), ACEROs, though independent offices, worked and shared some administrative functions with the RCCs and

⁵ U.S. Department of Commerce, "Census 2000 Operational Plan," DMD/01-1419, December 2000, p. VIII-3.

⁶ Data collection for the U.S. Virgin Islands and the three Pacific island areas (American Samoa, Guam, and the Northern Mariana Islands) was the responsibility of the Decennial Management Division (DMD). For more information on data collection in the Island Areas and Puerto Rico, see Chapter 12, "Puerto Rico and the Island Areas."

⁷ U.S. Census Bureau, "Census 2000 Operational Plan," DMD/01-1419, December 2000, p. VIII-1.

Figure 5-1.
Regional Census Centers and Their Boundaries for Census 2000



were responsible for the same geographic and operations areas. Unlike RCCs, however, data collection efforts conducted by ACEROs were designed to evaluate the overall accuracy and completeness of Census 2000 by measuring the net undercount of the census.⁸

Field Offices

The Census Bureau established three types of offices—census field offices, early local census offices, and local census offices—to undertake several large-scale operations for Census 2000. In addition to these offices, the census of Puerto Rico was managed by a local area office that reported to the Boston RCC, and the census of each of the four major Island Areas was conducted by their governments and reported to Census Bureau headquarters. The FLD delineated, numbered, and entered the geographic coverage of the various offices into the Topologically Integrated Geographic Encoding and Referencing (TIGER®) database.

The TIGER® database contains geographical data on such items as streets, water features, governmental unit boundaries, and census blocks. This database was used to create customized maps used by enumerators, to assign the city-style addresses in the master address file (MAF) to specific census blocks, and to group census blocks into field assignment areas and data tabulation units.

Census field offices (CFOs). The Census Bureau established 402 CFOs—including 24 in Puerto Rico alone—for Census 2000. These small temporary offices, usually occupying about 500 square feet, typically consisted of four employees. CFOs were responsible for the address listing operation performed in areas where living quarters generally did not use house-number, street-name mailing addresses.

Like RCCs, CFOs could cross jurisdictional boundaries. In fact, most CFOs consisted of groups of whole counties. However, a few counties with large workloads⁹ were shared by two CFOs. Of course, a CFO covered only the portion of a county that was address-listed; of the 2,940 U.S. counties that contained types of enumeration areas (TEAs) 2 and 9 (see below), only 898 were listed in their entirety.

Types of Enumeration Areas (TEAs)*

TEA	Enumeration method used	TEA	Enumeration method used
1	Mailout/mailback	6	Military
2	Update/leave	7	Urban update/leave
3	List/enumerate	8	Urban update/enumerate
4	Remote Alaska	9	Additions to update/leave block universe
5	Rural update/enumerate		

*The TIGER® system used the designation “TEAb” to indicate blocks consisting of water area only.

In addition, all 78 municipios in Puerto Rico were listed in their entirety. However, the 11 counties in South Carolina and 1 in Wisconsin listed for the Census 2000 Dress Rehearsal, and the 39 counties listed for the American Community Survey (ACS) test that took place in 1999, were not listed again during the address listing operation, so they were not included in any CFO. CFOs had no geographic or numeric relationship to the subsequent field offices. They were related to their appropriate RCCs by using the RO geographic code plus 30 as a numeric prefix. Initially 402 CFOs were opened between June and September of 1998 to support address listing; these CFOs closed

⁸ U.S. Census Bureau, “Accuracy and Coverage Evaluation of Census 2000: Design and Methodology,” DSSD/03-DM, September 2004, pp. 1-1-6; U.S. Census Bureau, “Local Census Office Manager’s Handbook,” August 16, 1999, pp. 11-61-11-63. For more detail on the A.C.E. and other evaluations of Census 2000, see Chapter 10, “Testing, Experimentation, Evaluation, and Coverage Measurement Programs.”

⁹ The “workload” for a given office was determined by the number of housing units for which that office was responsible for enumeration and other ancillary activities.

in January 1999. An additional 92 urban CFOs were opened between December 1998 and March 1999 to support block canvassing; they were closed in July 1999.¹⁰

Early local census offices (ELCOs). These large temporary offices—about 6,000 to 7,000 square feet—were responsible for conducting some early Census 2000 activities and for establishing a presence in the community. Such early activities included the completion of block canvassing operations to ensure the quality of the MAF for mailout/mailback (MO/MB) areas. ELCOs conducted Waves 3 and 4 of the block canvassing operation and, later, the LUCA Field Verification; both of these took place only in MO/MB areas.

The RCCs delineated 130 ELCOs for the 50 states and the District of Columbia. Most ELCOs covered the TEA 1 portion of one or more counties; however, a few counties with large workloads were shared by two or more ELCOs. Each ELCO was assigned a unique 4-digit code; the first two digits were the standard RCC code, followed by consecutive numbers for the ELCOs, beginning with [XX]01. The first ELCO was opened on October 1, 1998, and the last conversion to an LCO took place in late October 1999.

Local census offices (LCOs). By Census Day (April 1, 2000) the Census Bureau had opened 520 LCOs nationwide. These large temporary offices were responsible for the data collection operations for the census, including update/leave (U/L), update/enumerate (U/E), list/enumerate (L/E), urban update/leave (UU/L), special place and service-based enumeration, nonresponse follow-up (NRFU), and coverage improvement follow-up. The average LCO employed approximately 60 office employees and a large dispersed field staff. Field staffing per office ranged from 600 to 1,000 enumerators based on LCO workload. Each enumerator was assigned an area and a list of addresses to visit during NRFU. Enumerators provided daily progress reports to their crew leaders.¹¹

Most LCOs covered a group of whole counties; however, some highly populated counties were divided into two or more LCOs because of the size of the workload. One LCO covered the Navajo Nation. The FLD established the boundaries of all LCOs in late June 1999, just before the scheduled opening of the first LCO. Census 2000 LCOs were the first Census Bureau field offices that could print their own maps, and the first operation for which they did so was U/L.¹²

Early Census 2000 planning called for a census that incorporated sampling and estimation, along with traditional census-taking methods, to provide its official counts. This plan established boundaries for 467 LCOs in the United States, plus 9 in Puerto Rico. In January 1999, the U.S. Supreme Court ruling against the use of sampling for producing the apportionment count prompted the Census Bureau to revise its plans.¹³ Replacing this plan with one that relied solely on traditional census-taking methods necessitated substantial changes in agency plans. In mid-1999, the Census Bureau redrew the LCO boundaries to establish offices located stateside and in Puerto Rico and the Island Areas, for a total of 520 LCOs. The FLD completed redelineation of the LCOs and gave final approval to the plans reflected in the TIGER® database on June 25, 1999. The FLD assigned each LCO a unique 4-digit code. Like the ELCO codes, the first two digits of an LCO code were the standard RCC code, followed by consecutive numbers for the LCOs, beginning with [XX]01.

The organizational structure of Census 2000 called for six types of LCOs. Each of these was designed to address the specific characteristics of a particular geography type, mail delivery system, and rural- or urban-style addresses, as well as the particular requirements of accurately enumerating widely varying communities. LCOs occupied office space ranging from 6,500 to 10,000

¹⁰ U.S. Department of Commerce, Office of Inspector General, “Bureau of the Census: Local Census Offices Were Successfully Opened, but Some Lessons Can be Learned from Decennial Leasing Operations,” Final Inspection Report No. IPE-11573, September 2000, p. 5; U.S. Census Bureau, “Census 2000 Operational Plan,” DMD/01-1419, December 2000, pp. VIII-1–3. For more information on address listing, see Chapter 8, “Addresses and Questionnaire Printing and Mailing.”

¹¹ On average, a crew leader was responsible for 16 enumerators.

¹² CFOs and ELCOs could not print maps. RCCs provided these offices with the necessary maps.

¹³ For more information on the debate over the use of sampling in Census 2000, see Chapter 11, “Legal Issues.”

square feet, and the types of LCOs varied by the number of housing units for which each was responsible and also by methods of enumerating the population.¹⁴

- **Type A** LCOs were located in inner-city urban areas (TEAs 1, 6, and 7 only) and were responsible for the enumeration of between 121,000 and 285,000 housing units (HUs). Considered by the FLD to be the most difficult of areas to enumerate, Type A LCO enumeration was accomplished primarily through MO/MB. There were, however, small areas enumerated through UU/L.
- **Type B** LCOs were located in urban metropolitan areas (TEAs 1, 6, and 7 only). Like Type A LCOs, Type B LCOs were responsible for some difficult-to-enumerate areas. For the most part, these areas were enumerated through MO/MB, although in some portions the UU/L method was used. These LCOs were responsible for between 300,000 and 335,000 HUs.
- **Type C** LCOs were located in small cities, towns, and rural areas (TEAs 1, 2, 5, 6, 7, 8, and 9). Representing a moderate, or average, challenge to enumerators, Type C LCO enumeration was completed largely through MO/MB and U/L, with some areas where U/E was used. These offices were responsible for between 316,000 and 325,000 HUs.
- **Type D** LCOs were located in more remote rural areas. While enumerators collected data primarily through U/L and L/E, some portions of Type D LCOs were completed through rural update/enumerate.
- **Type E** LCOs were assigned to Puerto Rico (TEA 2 only). Enumeration in Puerto Rico was conducted solely through U/L. These LCOs accounted for between 152,000 and 160,000 HUs. Data collected from Type E LCOs were handled by the RCC in Boston.
- **Type F**, the Anchorage LCO, had its own type designation due to the use of remote Alaska enumeration methodology, which was a modified L/E methodology. The remote procedures were used in the majority of Alaska, excluding southeast Alaska which was mainly completed using the regular L/E procedures.

The following criteria applied to the delineation of LCOs:

- Their boundaries were required to include and follow whole pseudo-tract boundaries.¹⁵ LCO boundaries could not cross state or regional boundaries.
- If appropriate for the type, their boundaries had to conform to the extent of the “blue line” (TEAs 1 and 9).¹⁶
- Each congressional district had to contain at least one LCO.
- LCO boundaries could not split an American Indian reservation (either federal or state) or off-reservation trust land, except where a state line or, for reservations with many widespread discontinuous parcels, a county line was involved (see section below on pseudo-LCOs).
- LCOs had to be geographically compact to the extent possible.
- All parts of an LCO had to be accessible without having to travel through another LCO.
- Office staff had to be able to access any point in the LCO in a “reasonable” amount of time; areal size could not exceed that of the similar type of local offices used for the 1990 census (the district offices, or DOs), enabling the RCCs to duplicate the 1990 DOs where feasible.

Pseudo-LCOs. In addition to the six types of LCOs, the Census Bureau also created administrative areas called “pseudo-LCOs” in order to satisfy two conflicting LCO requirements. It was both more efficient, and administratively more appropriate, for the Census Bureau to enumerate the

¹⁴ U.S. Census Bureau, “Local Census Office Manager’s Handbook,” August 16, 1999, Section D-506, p. 1-19–1-22.

¹⁵ “Pseudo-tracts,” also known as interim tracts, were the geographic boundaries and block numbering areas used in the 1990 census that, with some modification, were again used for Census 2000 operations. For more detail on pseudo-tracts, see Chapter 7, “Census Geography and the Geographic Support System.”

¹⁶ An area “inside the blue line” was one characterized by addresses having a house number, street name (or “city-style”) format. Such addresses were termed “inside the blue line” because blue pencil was used to circumscribe these areas when their boundaries were first drawn for the 1970 census.

land area (reservation and off-reservation trust land) under the authority of each American Indian tribe and the populated portion of each military base under the control of a single LCO. While LCO boundaries for Census 2000 were drawn so that most American Indian reservations and military installations were included within the boundaries of a single LCO, it was not always possible to satisfy these conditions. To resolve this problem, the agency created a pseudo-LCO and assigned a unique LCO code to those portions of land area belonging to either an American Indian reservation or a military installation that extended across state boundaries or were isolated parcels of land too widely dispersed to be included within the boundaries of a single LCO.

Where the area for a tribe or base would normally have been in more than one LCO, the Census Bureau assigned the appropriate territory to a pseudo-LCO and directed the responsible RCC to coordinate administrative activities for the area through one LCO.¹⁷ As a result, every tribe or military base was enumerated entirely by the one main LCO that contained its main area. This honored the Census Bureau's commitment to tribal governments to have each one deal with a single LCO and RCC. For military bases, this arrangement avoided overlaps when an LCO dealt with the military command regarding the enumeration of an on-base population. Census 2000 marked the introduction of pseudo-LCOs.

While pseudo-LCOs were not physical offices, they were part of the LCO coding infrastructure. To identify the special nature of the lands included in pseudo-LCOs, the Census Bureau assigned each pseudo-LCO a unique code whose first two digits were those of the RCC in which the pseudo-LCO was located and whose last two digits were 66 through 89—a range of numbers that allowed an RCC to have up to 24 pseudo-LCOs within its boundaries. The end result was that an LCO could be responsible for enumerating not only the area within its normal boundaries, but also one or more pseudo-LCOs that lay within the boundaries of another RCC and/or LCO. Conversely, some of an RCC's area could include pseudo-LCOs that were enumerated by other LCOs.¹⁸

Office Organization

Regional census centers. RCC staffing consisted of a team of managers, technicians, and other staff required to support LCO activities. Their tasks focused on these five major areas of support: the formation and management of partnerships with local governments, civic and religious groups, business communities, and fraternal, community, and charitable organizations; geographic support; recruiting; automation; and general administrative support. Under the supervision of the regional director and assistant regional census manager, partnership coordinators and partnership specialists established and maintained partnerships with local governments, media, and community organizations. Such partnerships were developed to promote community awareness of and participation in the census throughout the LCO community.

Working with automation technicians and a variety of computer and network specialists, RCC geographic coordinators and geographers provided LCOs with technical assistance on geographic issues such as MAF update and LUCA. In addition to technical assistance, RCC geographic specialists helped LCOs establish, organize, and maintain their map inventories; worked with the U.S. Postal Service to delineate TEAs; coordinated the New Construction program; and worked with the states on redistricting programs. Daily operational needs, such as telecommunications maintenance, human resources management, and clerical support were provided by an administrative supervisor and a number of administrative specialists. Area managers, with technical support from regional tech operations specialists, were responsible for the training and supervision of LCO managers.

Local census offices. The organization of LCOs was divided into five areas of responsibility: management; field operations; recruitment; administration and selection; and automation. The LCO manager, supported by three assistant managers and an automation technician, had ultimate

¹⁷ If the portion of a military base in question was known to be unpopulated, no pseudo-LCO was established.

¹⁸ The FLD delineated 39 pseudo-LCOs, assigned to 25 "parent" LCOs in 9 RCCs; 10 pseudo-LCOs crossed RCC boundaries, affecting 6 RCCs. U.S. Census Bureau, "Local Census Office Manager's Handbook," August 16, 1999, Section D-506, pp. 1-19-1-22.

responsibility for all operations performed by LCO staff, including monitoring the progress and cost of operations, meeting deadlines and data quality standards, and ensuring both the overall security and efficiency of the LCO. Under the supervision of the assistant manager for field operations, field activities were coordinated by field and office operations supervisors. These supervisors were responsible for training and supervising crew leaders who trained, monitored, and coordinated the activities of the enumerators. Enumerators were directly responsible for data collection in the field, visiting housing units and group quarters, and completing census questionnaires. Their efforts, along with other field operations, were supported by clerks responsible for preparing assignments, reviewing and checking in work from the field, and maintaining an inventory of supplies and training materials.

Recruitment for LCOs was the responsibility of the assistant manager for recruiting (AMR). Supported by assistants, clerks, and an office operations supervisor (OOS), the AMR was responsible for overseeing the recruiting and testing of all applicants for census operations. Administrative activities such as payroll, the interviewing and selection of staff, the processing of applications, the maintenance of office and training supplies, and other human resources duties were the responsibility of the assistant manager for administration (AMA) and his or her office operations supervisors and clerks.

LOGISTICS

For the first time since the 1970 census, the Census Bureau partnered with the U.S. General Services Administration (GSA) to lease space, acquire telecommunications services, and obtain much of the required office equipment and supplies for its Census 2000 offices. The Census Bureau and the GSA entered into an agreement, the Joint Venture 2000 partnership, through which the Census Bureau utilized the GSA's Public Buildings Service for space acquisition, its Federal Technology Service to obtain telecommunications services, and its Federal Supply Service to obtain supplies and furniture.

Before 1970, the Census Bureau leased its own space. In 1970, it enlisted the services of the GSA but was critical of the quality of some of the space the GSA obtained. Some offices were reportedly low-grade or were located in unsafe neighborhoods (though this was due partly to the uneven quality of available space at that time). As a result of that experience, the Census Bureau decided to conduct its own space acquisition for the 1980 and 1990 censuses. Due to delays in the Census 2000 budgetary allocations connected with the sampling debate, the Census Bureau was unable to meet its schedule in its leasing preparations. As a result, it was suggested that a partnership be formed between the Census Bureau and the GSA for Census 2000.¹⁹

This partnership was formed and performance measures developed with the involvement of the National Performance Review.²⁰ It allowed the Census Bureau to focus more on its primary mission and provided the GSA with an opportunity to demonstrate its service orientation to a major government client with special needs.

Management and Oversight

The logistics staff for Census 2000 was created by reassigning personnel from within the Census Bureau's Field Division (FLD) and other divisions. The Census Bureau established a Logistics Operation Center within the FLD to monitor, plan, and execute day-to-day logistical operations.

The Logistics Operation Center performed the following functions:

Planning

- Collected, evaluated, documented, and disseminated logistics information.

¹⁹ U.S. Department of Commerce, Office of Inspector General, "Bureau of the Census: Local Census Offices Were Successfully Opened, but Some Lessons Can Be Learned from Decennial Leasing Operations," Final Inspection Report No. IPE-11573, September 2000, pp. 3–4; U.S. Census Bureau, "Memorandum of Understanding, Census/GSA Partnership Project," February 17, 1998.

²⁰ The National Performance Review, later renamed the National Partnership for Reinventing Government, was the Clinton Administration's task force intended to reform major government functions through such initiatives as better customer service, employee empowerment, partnerships, interagency cooperation, and "reinvention."

-
- Tracked material and equipment resources.
 - Provided event-planning assistance.
 - Monitored and provided daily executive summaries of operations throughout the census.

Management

- Developed and implemented logistics procedures.
- Coordinated assistance requests and provided support via a help desk.
- Coordinated all aspects of opening and closing field offices, including scheduling and monitoring using the Census 2000 Logistics Tracking System (see below).
- Published guidance and procedures for RCCs to use during the opening and closing phases of census activities.

Operations

- Coordinated actions with the GSA, National Processing Center (NPC), vendors, and other field operations.

Providing logistical support for the decennial census was a monumental effort necessitating the integration of GSA support operations, equipment and furniture procurements, telecommunications, space acquisitions, internal staff coordination, and NPC operations.

The Logistics Operation Center worked with the GSA and the decennial field offices to track and monitor logistical support. Additionally, the center was the coordinating hub for GSA, NPC, local census office (LCO), census field office (CFO), regional census center (RCC), and headquarters staff for all logistical matters.

Census 2000 Logistics Tracking System

The Census 2000 Logistics Tracking System was a Web-based support tool designed to assist census managers in tracking tasks, materials, and equipment at census offices across the nation, from the offices' opening to shutdown of operations. The system used red, yellow, and green color-coded indicators to identify situations requiring specific management actions.

Included in the Census 2000 Logistics Tracking System was the Trouble Tracking and Reporting System. This system was designed to provide a central help desk to receive, record, and follow up on situations relating to equipment, automation, and supplies that could adversely impact field operations. Reports from the field, uploaded to the GSA on a daily basis, provided the GSA current status reports on facilities and telecom issues. The daily updates between the Census 2000 Logistics Tracking System and the GSA counterpart system ensured that the most current and accurate data were available for FLD management decisions.²¹

Leasing Office Space

The Census Bureau developed a plan to open offices sequentially and have them perform major Census 2000 functions from June 1, 1998, to December 31, 2000. The plan called for opening 520 early local census offices (ELCOs) and LCOs nationwide rather than the 476 offices necessary had sampling been used to complete the census. The opening of offices was completed in two phases, with 130 ELCOs opened by the end of fiscal year (FY) 1998 (Phase 1) and 390 LCOs opened by the end of FY 1999 (Phase 2). The first phase was operated as a trial run to ensure that the Census Bureau–GSA partnership would produce adequate leased space for the required 130 ELCOs within reasonable time and cost objectives. Deeming the first phase a success, the Census Bureau chose to continue the Joint Venture 2000 arrangement with the GSA by authorizing the second phase of leasing.

²¹ The Census 2000 Tracking System also was used to create logistics summaries for presentation to the Census Bureau's executive staff. U.S. Census Bureau, Decennial Logistics Staff, Field Division, "Census 2000 Decennial Logistics Final Report," May 2001, pp. 3–4.

Upon initiating the second phase of the leasing operation, the Census Bureau attempted to standardize the site survey process hoping to obtain leased space at consistently reasonable prices. The GSA first determined the availability of government-owned or already leased space that could be used for census offices. When government-controlled space was not available, the GSA and the Census Bureau jointly identified and acquired available privately owned space. In total, the Census Bureau–GSA partnership resulted in leasing 1,027 offices, totaling 4.5 million square feet of space, across all 50 states and Puerto Rico in support of Census 2000.

Twelve RCCs were opened by March 1998 in the continental U.S., as was an area office in Puerto Rico. Each RCC required a support staff of approximately 135 employees and 14,000 to 26,000 square feet of usable space. There were 494 CFOs opened by March 1999 and closed by August 1999. These offices required about 500 usable square feet of space for four employees. The 520 LCOs were scheduled to open in successive waves beginning in October 1998. Each office, with an office staff of 44, required between 7,000 and 8,500 usable square feet. The Anchorage LCO was the largest, with 10,000 square feet; this was necessitated by the large geographic area for which it was responsible. In addition, there were two supply depots in Juneau and Fairbanks of approximately 1,000 square feet each. The first group of ELCOs, delivered in Phase 1, were smaller—approximately 6,000 square feet; additional space had to be added during Phase 2. Phase 2 saw the scheduled opening of an additional 390 of the larger LCOs beginning in September 1999. Thirteen Accuracy and Coverage Evaluation regional offices (ACEROs) were added to the existing LCOs by September 1999. The ACEROs were approximately 12,000 square feet, while ELCOs were expanded to 7,000 to 8,500 square feet during Phase 2.

Obtaining Furniture, Equipment, and Supplies

The use of vendor-leased equipment and furniture for the LCOs was widely recognized as one of the best practices of Census 2000. Furniture for the 520 LCOs was leased through CORT Furniture, a national furniture-rental company. FLD's logistics staff specified furniture needs and requirements to CORT and the GSA, and CORT synchronized the delivery of furniture to coincide with the setup of the LCO office-automation equipment. The equipment vendor provided technical support and maintenance service throughout Census 2000.²² The following equipment was provided to the census offices:

Office type	Equipment received
Census field offices (CFOs)	Fax machine (1 each) Hand truck (1 each)
Local census offices (LCOs)	Fax machine ²³ (2 each) Photocopier (1 each)* Shredder (1 each) Typewriter (1 each) Postal meter (1 each) Hand truck (1 each)

*Initially, the LCOs received remanufactured photocopiers rated at 50,000 to 80,000 copies per month. As a result of higher than expected breakdown rates, selected LCOs were supplied with a second, new photocopier.

Over the 1-year operating time frame of the LCOs, the cost to rent furniture was nearly identical to the purchase cost. However, when the costs for purchasing and disposing of furniture were considered along with the time needed for administrative, procurement, and disposal activities, renting appeared to be the more advantageous option. At the conclusion of Census 2000 operations, pickup of the leased equipment and furniture was scheduled. This process was relatively quick and without incident, especially when compared with the disposition of government-owned material.

²² Generally, the leased equipment stood up well to the demands of most census operations. However, heavy workloads at peak periods put unexpected stress on copiers and shredders. As a result, the specifications for such equipment may need to be reviewed to determine if more or greater capacity is needed to support the offices in the future.

²³ Instead of business-use fax machines, the LCOs were supplied with lower capacity home-use fax machines. As a result, offices reported frequent problems requiring repair.

Supplies

The procedures for supply support called for the NPC to deliver prepackaged bulk supplies to each office when it opened. Resupply was accomplished by direct delivery from GSA's regional Customer Support Centers (CSCs). The GSA established individual census accounts within its Federal Supply System to support LCO supply requirements. Each LCO was given procedures and a specific listing of supplies it was authorized to order. LCOs requested resupply through their RCC which, in turn, placed the orders with the support CSC.

Census Operational Kits

Between November 1999 and May 2000, the Census Bureau conducted 19 different census operations that required the delivery of 295 different types of operation kits. For each census operation, FLD developed kit specifications that identified the materials to be included in each kit. FLD provided these requirements in a memorandum to NPC, which then keyed this information into its kit specification and scheduling system. The NPC shipped over a million kits to the LCOs.

Administrative Forms and Operational Materials

The Census Bureau printed millions of administrative forms and operational materials for Census 2000. Form quantities were determined by an extensive review of operational workloads, staffing, and administrative requirements. Upon opening, each LCO received an initial supply of administrative materials. Subsequently, preprogrammed resupply deliveries were made to the RCCs and LCOs.²⁴

Disposal of Excess

At the conclusion of Census 2000 field operations, LCOs had large quantities of operational kits and administrative forms that needed to be moved from the leased office space. On average, each LCO shipped approximately 240 boxes containing supplies and other kit materials to the NPC. The NPC sent these supplies to the GSA for resale or disposal, a procedure that was handled as a "business as usual" operation rather than a Census 2000-specific operation.

National Processing Center Support

In preparation for Census 2000, the NPC acquired additional warehouse storage space through a commercial lease. The additional space for decennial operations totaled 396,200 square feet. When added to existing NPC decennial warehouse space, the available storage was 596,200 square feet. The average lease period for warehouse space was 26 months, and the per square foot cost in southern Indiana, NPC's location, was \$3.15.

All incoming materials, forms, envelopes, and supplies to the NPC arrived at the central receiving area. These items were processed and posted to the Oracle Order Entry Inventory, the NPC's inventory management system. The NPC's central shipping office controlled the distribution of materials to the RCCs and LCOs. The NPC shipped more than 60,000 tons of bulk supplies and operational materials between January and May 2000.²⁵

FIELD SAFETY AND SECURITY

The Census Bureau's regional directors had ultimate responsibility for safety and security. As in the 1990 census, the regional director was assisted by the assistant regional census manager, who was operationally responsible for safety and security. Sound procedures outlining the importance of employee personal safety, protection of Title 13 data, and protection of government property played a major role in maintaining a safe and secure environment for office and field

²⁴ For more information on the printing of forms and questionnaires, see Chapter 8, "Addresses and Questionnaire Printing and Mailing."

²⁵ U.S. Census Bureau, Decennial Logistics Staff, Field Division, Census 2000 Decennial Logistics Final Report, May 2001, pp. 8–9.

employees. Managers and supervisors widely publicized the safety program using several media, including U.S. Occupational Safety and Health Administration (OSHA) posters and weekly briefings. They also advised employees to be safety-minded and conscious of their work surroundings at all times.

Census Bureau employees were instructed to report any accident that occurred in connection with their work promptly. Employee reporting instructions and applicable forms were provided in the regional census center (RCC) and local census office (LCO) administrative manuals and employee handbooks. These instructions provided guidance for reporting assaults, threats, personal injuries, personal property claims, third-party claims, and motor vehicle accidents.

Employees were responsible for adhering to safe practices and for promptly reporting accidents and incidents to their supervisors. Employees using their vehicles on official government business were advised to use seat belts and carry adequate liability insurance as well as the necessary amount of insurance for property damage to their own vehicles. Additionally, these employees were required to carry in their cars at all times a supply of Forms SF-91, Motor Vehicle Accident Report, and SF-94, Statement of Witness. Employees were not allowed to carry or have in their vehicles firearms, mace, or other weapons.

Regional Census Centers

Although the assistant regional census manager was responsible for safety and security within the RCC, the administrative area was responsible for the actual day-to-day monitoring, reporting, and follow-up of incidents. Supervisors had the responsibility for the safety education of all employees under their direction and for the reporting of all hazardous conditions found in their units. Office supervisory personnel were responsible for creating a safe environment for all employees by eliminating unsafe conditions and practices. Field supervisors also were responsible for providing guidance to their field staff for claims under the Federal Tort Claims Act.

The administrative supervisor or his or her designee was responsible for inspecting offices, making sure that security signs were in place and visible, the sign-in/sign-out log was maintained, exits monitored, and corrective measures implemented as necessary. Additionally, the administrative supervisor ensured that all safety procedures were followed when swearing in new employees, issuing the appropriate badges, and accounting for badges upon termination of census employment.

Local Census Offices

The LCO manager had primary responsibility for security and safety within the LCO. Any breach of security was reported to the security officer who was designated by the LCO manager. In most offices, the assistant manager for administration was designated as the security officer for all areas, except for the office automation area where the automation technician monitored security.

During Census 2000 operations, the LCOs were visited by observers from Census Bureau headquarters. Whenever possible, visits were scheduled with the field offices in a way that would minimize staff distractions. Only persons wearing proper identification were permitted in the field offices.

Procedures similar to those in the RCCs were followed to ensure that confidential data or census information was protected from unauthorized or inadvertent access. Special sworn status (SSS) individuals were authorized access to Census Bureau work areas containing Title 13 information for official purposes only. Individuals with SSS were paid by a third party and were not considered employees for pay purposes. SSS personnel were appointed and administered the Affidavit of Non-disclosure (using Form BC-1759, Special Sworn Status). The RCC/LCO manuals contained specific procedures for appointing and terminating individuals requiring SSS.

The LCO administrative assistant was responsible for keeping Form D-200, Census Office Employee—Official Credential, in a locked file cabinet or locked desk drawer. This included all D-200 office ID cards issued to observers and visitors, as well as temporary ID cards. The supervisor was responsible for collecting cards from employees at the end of the work assignment and returning them to the administrative assistant.

An employee who reported to work without an ID card was not granted entrance until he or she was identified and signed in. The D-200 form was issued with the current date as the expiration date.

Methods of Security

Security was an ongoing program in the census field offices, with oversight from the headquarters Office of Security. Staff from the Census Bureau's headquarters visited each of the 12 RCCs to provide security awareness training and domestic threat assessments as well as safety and security tips for enumerators. They also conducted a follow-up video conference. Both briefings provided field staff with strategies for addressing a wide variety of security issues. At headquarters, a security duty agent was available 24 hours a day, 7 days a week to provide guidance and direction on security matters.

As a precautionary measure, the Office of Security established a procedure with over 20,000 police departments nationwide to notify RCCs of potential threats to census operations or personnel. Police departments were provided a copy of the Census Bureau's temporary decennial identification badge, the name and telephone number of each regional director, and a U.S. map indicating the location of each RCC.²⁶ Most LCO managers met with the top law enforcement officers in their areas of responsibility and provided facsimiles of Census ID cards and other desired information. The following security measures were taken to provide a safe workplace and protect government and personal property:

Signs. All RCCs and LCOs were given signs²⁷ to be posted in the appropriate places. The signs' directives were to be enforced.

Personal property inspection. The regional directors and assistant regional census managers were authorized to make decisions to inspect personal property should there be any reason to suspect removal of Title 13 data or government property or if there was suspicion of an employee possessing weapons, drugs, or any other prohibited items. A sign was placed at each entrance advising that everyone entering the building (or office) was subject to search.

Government property protection. The Office of Security specified and oversaw the installation and monitoring of intrusion detection systems at the LCOs and RCCs. They also provided guidance and an oversight training video.

The administrative supervisor was responsible for the following:

- Issuing property passes for equipment leaving the premises.
- Preparing a Form CD-50, Personal Property Control, for any equipment going to another office.
- Maintaining an inventory list by serial number of electronic equipment assigned to employees.

Employees were responsible for the following:

- Protecting equipment assigned to them. (Office machines were to be contained in locked storage cabinets or supply rooms when not in use for an extended period of time.)
- Verifying the removal of equipment before a repair person left the office and promptly reporting the loss of any assigned equipment.
- Obtaining advance approval from the regional director for any camera brought into a field office.
- Refraining from personal use of any computer equipment or copying copyright-protected computer software.

²⁶ U.S. Census Bureau, Decennial Payroll/Personnel Staff, "Safety, Accidents, and Injuries: 2000 Decennial Census Branch Report," July 2001.

²⁷ Signs included: "Warning—Government Property," "Visitors Must Register Here," "Restricted Area—Confidential," "Census Operations Area," "Visitors Must Register At Main Entrance," "Restricted Area—Authorized Personnel Only," "Bomb Recognition," "Bomb Checklist," and "Firearms Prohibited."

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- Signing out equipment leaving the premises and obtaining a property pass from the administrative supervisor.

Personal security in the office. To discourage theft, employees were advised to avoid wearing expensive clothes or bringing expensive items into the office, leaving their purses or money in desk drawers when away from work stations, and working after hours in areas that could be unsafe.

Document/software/disk security. Only sworn Census Bureau employees were permitted in areas where address registers and other documents containing confidential information were kept. Disks were stored in locked cabinets.

Security and disposition of confidential material. Information such as applicant, payroll, and address files was stored in a secure location. Disposition of confidential material was in accordance with the RCC administrative manual (D-520, Chapter 20).

AUTOMATION INFRASTRUCTURE

During Census 2000, the Census Bureau made extensive use of computer automation to develop and deploy an advanced telecommunications infrastructure. The automation and telecommunications infrastructure deployed for Census 2000 consisted of several components that can be broadly classified into two categories—data networks and voice and data telecommunications.

The data networks consisted of the Decennial Network Operations Center and local area networks within each local census office (LCO), data capture center (DCC), and regional census center (RCC), as well as the wide area network connections between these components. Using automation software, the data network supported more than 10,000 desktop client systems, over 700 Dell Computer Corporation servers, and 100 servers from Compaq Computer Corporation and Silicon Graphics Incorporated.

Voice and data telecommunications consisted of telephone lines and telephone networks, as well as secure high-speed data lines provided by Government Telecommunications Incorporated and various other contractors and subcontractors. The Census Bureau used a system of frame relay services between LCOs and RCCs to provide both a mechanism for upgrading services and a means for establishing a contingency network if one of the RCCs failed. In addition, a dual system of voice and data lines was established between ROs, RCCs, Accuracy and Coverage Evaluation regional offices (ACEROs), and headquarters, including headquarters buildings in Suitland, MD, and the Bowie Computer Center, to ensure maximum uptime. The use of two separate telephone companies to support data services avoided a single point of failure. The Field Automation Infrastructure Team was responsible for the design, development, and implementation of automation and telecommunications for the RCCs, early local census offices, and LCOs.²⁸

Major Software Systems

Ten major systems were designed to support Census 2000 efforts. Of these, seven were used to support field data collection operations:

- *Geographic Support System (GSS):* This system consisted of the master address file (MAF) and the Topologically Integrated Geographic Encoding and Referencing (TIGER®) database. It provided basic census address lists, maps, and geographic boundary and reference files.
- *Pre-Appointment Management System/Automated Decennial Administrative Management System (PAMS/ADAMS):* This system supported applicant, personnel, and payroll processing.
- *Operations Control System (OCS 2000):* This system controlled and tracked assignments for field office operations.

²⁸ U.S. Census Bureau, Decennial Management Division (DMD), "Census 2000 Field Automation and Telecommunications Infrastructure: Comprehensive Operational Assessment," August 21, 2002, pp. 1–11. The Field Automation Infrastructure Team consisted of members from the Census Bureau's Decennial Systems and Contract Management Office, Decennial Management Division, Field Division, Technologies Management Office, Telecommunications Office, and Financial and Administrative Systems Division.

- *Telephone Questionnaire Assistance/Coverage Edit Follow-Up*: This system handled incoming calls from and outgoing calls to the public and provided for question resolution, data capture, and response to requests for additional forms.
- *Internet Data Collection/Internet Questionnaire Assistance*: This system allowed respondents, on a limited basis, to complete the English-language short form using a special Web site. Internet Questionnaire Assistance allowed Internet users to search for specific or general information on how to complete census questionnaires.
- *Accuracy and Coverage Evaluation (A.C.E.)*: The A.C.E. provided an independent estimate of the number of housing units and persons in order to determine the accuracy of the census count (see Chapter 10, “Testing, Experimentation, Evaluation, and Coverage Measurement Programs”). An independent network system was designed specifically to control and manage A.C.E. field operations.²⁹
- *Management Information System (MIS 2000)*: This system served as the official source of all senior management planning and tracking information, including schedules, performance of divisions and organizations, budget, cost, and progress.

The integration of these systems provided a high degree of automation and organization for the Census 2000 process, while also giving the field offices considerable autonomy in successfully completing their assignments.³⁰

Decennial Field Interface (DFI)

The Decennial Field Interface (DFI) was the framework linking all computer systems used in field data collection and control activities at the LCOs. The DFI consisted of seven key components. In addition to general office support systems (e.g., word processing, spreadsheet, and communications software), Internet and intranet access, and overnight delivery tracking, the DFI provided four applications designed specifically for use in field operations. These consisted of the PAMS/ADAMS, GSS, OCS 2000, and Contact Profile and Usage Management System (CPUMS).³¹

PAMS/ADAMS was the Census 2000 applicant, personnel, and payroll system. It was an automated, enterprise-wide, integrated system that utilized state-of-the-art client server technology to manage widely distributed databases that made information available to RCCs and their associated LCOs. PAMS/ADAMS was composed of administrative management programs that supported applicant tracking and processing, selection records, recruiting reports, personnel and payroll processing, and archiving of historical data.

For 1990 decennial census field operations, the Census Bureau operated separate payroll and personnel systems known respectively as the Decennial Automated Payroll and Personnel System (DAPPS) and the District Office Payroll and Personnel System (DOPPERS). There was also a separate applicant processing and criminal check program called the “Applicant File.” None of these programs was linked to another, and the programs did not share information. Planning for a more integrated system covering payroll and personnel applications, known as the Weekly Regional Automated Personnel and Payroll System (WRAPPS), began in 1992. The purpose of this system was to accommodate an estimated 350,000 temporary census workers to conduct Census 2000 operations. The WRAPPS was intended to be implemented in March 1995 for the test census that year, but did not materialize due to budgetary constraints.

The PAMS/ADAMS project was initiated in 1995 when the Census Bureau’s Administrative Directorate and Field Directorate formed a team of technical and computer system analysts to develop an automated human resources and financial management system for Census 2000 using a commercial off-the-shelf (COTS) software product.³² The system design incorporated the concepts of

²⁹ U.S. Census Bureau, “System Architecture Version 2.0,” 2000, pp. 8-1–8-6.

³⁰ *Ibid.*, pp. 1-1–1-9.

³¹ U.S. Census Bureau, “Local Census Office Manager’s Handbook,” August 16, 1999, p. 4-1.

³² Employees from the Census Bureau’s Decennial Payroll/Personnel Staff and Decennial Administrative Management Systems Staff, along with several outside consultants, composed the PAMS/ADAMS team.

WRAPPS and expanded WRAPPS to include a fully integrated system including applicant, personnel, and payroll functions, as well as a criminal history check. In addition to anticipating a payroll of 350,000 employees at peak, the system needed to support up to 6 million applicants. Senior management determined that time and resource limitations precluded any development effort. In September 1996, the Census Bureau purchased a COTS product—PeopleSoft 5.0—and modified the software to make it compliant with all U.S. Office of Personnel Management rules and regulations.³³

PAMS/ADAMS was initially installed in three regional sites in January 1997 for testing in the Census 2000 Dress Rehearsal. By March 1998, PAMS/ADAMS was completely installed in all regions, and between August and November 1999, it was distributed to all 520 LCOs. Dress rehearsal operations revealed the need for system and program enhancements to prevent duplicate payments and provide a more accurate and reliable method of data entry than the optical character/mark recognition component of the COTS software. Consequently, the Census Bureau abandoned the scanning and OCR/OMR component in favor of an alternative PAMS/ADAMS data entry (PADE) and transfer system. Developed by a team of in-house programmers and contractors, the PADE system provided a user-friendly front-end interface for capturing applicant and payroll information at the LCOs; help and edit features to assist clerks and resolve errors in the keying process; and a file transfer protocol (FTP) component allowing for the transfer of batches from LCOs to RCCs and the update of the RCC database. System enhancements continued throughout the life cycle of PAMS/ADAMS, resulting in a comprehensive automated system that was fully implemented by February 2000 and significantly improved the transfer of payroll and applicant data between LCOs and RCCs.³⁴

PAMS/ADAMS was part of the DFI and interfaced with the Decennial Applicant Name Check, MIS 2000, and OCS 2000. Other systems interfaced with PAMS/ADAMS and relied on it for personnel and payroll information such as cost reporting for the Commerce Administrative Management System, geocoding functions, and data for the Equal Employment Opportunity Office, U.S. Bureau of Labor Statistics, and U.S. Department of Treasury. PAMS/ADAMS contained 3.7 million applications on file, and a maximum of 512,000 individuals were on the weekly payroll during the peak of Census 2000. Overall, the PAMS/ADAMS system managed more than 865,000 employees in the year 2000.³⁵

The GSS component of the DFI consisted of two applications, the Street Name Index and the Personal Computer Map Image Metafile (PCMIM). Drawing on information stored in the MAF and the TIGER® database, these applications provided the RCC and LCO staff with access to necessary geographic functions. The Street Name Index listed the range of street addresses along a street or census block or tract. Using this index, field office staff were able to geocode applicant addresses so that enumerators could be assigned to work in their own neighborhoods. The PCMIM allowed LCO staff to create and produce 11" x 17" maps for field operations, including Assignment Area (AA) maps, block maps, and AA locator maps.³⁶

OCS 2000 was an automated, computer-based system developed to support, manage, and control all field operations for Census 2000. Different field operations occurred at different times prior to and during Census 2000. These operations varied considerably in terms of the nature of the work

³³ The primary organizations developing PAMS/ADAMS were Andersen Consulting (a contractor now known as Accenture); the Field Division (sponsor); and the Financial and Administrative Systems Division (technical lead and programming).

³⁴ U.S. Department of Commerce, Office of Inspector General, Office of Systems Evaluation, "Bureau of the Census: PAMS/ADAMS Should Provide Adequate Support for the Decennial Census, but Software Practices Need Improvement," Final Inspection Report No. OSE-11684, March 2000, pp. 1–16; Titan Systems Corporation, *Census 2000 Evaluation R.2a, Pre-Appointment Management System/Automated Decennial Administrative Management System, System Requirements Study, Final Report*, June 6, 2002, pp. 1–13. In February 2000, PeopleTools 7.0 was released to the RCCs, significantly improving the performance of the PeopleSoft modules. At the same time, the development team released the PAMS/ADAMS data entry (PADE) system with the file transfer protocol (FTP) version.

³⁵ U.S. Census Bureau, Decennial Payroll/Personnel Staff, "2000 Decennial Census Personnel System ADAMS," June 2001, pp. 1–19; U.S. Census Bureau, "Local Census Office Manager's Handbook," August 16, 1999, Chapter 6, D-506.

³⁶ U.S. Census Bureau, "Local Census Office Manager's Handbook" August 16, 1999, Chapter 4.

performed, starting and completion dates, and the number of people involved. OCS 2000 assigned work to all census enumerators, tracked the progress of those assignments, and produced reports on field operations in progress for managers at the RCCs, LCOs, and headquarters. The system printed block and address listings, labels, assignment directories, and management reports. It also tracked and managed shipping documents for materials checked out to DCCs and helped the RCC and LCO staff control and manage OCS 2000-supported operations by generating cost and progress reports.³⁷

CPUMS was a contact database designed to maintain pertinent information about Census Bureau contacts and their services to promote the census. This database was used to track information about organizations that helped promote the census in their areas through a variety of means, including donation of testing and training space, communication with constituents about census jobs and participation in the census, and promotion community-wide through special events. It also provided information lists and reports on various contacts organized by geographic area, program participation, or public commitments.

A.C.E. Automated Data Collection

To complete the A.C.E., laptop computers were used during the Person Interview (PI) and Person Interview Quality Assurance (PIQA) operations to conduct personal visits and telephone interviews with sample households. Laptop computers were also used during other A.C.E. field operations to communicate with field supervisory staff by using a custom mail application and transmitting status reports. Laptop computers for the A.C.E. (LC/A.C.E.) provided an automated interview questionnaire and a case management system to control and manage work assignments. The automation was intended to simplify the interview process to such a degree that minimal training would be sufficient to prepare an inexperienced enumerator to conduct these complex interviews. It was designed to replicate the survey in a manner that minimized the chances for user error to corrupt the dataset. Given the tight schedule of the A.C.E., this automation also proved beneficial by allowing the A.C.E. interview data to be captured more quickly than by using traditional keying techniques.

A.C.E. automation also provided electronic mail services and a means of electronic communication. Interviewers retrieved their assigned cases and questionnaire input files when they connected their laptops via external modem to the A.C.E. telecommunications servers. Completed cases were uploaded to the A.C.E. telecommunications servers at the Bowie Computer Center and at headquarters, where the case files were subject to quality checks. This system was critical for field control and kept field managers apprised of completion status and noninterview rates during production. There were two LC/A.C.E. automated instruments for the computer-assisted personal interview (CAPI), one for PI and another for PIQA. Additionally, each instrument had both an English and Spanish version available to the interviewers.

The Hewlett-Packard Omnibook 900 laptop was selected for the A.C.E. project. A sample size of approximately 300,000 cases was small enough to enable the Census Bureau to contract with a vendor that had been providing laptops since 1996 for other CAPI surveys. The contract was awarded in March 1999. The contract was a small-business set aside and included an option to purchase up to 15,000 laptops. By using a vendor with which the Census Bureau had an established relationship, the agency made a decision on the laptop model in time to write training materials and to test the software on the production laptop. The project plan was jointly developed by the vendor and a Census Bureau team; however, once the contract was in place, another team of Census Bureau personnel assumed control of the integration, production, quality control, and shipping arrangements.

³⁷ U.S. Census Bureau, DMD, David Coon, "Census 2000 Operations Control System 2000 (OCS 2000) Comprehensive Operational Assessment," August 20, 2002, p. 1.

Equipment purchase and integration of laptop kits were accomplished in four waves beginning in April of 1999 and ending in April of 2000. The 9,639 laptop kits required assembly before shipping, which in turn required the contractor to make BIOS³⁸ configuration settings, load the software, and bundle the various accessories (adapters, manuals, batteries, etc.). Although the anticipated laptop production rate was a very demanding 700 machines per week for each wave, the actual rate was 550 units per week during the final and largest integration/production wave. Census Bureau personnel quality-checked a sample of laptop kits each week during the production period prior to the units' shipping to the regional locations.³⁹ The vendor and ACEROs retained a pool of spare laptops and parts to resupply the interviewers when necessary.⁴⁰

Testing and Software Deployment

To ensure consistency in decennial census processes at headquarters and all field offices, the Census Bureau established a test schedule for Census 2000 production systems, including hardware and software. As it did for the 1990 census, the Census Bureau established a "beta site" for hardware and software testing and evaluation. Planning for the beta site began in mid-1996, and modifications were made throughout the process to accommodate changing operational requirements. The beta site was constructed in Federal Office Building 2 at the Suitland Federal Center in 1996. Application software testing began in January 1998 after RCC and LCO servers were installed. This site was configured with hardware and software that replicated the operating environment for census field offices. Its staff consisted of Census Bureau employees and contractors with a wide range of technical skills.

The beta site's primary objective was to assess a system's deployment readiness and to ensure its compatibility with the Census Bureau's networked computing environment. Additional objectives included conducting security testing; monitoring system performance and the configuration of personal computers and servers in field offices; providing assistance in solving technical problems; and releasing and maintaining software for Census 2000 systems.

Evaluation by the beta site typically resulted in a prioritization of software. Normal testing followed the beta site's four-day testing cycle, which included full system testing, regression testing, performance testing, and Year 2000 (Y2K) testing. Special tests such as integration testing, fail/recovery testing, and capacity testing were conducted as needed. There were, however, some situations (e.g., legal- or administrative-ruling compliance or deployment schedule delays) that allowed critical software to bypass beta site testing. Both emergency release and urgent testing requests required special approvals from Census Bureau senior management.⁴¹

Once successfully tested, software was deployed to field offices. The Decennial Systems and Contracts Management Office was responsible for releasing software to the Virtual Memory System (VMS)/NT systems in the National Processing Center, the Unix systems in the RCCs, and the Novell-Novell Directory Services systems in the ACEROs, RCCs, and LCOs.⁴² No changes to the system could be made unless specified by an appropriate Configuration/Change Control Board.⁴³ The beta site was responsible for the configuration management of these systems. During Census 2000 the beta site performed over 1,200 software tests, maintained system configurations for

³⁸ BIOS is an acronym for Basic Input/Output System and is the program that a personal computer's microprocessor uses to get the system started after it is turned on. It also manages data flow between the computer's operating system and attached devices such as the hard disk, monitor, keyboard, mouse, and printer.

³⁹ This slowed down the distribution process but increased quality. The return rate was about 12 units out of 7,000.

⁴⁰ Titan Systems Corporation/System Resources Division, Kevin A. Shaw, "Laptop Computers for Accuracy and Coverage Evaluation System Requirements Study," Census 2000 Evaluation No. R.2.b., December 9, 2002, pp. 1, 5, 8-9.

⁴¹ U.S. Census Bureau, "Program Master Plan: Census 2000, The Beta Site Testing Facility," February 23, 2000, pp. 3-4, 3-8.

⁴² Virtual Memory System software was written, tested, and maintained at the beta site beginning with the 1990 census.

⁴³ Configuration/Change Control Boards were made up of staff from various areas of a system who decided on the priorities of changes and waivers of changes for particular systems. U.S. Census Bureau, "Program Master Plan: Census 2000, The Beta Site Testing Facility," February 23, 2000, p. 8.

over 8,000 PCs and 570 servers, and effectively utilized a variety of systems management utilities to facilitate configuration management, system monitoring, and Y2K testing activities.⁴⁴

Field Technical Support

In addition to the predeployment software testing and technical support provided by the beta site, Census 2000 field offices relied on internal computer specialists for information technology support and troubleshooting once software was deployed. RCC computer specialists were responsible for all computer and network operations at RCCs. These technicians maintained all hardware and provided technical support for RCC staff. RCC computer specialists also provided first-level troubleshooting and technical support for hardware and operational problems in LCOs.

Automation technicians supervised scanning operations in the LCOs. They also maintained the security of the automation area and its systems. These technicians performed troubleshooting and preventive maintenance for LCO computers and local area networks, and they helped to resolve most technical problems within the LCO.⁴⁵

PERSONNEL

Conducting a modern decennial census requires a considerable mobilization effort as individuals are recruited to fill hundreds of thousands of temporary positions. To conduct Census 2000, the Census Bureau estimated that it would need to consider approximately 3 million applicants in order to fill 865,000 short-term, temporary enumerator positions. Most temporary workers served as enumerators during peak operations in the spring and summer of 2000.⁴⁶

Table 5-1.
Census 2000 Field Jobs

[Includes enumerator and supervisory positions]

Operation	Date	Positions to fill (865,000 temporary jobs)
Service-based enumeration	March 2000	41,000
Update/leave	March 2000	86,000
List/enumerate	March–May 2000	11,000
Group quarters enumeration	April–May 2000	24,000
Nonresponse follow-up	April–July 2000	539,000
Coverage improvement operations	July–August 2000	128,000
Be Counted/QAC programs	March–April 2000	15,000
Undeliverable as addressed distribution	April 2000	14,000
Rural update/enumerate and field follow-up	March–May 2000	6,000

To accomplish its recruiting goals, the Census Bureau hired locally, recruited an ethnically diverse and representative workforce, offered competitive pay rates, and cultivated recruiting partnerships.⁴⁷ Local census offices (LCOs) implemented a strategic recruiting advertising campaign that utilized a variety of media sources to distribute information about the availability of census jobs. Ads were placed in print and electronic media, including the Internet.⁴⁸ The assistant manager for recruiting and the recruiting assistants in the LCOs publicized census jobs among community organizations and key local officials, distributed flyers and brochures, and conducted testing sessions.

⁴⁴ Titan Systems Corporation/System Resources Division, Kevin A. Shaw, “Operational Requirements Study: The Beta Site Systems Testing and Management Facility,” Census 2000 Evaluation No. L.5., January 14, 2003, pp. i–20.

⁴⁵ ACEROs also employed computer specialists to support automation, laptop troubleshooting, and inventory of field laptops. U.S. Census Bureau, “Local Census Office Manager’s Handbook,” August 16, 1999, pp. 1-4, 1-5, 1-17.

⁴⁶ Although officially hired by one of the 520 LCOs, each enumerator worked from home. As a rule, enumerators worked in the neighborhoods in which they lived. Mark Holdrege, “Recruiting for Census 2000: Overcoming Tremendous Difficulties to Accomplish a Massive Task,” paper presented at the Census Advisory Committee of Professional Associations Meeting, October 21–22, 1999, Arlington, VA, p. 2.

⁴⁷ For more information on partnerships, see Chapter 4, “The Partnership and Marketing Program.”

⁴⁸ See Chapter 4, “The Partnership and Marketing Program” for a complete description of the Census 2000 marketing campaign.

A combination of federal legislation and administrative decisions allowed people on public assistance, as well as former members of the uniformed services, to work for Census 2000 without losing their federal assistance. Similar provisions were made for federal and military retirees. The Census Bureau also worked with states to ensure that recipients of Temporary Assistance for Needy Families could work for Census 2000 without risk of losing their benefits.

Exemptions

For Census 2000, the federal government instituted four administrative exemptions that waived restrictions on temporary federal work and one exception to the same effect used to attract and maintain qualified candidates for Census 2000 positions. In addition, outside entities granted four public assistance exemptions that allowed for temporary employment without adversely affecting candidates' benefits.⁴⁹ Beginning in late 1996, the Census Bureau's decennial field staff initiated meetings with several agencies to discuss the exemptions that would either make otherwise ineligible candidates eligible for employment or allow them temporary employment without adversely affecting benefits (e.g., retirement annuity reduction or loss of public assistance eligibility).⁵⁰ Exemptions and exceptions to increase the applicant pool for Census 2000 were approved as follows:

- *Waiver of the income offset provision for federal civilian and military annuitants for decennial positions.* Under the provision of the Federal Employees Pay Comparability Act (FEPCA), the U.S. Office of Personnel Management (OPM) delegated the authority to waive the pay/retirement deduction for military and civilian retirees to assist the Census Bureau with meeting the hiring goals for Census 2000. The Census Bureau's regional directors were given authority to grant these exceptions on a case-by-case basis. On October 5, 1999, President Clinton signed the National Defense Authorization Act for Fiscal Year 2000 (Public Law 106-65). Section 651 of this law, which repealed Section 5532 of Title 5, U.S. Code, ended the reduction in retired or retainer pay previously required for members of a uniformed service who were employed in a civilian position with the U.S. government. As a result, prior exceptions and waivers of these reductions approved by the OPM, or by agencies under delegated authority, were no longer needed.
- *Dual federal employment.* Anticipating the staffing challenges posed by Census 2000, the Census Bureau partnered with the OPM to revise federal regulations to allow most federal civilian employees to accept temporary decennial census jobs. This was accomplished by establishing an exception (under provisions of Title 13, U.S. Code, and Title 5, Code of Federal Regulations) to the general prohibition against concurrent employment by two federal agencies. Generally, agencies can determine whether to waive dual employment restrictions; however, both the OPM and the Office of General Counsel interpreted Title 13 as requiring that the U.S. Department of Commerce and Census Bureau first obtain an agency's consent before recruiting its employees. The Census Bureau immediately began a campaign to build support among its fellow agencies for the Dual Employment Initiative. In response to Commerce Secretary Daley's 1998 request, 80 federal agencies signed dual employment concurrence agreements, giving the Census Bureau access to an additional labor force of more than 2.4 million workers.⁵¹

The OPM's final regulations provided an exemption to enable the Census Bureau to hire employees already employed by other government agencies without assuming any cost or responsibility for federal benefits. This exemption applied specifically to appointments with intermittent

⁴⁹ A similar program was instituted for the 1990 census allowing the waiver of restriction on temporary work for federal, military, and postal retirees; people receiving unemployment benefits; families participating in the Aid to Families with Dependent Children Program and Food Stamp Program; American Indians living on reservations receiving general assistance; and people receiving Assisted Housing Program payments. Tammie Nelson, "Census 2000 Hiring Exemptions Program," U.S. Census Bureau, May 2001.

⁵⁰ Agencies involved in these meetings were the U.S. Office of Personnel Management, Department of Housing and Urban Development, Department of Veterans Affairs, Department of Health and Human Services, Social Security Administration, Bureau of Indian Affairs, Department of Agriculture, and Department of Labor.

⁵¹ Federal employees represented a particularly valuable applicant pool because they already possessed pertinent job skills, were generally well-distributed geographically, and were likely to remain with the census through the completion of their work assignments.

work schedules in the regional census centers (RCCs) and LCOs. The exemption did not apply to positions with mixed-tour work schedules in the LCOs (e.g., LCO manager, assistant manager, and administrative assistants) or the RCCs.⁵²

- *Employment of noncitizens.* Consistent with Department of Commerce policy and OPM requirements, when decennial operations began, all applicants were required to be U.S. citizens by birth or naturalization. In rare instances, after all recruiting avenues had been pursued and qualified U.S. citizens were not available, exceptions were considered for temporary employment. On July 14, 1999, the Census Bureau received approval to hire legal resident noncitizens for short-term temporary employment, subject to the restrictions of the annual appropriations act on paying noncitizens.⁵³ All legally eligible applicants were still required to meet Form I-9, Employment Verification, requirements and Selective Service registration requirements.
- *Public assistance exemptions.* Public assistance exemptions were needed to allow recipients to accept temporary employment without adversely affecting their program benefits or benefit eligibility. Exemptions for the following programs were agreed upon:

Public and Indian Housing Program. The U.S. Department of Housing and Urban Development approved an administrative exemption on May 15, 1996, for recipients of low-income housing assistance. This exclusion applied to Census Bureau appointments that did not exceed 180 days.⁵⁴

Temporary Assistance for Needy Families (TANF). At least 25 states made provisions to exclude census income from benefits determinations for program recipients.

Medicaid. The U.S. Health Care Financing Administration and Census Bureau agreed to coauthor a letter to states encouraging them to amend state plans to allow for exemption of census income. Thirty-one states positively amended their plans.

Indian recipients of general assistance. The Census Bureau presented information on Census 2000 at a meeting of tribal TANF directors in Washington, DC, on March 25, 1999. The Census Bureau worked with the U.S. Bureau of Indian Affairs, U.S. Department of Health and Human Services, the Division of Tribal Services, and tribes administering their own TANF programs to exempt census income from general assistance calculations. Twelve tribes agreed to exempt census income from general assistance calculations.

Food Stamp Program. The U.S. Department of Agriculture (USDA) initially stated it could not authorize the waiver due to cost neutrality requirements. On February 18, 2000, the USDA invited states to participate in a demonstration project that allowed them to exempt census income. Forty-four states, the District of Columbia, Guam, and the U.S. Virgin Islands participated.

- *Selective Service.* All male applicants born after December 31, 1959, were required to be registered with the Selective Service system prior to appointment to a federal position. Male applicants between the ages of 18 and 26 were eligible for appointments only after registering with the Selective Service. When an applicant 26 years or older declared that he did not register with the Selective Service, the regional director was delegated authority to adjudicate the case for excepted service positions. This determination was coordinated through the RCC area manager. The regional director had to determine whether the applicant knowingly or willfully failed to

⁵² *Federal Register*, Vol. 63, No. 37, February 25, 1998.

⁵³ According to the Treasury and General Government Appropriations Act (passed by Congress each year to authorize expenditure of appropriated funds), only certain categories of individuals can be compensated for work performed. Individuals who are not citizens or nationals of the United States must fall under one of the following categories to be hired: (1) a person who is eligible for citizenship and has filed a declaration of intention to become a citizen of the United States prior to employment and is residing in the United States; (2) a person who owes allegiance to the United States (i.e., a national but not a citizen of the United States) and who presents a certificate of noncitizen national status issued by the Secretary of State; (3) an alien from Cuba, Poland, South Vietnam, the countries of the former Soviet Union, or the Baltic countries lawfully admitted to the United States for permanent residence; (4) a South Vietnamese, Cambodian, or Laotian refugee paroled in the United States after January 1, 1975; or (5) a national of the People's Republic of China who qualifies for adjustment of status pursuant to the Chinese Student Protection Act of 1992.

⁵⁴ HUD Policy Notice, PIH 2000-1 (HA), May 15, 1996.

register based on the written explanation and documentation he provided. The RCC notified the individual, in writing, of the determination and his right to appeal. A copy of the determination was filed in the individual applicant's folder. All denials were maintained in a separate folder and kept for 2 years from the date of the written determination. Although this was not an "exemption," it was an exception to the rule, granting the Census Bureau flexibility in hiring that it did not have for the 1990 census.⁵⁵

Development of a System of Competitive Pay Rates

One factor that improved the Census Bureau's ability to hire temporary employees for Census 2000 operations was a relatively new policy of paying competitive rates in each LCO area, based on the local average wages. The Census Bureau reviewed average wages for each area and paid its enumerators about 75 percent of the average wage.

Offering competitive pay (see Table 5-2), while common practice in the private sector, was a drastic improvement over previous censuses and proved to be key to Census 2000 recruiting success. In past censuses, an enumerator working in Manhattan or San Francisco received the same pay rate as an enumerator working in a rural area. The Census Bureau recognized that retention of employees would save the time and cost of recruiting and training.⁵⁶ The RCC field operations staff had the flexibility to document and request higher pay rates in an LCO or a county within an LCO if they felt higher pay was necessary.

Table 5-2.
Census 2000 Local Census Office Hourly Pay Rates

Position	Census operations	A.C.E. operations
Field operations supervisor	\$12.00–\$19.00	\$12.65–\$19.65
Crew leader	\$10.50–\$17.50	\$11.15–\$18.15
Enumerator	\$9.00–\$16.00	\$9.65–\$16.65

Source: U.S. Census Bureau, Decennial Management Division, Budget Office.

Selection Process

Applicants were required to take a written exam so that applications for census employment could be ranked. The test consisted of 28 multiple-choice questions designed to assess basic skills and abilities in five areas: reading, mathematics, clerical tasks, evaluation, and organization. Applicants were permitted to take the exam as often as necessary to be considered qualified for a field position. A minimum score of 70 percent was used as the criterion for hiring, but there was no pass/fail score for these applicant screening tests.⁵⁷

Once an applicant achieved a score of 70 or higher, he or she was then subject to a background investigation. The Decennial Automated Name Check (DANC) program was originally designed and implemented for the 1990 decennial census as a way to enhance the screening process of all persons applying for temporary decennial positions. This was the first time that the Census Bureau made an effort to check the background of prospective decennial employees and screen for those who represented an unacceptable risk to the census effort. The name check program has been used continuously since its implementation in 1990. In January 1997, the DANC program was updated for Census 2000 operations. The DANC system retrieved applicant information from the Pre-Appointment Management System (PAMS) database and sent it electronically to the FBI. Information contained in this transmission included the applicant's name, social security number, date of birth, gender, office code, and address. The FBI, in turn, processed this information against its criminal history index and returned results to the DANC system within 2 days. Once processed

⁵⁵ U.S. Census Bureau, "Census 2000 Program Master Plan: Recruitment, Decennial Applicant Name Check (DANC) and Selection," May 8, 2003, pp. 6–8.

⁵⁶ Westat, "Part 1: Census 2000 Staffing Programs, Recruiting Component," Census 2000 Evaluation No. G.1., June 7, 2002, p. 5-1; Darlene L. Monaco, Decennial Management Division, U.S. Census Bureau, "Assessment Report: Census 2000 Nonresponse Followup (NRFU)," Census 2000 Informational Memorandum No. 127, August 5, 2002.

⁵⁷ U.S. Office of Personnel Management, "Census 2000 Hiring Starts in Summer 1998," June 10, 1998.

through the DANC, an applicant was rated “A” (for available) or “UR-R” (for under review-risk), which indicated that the application was to undergo further review to determine if he or she posed a threat to the public’s safety or the agency’s integrity. These ratings were passed back to PAMS. An applicant who received an “A” was eligible for consideration.

After an applicant cleared the DANC, LCO staff began the selection process, evaluating candidates on a number of criteria. The primary selection criterion when hiring enumeration staff was the test score. A score of 70 or more was considered “passing or qualified.” Additional selection criteria included:

- Geographic area of consideration.
- Availability of transportation.
- Number of hours available to work (20 to 40 per week preferred).
- Bilingual proficiency, if this skill was needed.
- Position location.

Applicants who scored highest on the test were selected over other applicants. Eligible applicants received additional points if veterans. This process continued until the number of applicants needed was selected.

For the most part, recruiting efforts for Census 2000 were successful. While there were variations in performance levels across LCOs, by April 2000, 82 percent of LCOs either met or exceeded their recruiting goals. Every LCO had at least three applicants for every enumerator position, and most LCOs had more than eight applicants for each slot. Such high levels of recruiting were strongly associated with competitive pay rates, higher test scores, and lower turnover of LCO management.⁵⁸

Hiring

Once the area manager determined the number of enumerator and crew leader positions to be filled, LCO office staff conducted phone interviews and made job offers to applicants. All applicants who cleared the DANC were listed in the PAMS database according to test score and, if applicable, assigned to one of two priority groups. Priority Group I contained all 10-point compensable disability preferences. Priority Group II contained other 10-point and 5-point veterans at the top of their score group. Clerks then conducted reference checks on field operations supervisor positions and began contacting applicants at the top of the priority lists. Clerks were required to document all attempts to contact an applicant, with a minimum of three attempts before disqualifying an applicant for consideration. All responses from applicants were then entered in PAMS, and for those who accepted job offers, an automated record of training (Form D-275) was entered in PAMS.⁵⁹

TRAINING

Training for Census 2000 field operations varied depending on the position. Most training included 2 to 4 days in the classroom. Enumerators were required to undergo an additional half-day of training in the field. The Census Bureau hired experienced trainers to conduct formal and

⁵⁸ U.S. Census Bureau, “Program Master Plan: Recruitment, Decennial Applicant Name Check (DANC), and Selection,” Informational Memorandum 73, October 5, 2000, pp. 1–12; Westat, “Part 1: Census 2000 Staffing Programs, Recruiting Component,” Census 2000 Evaluation No. G.1., June 7, 2002; Westat, “Part 2: Census 2000 Staffing Programs, Pay Component,” Census 2000 Evaluation No. G.1., pp. i–iv, 64. In its evaluation of Census 2000 recruiting, Westat indicated that the Census Bureau should reassess its reliance on test scores as a predictor of performance given that those with lower test scores tended to be available to work more hours or possessed special language skills.

⁵⁹ U.S. Census Bureau, “Program Master Plan: Recruitment, Decennial Applicant Name Check (DANC), and Selection,” Informational Memorandum 73, October 5, 2000, p. 12.

“Just-in-Time” (JIT) training. The trainers emphasized the importance of cross-training clerks and office management staff. They also stressed the need to maintain continuous communications through daily and weekly staff meetings and between management staff in the field offices and regional census centers (RCCs).⁶⁰

Management Training

RCC managers were required to complete 3 days of classroom training for RCC management overview, as well as any job-specific classroom training, which usually required 1 day per course. Some RCC managers were selected to complete training in crisis communication and media skills (2 to 3 days), and others were required to attend a variety of JIT operational briefings for regional directors, assistant regional census managers, and area managers (1 to 3 days per session).⁶¹

Local census office (LCO) management teams were required to complete a 4-day LCO management overview, as well as relevant job-specific training for LCO managers, assistant managers, and automation supervisors. An additional 1 to 2 days of media skills training and a variety of JIT operational classroom sessions were required of LCO management teams (preclassroom self-study for five sessions and 1 day of classroom time per session).

Administrative Training

The Decennial Payroll/Personnel Staff (DPPS) in the Field Division was tasked with training RCC staff to ensure administrative policies and procedures were understood and implemented and to explain and distribute training materials. Once the RCCs were comfortable with the information, they trained the LCO administrative staff using in-house materials and materials provided by DPPS. Training was delivered in several ways, including conference room presentations provided by DPPS and hands-on learning of personnel and payroll software systems.

DPPS established computer-based training programs (CBT) designed to follow the applicant data entry, selection, training schedule, and hiring process and all aspects of the personnel and payroll database process. In addition to the CBT, LCO administrative staffs used an appointment training module, “Chapter A.” This manual guided the staff through the personnel process of appointment forms, payroll tax forms, and the Oath of Office process.⁶² Administrative clerks learned through on-the-job training, while clerks learned payroll and personnel procedures from the assistant manager for administration and from more experienced clerks.

Field Training

The Census 2000 nonresponse follow-up (NRFU) operation required hiring and training approximately 500,000 people. With less than 20 hours of formal training, these workers were expected to knock on doors to collect census data from about 42 million nonresponding addresses. The Census Bureau’s method of training field staff has remained essentially unchanged over the past few decennial censuses. Instructions were presented to a class of trainees via lecture and discussion and delivered verbatim from a training guide. Practice interviews and role play were interspersed throughout training in order to develop the interviewing skills of trainees.⁶³

The Census 2000 NRFU training program was designed to provide enumerators with 14 hours of classroom training on NRFU duties and responsibilities, 1 half-day of supervised interviewing practice in the field, and 4 hours of on-the-job field training. Although the field work component

⁶⁰ Brad Eaton, Decennial Management Division, U.S. Census Bureau, “Field Office Management and Administration Comprehensive Assessment Report,” August 28, 2002, pp. 1–5.

⁶¹ JIT training was informal training on specific operations, usually the larger and more technical ones. JIT was conducted immediately before an operation began in order to review management procedures related to the operation with staff. U.S. Census Bureau, “Local Census Office Manager’s Handbook,” August 16, 1999, D-506, pp. 10-1, 10-5.

⁶² U.S. Census Bureau, Decennial Payroll/Personnel Staff, “2000 Decennial Administrative Training,” April 2001, pp. i–1.

⁶³ The advantage of verbatim training is a consistent message delivered to hundreds of thousands of employees in a manner that controls cost and timing. The disadvantage is that training is delivered primarily by newly hired employees, not career professionals with years of practical knowledge and field experience. Geraldine Burt and Ruth Mangaroo, Field Division and Foreign Trade Division, “Nonresponse Followup (NRFU) Enumerator Training,” Census 2000 Evaluation No. H.7., March 28, 2003, pp. 1, 27.

was part of the training program, only 67 percent of enumerators surveyed in a postcensus evaluation actually received field training in addition to the classroom component. The majority (approximately 89 percent) of these enumerators indicated they found field training useful, and their performance reflected this. Many crew leaders, however, whose training program did not include a field work component, had little or no practical experience to share with their enumerator trainees. For the most part, however, the NRFU training program proved to be successful. Of those enumerators surveyed, 82 percent felt that they were well-prepared for their first assignments, and 72 percent added that the training program (with or without the field component) provided them with valuable, transferable job skills. A similar training program with these same verbatim requirements was used for all the various field operations.⁶⁴

MAIL CENSUS

The mailout/mailback (MO/MB) method was used to enumerate approximately 254 million people in about 92 million housing units not included in other enumeration operations (update/leave [U/L], update/enumerate, special places, etc., see below). Table 5-3 illustrates the distribution of housing units by type of enumeration area (TEA). MO/MB was conducted in cities, towns, suburban areas, selected rural areas, and small towns in rural areas where mailing addresses consisted mainly of house numbers and street names or other addresses that permitted letter carriers to deliver questionnaires to specific housing units. In essence, MO/MB enumeration required the Census Bureau to develop a master address file (see Chapter 8, “Addresses and Questionnaire Printing and Mailing”) to send questionnaires to all housing units through the mail, and request that someone in each household complete the questionnaire and return it by mail.

Table 5-3.
Distribution of Housing Units by Type of Enumeration Area

Type	Number
1 Mailout/mailback	92,452,739
2 Update/leave	21,334,143
3 List/enumerate	392,369
4 Remote Alaska	27,002
5 Rural update/enumerate (from TEA 2)	886,215
6 Military in update leave area	50,644
7 Urban update/leave	238,253
8 Urban update/enumerate (converted from TEA 1)	70,404
9 Update/leave (converted from TEA 1)	452,872
Total	115,904,641

Source: U.S. Census Bureau, Census 2000, HCEF

Address Listing

The Census Bureau developed a nationwide address list—the master address file (MAF)—that contained the street address (or a comparable location description), the mailing address (if different from the street address), and the census block location of every living quarters in the U.S.

In addition to containing the mailing address (including post office name and ZIP Code) of every occupied or vacant housing unit, the Census 2000 address list included geographic codes that identified the many tabulation areas in which each address was located (e.g., state, county, census tract, and census block). For areas that did not use house number and street name addresses for mail delivery, each Census 2000 address list record also contained additional information and a location description (e.g., “east side of State Highway 12, 4 miles north of intersection with State Highway 122”).

⁶⁴ Ibid., pp. 12, 26–27.

The Census Bureau used these geographic codes and related location information to create enumerator assignment areas, to determine samples for such programs as the Accuracy and Coverage Evaluation, and to help field staff locate every housing unit.⁶⁵

Block Canvassing

In August 1997, the Census Bureau reexamined its program for maintaining the Census 2000 address list in MO/MB areas. Prior to this, the Census Bureau had decided not to canvass all blocks in which city-style addresses were used for mail delivery, as had been done in previous censuses. The agency believed that this operation (known in the 1990 census as “Precanvass”) was not needed in every block for Census 2000 because of the availability of the U.S. Postal Service delivery sequence file (DSF).⁶⁶ However, the Census Bureau’s examination of the results of various census and American Community Survey tests during the 1990s indicated that additional steps were needed to ensure that the Census 2000 address list was complete and up-to-date.

As a result, the Census Bureau reinstated a canvassing operation for all census blocks in MO/MB areas. The canvass commenced during winter of 1998–99 and ended in spring 1999. As part of the canvassing operation, temporary Census Bureau staff visited each census block carrying an extract of the current MAF that included address additions and changes that had been identified by the Local Update of Census Addresses program at that time. Using this list, these staff confirmed the existence of addresses on the list, deleted addresses as nonexistent, or added new addresses.⁶⁷

Multiple Mailing Strategy

Research conducted by the Census Bureau during the 1992 and 1993 census tests demonstrated that using a multiple mailing strategy increased the likelihood of response. For Census 2000 the agency used a strategy that included multiple contacts for MO/MB areas. These contacts included three items. First, a prenotice letter, delivered between March 6 and March 8, 2000, alerted residents in the MO/MB universe that a census questionnaire would soon arrive by mail.⁶⁸ Second was the census questionnaire itself, which was delivered from March 13 to March 15. Third was a postcard that served as a thank-you for respondents who had mailed back their questionnaires or as a reminder to those who had not. These postcards were delivered between March 20 and March 22. This multiple mailing strategy used first-class postage for all 100 million mailing pieces in MO/MB areas for each of the mailings.⁶⁹

Questionnaire Assistance Centers (QACs)

Questionnaire Assistance Centers (QACs) were opened at targeted locations between March 8 and April 14, 2000. The QACs were designed to assist individuals who had questions about completing their census questionnaires, who needed language assistance, who had general questions

⁶⁵ Prepared statement of Kenneth Prewitt, Director, U.S. Census Bureau, before the Subcommittee on the Census, Committee on Government Reform, U.S. House of Representatives, September 29, 1999; U.S. Census Bureau, “Census 2000 Operational Plan,” December 2000, pp. VI-1–VI-8; Frank Vitano, Jim Treat, and Robin Pennington, *Address List Development in Census 2000*, Census 2000 Testing, Experimentation, and Evaluation Program Topic Report No. 8 (Washington, DC: U.S. Census Bureau, 2004), pp. 1–4.

⁶⁶ The DSF is a computerized file that contains all delivery point addresses serviced by the USPS, with the exception of general delivery. On the file, each delivery point is a separate record that conforms to all USPS addressing standards. Each record contains the ZIP+4 Code, carrier route code, delivery sequence, delivery type, and seasonal delivery information. Public Law 103-430, the Census Address List Improvement Act of 1994, directed the USPS to provide on a periodic basis a copy of the address information it maintains for mail delivery to the Census Bureau for use in creating and updating the housing unit address list.

⁶⁷ For more information on block canvassing, see Chapter 8, “Addresses and Questionnaire Printing and Mailing.”

⁶⁸ The MO/MB universe consisted primarily of addresses containing street numbers and street names to which the USPS delivered preaddressed census questionnaires.

⁶⁹ Don A. Dillman, “Research and Improve Mail-Back Response Rates for Decennial Census Forms,” paper presented to the Census Advisory Committee of Professional Associations Meeting, April 1993, U.S. Bureau of the Census, Suitland, Maryland; Don A. Dillman, Jon R. Clark, Michael D. Sinclair, “How Prenotice Letters, Stamped Return Envelopes and Reminder Postcards Affect Mailback Response Rates for Census Questionnaires,” paper presented at the U.S. Bureau of the Census Annual Research Conference, March 1993, Arlington, Virginia; Herbert Stackhouse and Sarah Brady, “Census 2000 Mail Response Rates: Final Report,” Census 2000 Evaluation No. A.7.a., January 2003, p. 4.

about the census, or who did not receive a census questionnaire. In total, 23,556 QACs were established in the MO/MB and U/L areas throughout the country.⁷⁰ The QACs resulted in the keying of 559,027 potential census respondents (220,489 utilizing the Be Counted questionnaire).⁷¹

Census Bureau partnership specialists, in consultation with local officials, played an important role in selecting the census tracts where QACs were placed. Once the tracts had been chosen for QACs, partnership specialists contacted local governments and community organizations for space to house the centers. Often, space was provided free of charge by community organizations. Most of the tracts chosen were in areas known to be difficult to enumerate, heavily populated by certain racial and ethnic groups, or in linguistically isolated areas heavily populated by speakers of languages other than English. Publicly accessible locations, such as community centers and social service centers, were set up to house QACs.

Operations staff at the local census offices (LCOs) were responsible for maintaining the QAC sites and for training and scheduling staff to administer the sites. QACs were staffed by paid clerks and volunteers, some of whom had language skills that enabled them to provide expert assistance to potential census respondents experiencing language difficulties.⁷² Paid and unpaid staff provided literacy assistance to respondents. Staff were instructed to complete a Form D-399, Record of Contact, for each potential census respondent who visited the center.⁷³ These forms were transmitted weekly to the LCO, where census staff reviewed them to determine whether the QAC site was receiving the expected amount of traffic or had sufficient staffing and materials. After the QACs closed on April 14, 2000, the Record of Contact forms were sent to the National Processing Center (NPC), where they were keyed for tabulation and data analysis. To indicate their status, questionnaires were assigned codes such as these: questionnaire requires assistance; general problems with the questionnaire; Be Counted language form requested; and language assistance guide used. How respondents learned about the QACs was also indicated.

Although “in-language” questionnaires were not available in the QACs, the following materials, among others, were available:⁷⁴

- *Language assistance guides.* Language assistance guides were user-friendly visual aids that helped census respondents who had language barriers understand and complete the English language short- or long-form questionnaire. Guides were available in 49 different languages⁷⁵ and in large-print English.
- *Language identification flash cards.* These were cards with phrases in each of the available languages. They were used to assist QAC staff in identifying the language spoken by census respondents. A staff member held the card in front of the respondent and moved his or her finger from line to line on the card until the respondent indicated that the clerk was pointing to a line written in a language he or she could understand.
- *Be Counted forms.* Be Counted forms were questionnaires provided to those who had not previously received a questionnaire, who thought that they were not included on a questionnaire, or who were without conventional housing on Census Day. Be Counted forms were available in six languages: English, Spanish, Chinese, Korean, Vietnamese, and Tagalog. Available at QACs, these forms were also distributed at locations throughout the community.

⁷⁰ Questionnaire Assistance Centers were not established in update/enumerate or list/enumerate areas. Enumerators provided assistance to census respondents in those areas.

⁷¹ John Jones and Diane F. Barrett, “Questionnaire Assistance Centers for Census 2000—Final Report,” Census 2000 Evaluation No. H.4., June 25, 2003, pp. ii–iii.

⁷² Volunteers were chosen from local community groups or from organizations entering partnership agreements with the Census Bureau. For more information on partnerships, see Chapter 4, “The Partnership and Marketing Program.”

⁷³ Form D-399, Record of Contact, documented the type and extent of assistance needed.

⁷⁴ “In-language” questionnaires were made available to respondents who spoke a language other than English.

⁷⁵ The available language guides (not available at all QACs) were Albanian, Amharic, Arabic, Armenian, Bengali, Burmese, Cambodian, Chamorro, Chinese, Creole (Haitian), Croatian, Czech, Dari, Dinka, Dutch, Farsi, French, German, Greek, Hebrew, Hindi, Hmong, Hungarian, Ilocano, Italian, Japanese, Korean, Kurdish, Laotian, Polish, Portuguese, Roma, Romanian, Russian, Samoan, Serbian, Slovak, Somali, Spanish, Swahili, Tagalog, Thai, Tibetan, Tigrayan, Tongan, Ukrainian, Urdu, Vietnamese, and Yiddish.

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- *Form D-399, Record of Contact.* These forms were used to document the reason that census respondents visited the QACs. Census respondents who visited or contacted QACs answered the questions on this form. It was administered and completed by QAC staff.

Telephone Questionnaire Assistance (TQA)

The Census Bureau implemented a telephone program to provide the public with assistance in completing census forms. To meet the program requirements, the Census Bureau contracted with Electronic Data Systems (EDS). EDS provided state-of-the-art technology commonly used in customer service environments in the private sector. This included intelligent call routing software and interactive voice response (IVR) technology coupled with a network of commercial call centers functioning as a single virtual call center. The IVR system allowed callers to enter and obtain information through a series of menu options using either the telephone keypad (touch-tone) or, for English-speaking callers, voice response. The intelligent call routing system responded to a request from the AT&T network and routed the calls to an IVR system or, if necessary, to an agent.

The Telephone Questionnaire Assistance (TQA) network was available to the public through language-specific toll-free numbers from March 3 through June 30, 2000. Callers could access the IVR portion of the network 24 hours a day, 7 days a week. TQA agents were available 8 a.m. to 9 p.m. for each of the nation's nine time zones, 7 days a week. TQA services included answering questions about the census and the census questionnaire; providing respondents with a method for requesting a census form or language guide by mail; and providing respondents who met certain criteria an alternative way of responding to the census if they had received a short form.

TQA was delivered in the three phases that corresponded to Census 2000 field activities. Throughout all three phases, callers could use TQA to get basic information or answers to frequently asked questions. During Phase One (March 3 through March 21, 2000) callers were informed that census forms were being delivered to all housing units and that if they did not receive a form by March 22 they should call and request a form. During this phase, replacement forms were mailed only if a census ID was provided.

Phase Two began on March 22 and lasted until April 7. During this period, the recorded greeting gave the Internet address and informed callers that census forms had been delivered, that the information provided must be as of Census Day (April 1), and that if forms were not returned by April 12, an enumerator would visit to collect information. The main menu during this phase allowed callers to request a census form or, for callers with short forms, provided access to agents who could conduct telephone interviews.

Phase Three of TQA lasted from April 8 to June 30. During this period callers were able to retrieve general information, however no forms were mailed. Instead, callers who had not received a form or who had received but not returned short forms were directed to an agent for a short-form interview.⁷⁶

The TQA network consisted of IVR systems and 22 call centers networked together as a virtual call center. Intelligent call routing software routed calls from the AT&T network to the IVR systems, and if necessary, from the IVR to a call center. Intelligent call routing had the capability of identifying and routing a call to an open IVR system. If a caller needed to be transferred to an agent, intelligent call routing could view call activity at the individual agent level and route the call to the most available agent across the network.⁷⁷

The IVR systems provided options in English and Spanish. Ideal for handling routine inquiries, the IVR system often provided users with information, which avoided the need to transfer them to an agent. In the Census 2000 system, a caller was transferred to an operator if the caller gave two invalid responses to a menu, selected a menu option that automatically transferred the caller, or chose to speak with an agent.

⁷⁶ U.S. Census Bureau, "Program Master Plan: Telephone Questionnaire Assistance," July 2001, p. 7.

⁷⁷ Due to unexpectedly high call volumes some undetected intelligent call routing programming problems occurred. In order to overcome the situation and continue taking calls, the prime contractor turned off certain intelligent call routing functions for the dates of March 13 and 14.

To respond to callers' requests, operators used a browser-based desktop tool, called the Operator Support System (OSS). The OSS was written in HTML and Java. Operators at the 22 call centers accessed the OSS through a network to retrieve answers to census-related questions, record mailing address information for census forms or language assistance guides, or conduct short-form interviews if the caller met certain criteria.

Staffing at the call centers was based on projected call volumes that were keyed to the individual day and hour level, with allowances for unexpected spikes. During Census 2000, TQA staffs were able to handle nearly a 25 percent increase in call volume. When call volume far exceeded projections and exhausted agent capacity, a message was sent from the intelligent call routing software to block incoming calls.⁷⁸

Web Site Operations

Census 2000 marked the first time in the history of the decennial census that the Census Bureau provided respondents with the option to submit their census responses via the Internet. As part of a comprehensive plan to simplify public participation and to increase response rates to Census 2000, Census Bureau staff designed a single Web site to serve Internet users. The site contained two major components: Internet Questionnaire Assistance (IQA) and Internet Data Collection (IDC). The intent was to provide respondents with a highly secure Internet filing alternative to the paper-based short-form questionnaire and to assist respondents with completing their census questionnaires.

The IQA consisted of a collection of Web pages that contained all of the materials from the *Census 2000 Questionnaire Reference Book* (QRB). The QRB contained descriptions about using census information and completing each questionnaire item. The IQA site allowed users to search an alphabetic list of topics or select from a list of popular help topics located on a pull-down menu. IQA information was consistent with TQA-provided information, as well as being compatible with the mailout and Internet-based questionnaires used in the IDC.⁷⁹

IQA was online from March 3 to July 7, 2000. Most respondents, however, were not satisfied with IQA. Nearly 62 percent of the respondents indicated that, overall, they were not at all satisfied with the Internet help screens. While nearly 77 percent found it easy or very easy to understand the help screen information, about 58 percent said it was not at all easy to find the help topics for which they were searching. In addition, 65 percent of the respondents stated that the help screen information was not at all helpful. The respondents complained that, while the information on the IQA was easy to understand, it was difficult to locate and generally unhelpful. In short, the IQA did not provide the information that respondents sought.⁸⁰

The IDC effort, on the other hand, received a favorable response from users. Overall, 91 percent of users surveyed were satisfied with the Census 2000 Internet form. IDC questionnaires, however, were completed by less than 1 percent of the total number of census respondents. Out of approximately 117 million households, only 66,556 Internet forms were received, and of these, 65,683 forms were processed by April 18.⁸¹ Short-form recipients were able to respond on the Internet, if they could provide their 22-digit census ID.⁸² Since there was insufficient time to produce a Spanish-language version of the form, Internet responses could be submitted in English only. Though it was met with many challenges, including a low volume of responses, IDC was an

⁷⁸ John Chesnut, Decennial Statistical Studies Division, "Telephone Questionnaire Assistance," Census 2000 Evaluation No. A.1.a., March 20, 2003, pp. v-4.

⁷⁹ U.S. Census Bureau, "Program Master Plan: Internet Questionnaire Assistance Data Collection Operations," undated, p. 3.

⁸⁰ Courtney Stapleton and John Irwin, "Census 2000 Internet Web Site and Questionnaire Customer Support Satisfaction Surveys: Final Report," Census 2000 Evaluation No. A.2.c., April 15, 2002, pp. vi-3.

⁸¹ There is no clear explanation for this discrepancy. Of these, 66,556 submissions were associated with unique MAFIDs. However, some were excluded from Decennial Systems and Contracts Management Office processing due to various submission errors or because they were blank. Erin Whitworth, "Internet Data Collection," Census 2000 Evaluation No. A.2.b., August 14, 2002, pp. 7-8.

⁸² IDC was available only to those who received short-form questionnaires. The system was brought online on March 3 for stateside and Puerto Rico U/L operations. The MO/MB version was not online until March 13. IDC was taken offline on April 18 when the Census Bureau began NRFU operations.

operational success. It proved to be secure, and no hardware or software failures occurred. However, it did not reach its potential. This is probably a result of the Census Bureau's decision not to advertise this response mode. The IDC system was designed and tested to handle tens of millions of forms. Instead, only 63,053 households consisting of 169,257 people were enumerated using just the Internet census form.

Receiving Mail Returns

MO/MB, U/L, and urban update/leave (UU/L) questionnaires were returned by the U.S. Postal Service (USPS) to data capture centers (DCCs) for processing. DCCs checked-in mail returns using laser sorters to read the form bar code through the envelope window. Questionnaire bar codes included a two-digit check digit to ensure that the code was read correctly. The check-in sub-system stored the unique identifier encoded by the bar code in a check-in file. This file was transmitted daily to the Decennial Systems and Contracts Management Office at Census Bureau headquarters to identify the addresses on the decennial master address file (DMAF) that had returned a mail questionnaire. By April 11, 2000, approximately 77.6 million census forms were received and checked into the DCCs in order to produce the nonresponse follow-up (NRFU) universe.⁸³

Many questionnaires, however, were not initially returned to the DCCs. In fact, approximately 9.3 million forms were identified by the USPS as “undeliverable as addressed” for a variety of reasons. These forms were sorted by ZIP Code and retrieved by LCO field staff for redistribution.⁸⁴

Undeliverable as Addressed (UAA)

During the mailout of Census 2000 questionnaires, the USPS designated a questionnaire packet as undeliverable as addressed (UAA) if it could not be delivered successfully to the labeled address. An undelivered packet with the enclosed questionnaire was annotated with a reason for “undeliverability” and sent back to the NPC. Almost half of the undeliverable questionnaires received were stamped or annotated by the USPS with “vacant” as the reason for undeliverability. This was the most common reason questionnaires were not deliverable. Other common reasons for UAA questionnaires included labeled addresses identified by USPS as “no such address” (indicating that the address location did not exist) and labeled addresses identified as not having a mail receptacle.⁸⁵

From March 13 to 18, 2000, UAA questionnaires brought back by letter carriers were gathered by USPS personnel, sorted by ZIP Code, and held in postal trays. On March 18, LCO personnel, from the 317 LCOs in the redistribution operation, retrieved the UAAs. Only questionnaires from pre-selected ZIP Codes were retrieved. These questionnaires were taken to the LCOs for “check-in” as LCO UAA redistribution questionnaires. The remainder of the questionnaires (those not in the pre-selected ZIP Codes) were returned by the USPS directly to the NPC for “NPC only check-in.”

From March 23 to April 7, 2000, LCO enumerators used commercial street maps to attempt delivery. Each UAA questionnaire was placed in a plastic bag and hung on the doorknob of the housing unit to which the questionnaire was addressed. If redistribution was unsuccessful, the UAA packet was returned to the LCO, where it was “checked-out” of the LCO and shipped to the NPC. By redistributing UAA questionnaires in areas where they were clustered, the Census Bureau sought to increase response by getting questionnaires into the hands of potential census respondents early in the mail response period. Another purpose of the redistribution operation was to address geographic clustering of UAA questionnaires.⁸⁶

⁸³ U.S. Census Bureau, “Program Master Plan: Data Capture Systems and Operations,” March 30, 2001, p. 17.

⁸⁴ *Ibid.*, p. 13.

⁸⁵ These may have been cases where the respondents collected mail at post office boxes as opposed to places of residence. The remaining undeliverability categories (duplicate, under construction, demolished, nonresidential, no such apartment, post office box, not deliverable and unable to forward, outside delivery limits, refused, blank/other, and illegible) contributed 6 percent or less each to the universe of undeliverable questionnaires.

⁸⁶ Felipe Kohn, Decennial Statistical Studies Division (DSSD), “The United States Postal Service Undeliverable Rates for Census 2000 Mailout Questionnaires: Final Report,” Census 2000 Evaluation No. A.6.a., April 10, 2003, pp. i–3; John Chesnut, DSSD, “Study of the U.S. Postal Service Reasons for Undeliverability of Census 2000 Mailout Questionnaires: Final Report,” Census 2000 Evaluation A.6.b., September 30, 2003, pp. i–5.

Questionnaires delivered by the USPS or in the census redistribution operation may or may not have been returned by mail. Those not returned by mail were included in NRFU. Any questionnaires that were sent to the NPC designated as final UAA were also included in NRFU. A total of 9.7 million UAA questionnaires were received at the NPC.⁸⁷

Mail Response Rate and Return Rate

The mail response rate refers to the percent of addresses eligible for NRFU that returned questionnaires prior to the designation of the NRFU universe. Response rates are the result of a combination of respondent cooperation level, the housing unit vacancy rate, and the quality of the decennial master address file.⁸⁸

Preliminary analysis indicated that questionnaires mailed back by respondents are more complete and so have lower amounts of imputed information than enumerator returns.⁸⁹ Due to the higher data quality and lower cost associated with self-enumerated responses relative to enumerator-collected responses, the Census Bureau considers a high mail response to the census very important.

The initial mail response rate is defined as the number of mail returns received prior to the cut-off date for determining the NRFU universe, divided by the total number of housing units in mailback areas eligible for NRFU. The final mail response rate is similar but includes all mail returns through the end of the year. Returns included in these response rates are paper questionnaires, responses collected through the TQA and IDC programs, Be Counted forms, and coverage edit follow-up returns.

The mail return rate is different from the mail response rate. The mail return rate is used primarily to determine the level of respondent cooperation, whereas the mail response rate is used to determine the NRFU workload. The mail return rate measures the percentage of occupied housing units that returned questionnaires by April 18, 2000. The denominator of the mail return rate is calculated from the 100 percent Census Edited File with the reinstated housing units. This file includes all occupied housing units in MO/MB areas that were added to the DMAF prior to NRFU and addresses to which questionnaires were delivered by the USPS or during the Census Bureau's UAA redelivery operation. The response rate denominator is greater than the return rate denominator, largely because the response rate denominator includes vacant housing units, UAA addresses, some addresses deleted in U/L and UU/L, and others deleted in either NRFU or coverage improvement follow-up.

Mail response rate. The mail response rate as of April 18, 2000, was 64.3 percent, slightly lower than the 1990 mail response rate of 65.0 percent.⁹⁰ This rate represents 75,608,035 mail returns that were received by April 18, 2000, out of a response rate denominator of 117,661,748 households. Another 3,703,140 questionnaires were returned after April 18, resulting in a final response rate of 67.4 percent, as of December 31, 2000.

⁸⁷ The undeliverable questionnaires that were successfully redistributed by the redistribution operation conducted by selected LCOs are not included in the workload received at the NPC. John Chesnut, DSSD, "Study of the U.S. Postal Service Reasons for Undeliverability of Census 2000 Mailout Questionnaires: Final Report," Census 2000 Evaluation No. A.6.b., September 30, 2003, p. iii.

⁸⁸ Herbert Stackhouse and Sarah Brady, "Census 2000 Mail Response Rates: Final Report," Census 2000 Evaluation No. A.7.a., January 30, 2003, and "Census 2000 Mail Return Rates: Final Report," Census 2000 Evaluation No. A.7.b., January 30, 2003.

⁸⁹ The imputation rate indicated the proportion of people or housing units with missing or inconsistent information for which the Census Bureau used imputation to assign values based on people or housing units with similar attributes. There were two major types of imputation: (1) allocation, in which missing values for individual items are filled in on the basis of information reported on another person or housing unit record and (2) substitution, in which all of the information for a household is duplicated from another household of the same size. "Study Plan for B.1: Evaluation of the Analysis of the Imputation Process for 100 Percent Household Population Items," DSSD Census 2000 Procedures and Operations Memorandum No. Y-1, October 1, 2001.

⁹⁰ U.S. Bureau of the Census, "1990 Census Mailback Questionnaire Check-in Rates, Decennial Planning Division," March 14, 1991; Herbert Stackhouse and Sarah Brady, "Census 2000 Mail Response Rates: Final Report," Census 2000 Evaluation No. A.7.a., January 2003, p. v.

Reflecting the greater effort required of long-form respondents, the short-form mail response rate of 66.4 percent was 12.5 percentage points higher than the long-form mail response rate of 53.9 percent. In 1990, the mail response rates for short forms and long forms were 65.9 percent and 60.6 percent, respectively.⁹¹

Mail return rate. The mail return rate as of April 18, 2000, was 74.1 percent, which was the same as the 1990 mail return rate.⁹² This rate represents 75,163,020 mail returns that were received by April 18, 2000, out of a return rate denominator of 101,398,131 households. Another 4,367,080 questionnaires were returned after April 18, resulting in a final return rate as of December 31, 2000, of 78.4 percent. The final return rate in 1990, which included late mail returns received through the end of the census, was 75.0 percent.

Reflecting the higher response burden of the long-form questionnaire, the short-form mail return rate (as of April 18, 2000) of 76.4 percent was 13.4 percentage points higher than the long-form mail return rate of 63.0 percent. The mail return rates for short forms and long forms in 1990 were 74.9 percent and 70.4 percent, respectively.⁹³

Table 5-4.
Mail Response Rates
[As of cutoff for NRFU]

Description	1970	1980	1990	2000
Total	78.3	75.0	65.0	64.3
Short form.....	(NA)	(NA)	65.9	66.4
Long form.....	(NA)	(NA)	60.6	53.9
Difference (S/L).....	(NA)	(NA)	5.3	12.5

Sources: DMAF and DRF-2. Census 2000 Evaluation No. A.7.a., pp. v-2, 10-11; U.S. Census Bureau, *1990 Census of Population and Housing History Part A*, 1990 CPH-R-2A, p. 6-29; GAO, "2000 Census Best Practices and Lessons Learned for a More Cost-Effective Nonresponse Followup," GAO-02-196, p. 12.; U.S. Census Bureau, *1980 Census of Population and Housing History, Part B*, PHC80-R-2B, pp. 5-24-5-25.

Table 5-5.
Mail Return Rates
[As of cutoff for NRFU]

Description	1970	1980	1990	2000
Total	87.0	81.3	74.1	74.1
Short form.....	(NA)	81.6	74.9	76.4
Long form.....	(NA)	80.1	70.4	63.0
Difference (S/L).....	(NA)	1.5	4.5	13.4

Sources: HCEF_D', DRF-2, and March 2001 MAF Extract. Census 2000 Evaluation No. A.7.b., pp. vi, 1-2, 12; U.S. Census Bureau, *1990 Census of Population and Housing History Part A*, 1990 CPH-R-2A, p. 6-29; GAO, "2000 Census Best Practices and Lessons Learned for a More Cost-Effective Nonresponse Followup," GAO-02-196, p. 12; U.S. Census Bureau, *1980 Census of Population and Housing History, Part B*, PHC80-R-2B, pp. 5-24-5-25.

Tables 5-4 and 5-5 illustrate the continuing decline in both mail return and mail response rates for the past three censuses. While response and return rates for short forms decreased substantially after 1980, during Census 2000 short-form responses rebounded due in part to the aggressive promotional campaign.⁹⁴ The continued decline in long-form response and return rates, however, suggests that respondents have become much less likely to complete a long-form census questionnaire.⁹⁵ Given this overall decline in public participation, and specifically the continued decline

⁹¹ U.S. Bureau of the Census, "1990 Census Mailback Questionnaire Check-in Rates," Decennial Planning Division, March 14, 1991.

⁹² U.S. Bureau of the Census, "Documentation of the 1990 Census Mail Return Rates," Decennial Statistical Studies Division 1990 REX Memorandum Series #Q13, October 15, 1992.

⁹³ Ibid.

⁹⁴ The final mail response rate increased to 67.4 percent by December 31, 2000. The final response rate for short forms was 69.1 percent and for long forms was 59.4 percent. Census 2000 Evaluation No. A.7.a., pp. v-2, 10-11.

⁹⁵ Eleanor Singer, *Privacy Research in Census 2000*, Census 2000 Testing, Experimentation, and Evaluation Program Topic Report No. 1, TR-1 (Washington, DC: U.S. Census Bureau, 2003), pp. 13-14.

in long-form responses, the Census Bureau is likely to encounter greater challenges in encouraging public participation in 2010. Moreover, this continued decline in participation reflects an increasing NRFU workload, and with it, a substantial increase in the cost of completing field enumeration.

ENUMERATION METHODS

Update/Leave (U/L)

For Census 2000 the country was divided into nine types of enumeration areas, determined by address type and enumeration procedure. While the primary method of enumeration was mailout/mailback (MO/MB), the second largest enumeration methodology, based on the quantity of housing units, was update/leave (U/L). U/L was used in areas where mail delivery was predominately to addresses not in house-number, street-name format. Noncity style addresses, such as rural route and box, or post office box, are often not linked to the physical location of the housing unit. Since U.S. Postal Service (USPS) mail delivery was not possible when only a location description was available for a unit, U/L was the methodology used. This methodology required census enumerators to deliver the questionnaire package to the housing units in each U/L area. Areas designated for U/L were primarily rural though not usually located in remote or sparsely populated areas. Designations of U/L were made by block. In Puerto Rico, U/L was the only enumeration methodology used.

During the Census 2000 U/L operation, questionnaires with preprinted address labels were hand-delivered to every housing unit on the U/L address list. Housing units not listed on the address register received hand-addressed questionnaires and their addresses were added to the list. Staff in the field delivering questionnaires also made other updates to the address list and to the maps.

There were 23,525,257 addresses in stateside U/L operations and 1,471,225 in Puerto Rico. This represents the number of addresses that had either a labeled questionnaire that was distributed during U/L or a hand-addressed questionnaire for a unit that was added to the address list during the U/L operation. Questionnaires were distributed to all housing units within U/L areas. Some of the addresses on the U/L address list were deleted as nonexistent or nonresidential. Their labeled questionnaires were not delivered.⁹⁶

Stateside U/L operations added 1,644,174 addresses, and Puerto Rico added an additional 111,787. The number of corrections in stateside areas was 9,045,814 and 751,156 in Puerto Rico. The number of deletes, either as nonexistent or as nonresidential, was 1,228,987 in stateside areas and 122,815 in Puerto Rico. In addition, some units that were deleted in U/L were matched with units added during U/L, using address matching after processing the address file. This resulted in 24,265 moves, all of which were stateside. Units on the address list for U/L that did not receive any of these field actions were verified. There were 11,582,017 of these stateside and 485,467 of these in Puerto Rico.⁹⁷

Urban Update/Leave (UU/L)

The Census Bureau conducted the urban update/leave (UU/L) operation between March 3 and March 31, 2000, with the intent of improving coverage by improving the deliverability of the questionnaires and updating address information and census maps. The UU/L operation targeted urban areas deemed unsuitable for MO/MB. Such areas included multiunit buildings, where the USPS delivered mail to a drop point rather than to individual units, and urban communities, where despite the use of city-style addresses, many residents picked up their mail at post office boxes. The UU/L operation relied on local knowledge to identify areas where the USPS could not adequately deliver the census questionnaires.⁹⁸

⁹⁶ Robin Pennington, "Evaluation of the Update/Leave Operation, Final Report," Census 2000 Evaluation No. F.10. June 6, 2003.

⁹⁷ U.S. Census Bureau, "Census 2000 Operational Plan," DMD/01-1419, December 2000; U.S. Census Bureau, "Program Master Plan for the Census 2000 Update/Leave Operation," December 7, 2000, pp. 1-4.

⁹⁸ Miriam Rosenthal, "Urban Update/Leave," Census 2000 Evaluation No. F.11., October 3, 2002.

In areas designated for UU/L, enumerators delivered census questionnaires and updated their address registers and census maps concurrently. Residents were asked to complete and mail back their census questionnaires. Housing units from which the Census Bureau did not receive a completed questionnaire on or before April 18, 2000, were visited and enumerated during nonresponse follow-up.

Eight regions (Atlanta, Boston, Chicago, Dallas, Denver, Detroit, Philadelphia, and Seattle) chose to participate in the UU/L operation.⁹⁹ Twelve states (California, Colorado, Delaware, Florida, Idaho, Illinois, Louisiana, Michigan, New Jersey, Pennsylvania, Rhode Island, and Washington) and the District of Columbia contained UU/L enumeration areas. Nationwide, 12,843 blocks were covered by UU/L, of which 7,657, or 59.6 percent, contained housing units. The master address file (MAF) included 314,059 residential addresses in UU/L blocks. Removing known duplicates left 310,114 addresses. Of these, 280,086 (90.3 percent) were delivered to the decennial master address file (DMAF). Ultimately, 238,216 addresses were enumerated in the census as either occupied or vacant housing units.

Update/Enumerate (U/E)

The update/enumerate (U/E) method of enumeration targeted communities with special enumeration needs and areas where most housing units may not have had city-style mailing addresses. These included resort areas with high concentrations of seasonally vacant housing units and selected American Indian reservations and colonias—the latter generally were Hispanic-occupied unincorporated communities near the Mexican border. By going directly to the field, the Census Bureau was able to save time and money in areas where it had significant concerns about responsiveness and address integrity.

In U/E areas, enumerators updated address registers and census maps and enumerated housing units at the time of their visits. The Census Bureau conducted the U/E operation from March 13 to June 5, 2000. Every RCC, except Detroit, was responsible for areas enumerated using the U/E methodology. Thirty-five states contained U/E areas.¹⁰⁰ Nationwide, 183,889 blocks were covered by U/E, and 75,827 of these blocks (41.2 percent) contained housing units. The MAF contained 1,191,835 residential addresses in U/E blocks. After removing known duplicates, there were 1,169,090 addresses. Of these, 1,056,317 addresses, (90.4 percent) were delivered to the DMAF. Ultimately, 956,214 U/E addresses were enumerated in the census as either occupied or vacant housing units.¹⁰¹

List/Enumerate (L/E)

List/enumerate (L/E) operations were conducted in remote, sparsely populated areas of the United States, in areas without city-style mail delivery, and in the Island Areas. For Census 2000, approximately 392,000 housing units were enumerated during the L/E operation, compared to 6.5 million in 1990.¹⁰²

In September 1996, the Census Bureau's regional staff identified counties that were the most likely candidates for using the L/E methodology during Census 2000. The main criterion used to prioritize a county was housing unit density. Counties with the lowest housing unit density were

⁹⁹ For Census 2000, regions were given the option to participate in UU/L. Evaluations of this practice recommend that in the future, UU/L participation should be decided by headquarters staff, with information provided by regional staff.

¹⁰⁰ The 35 states were Alabama, Alaska, Arizona, California, Colorado, Connecticut, Florida, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Massachusetts, Minnesota, Mississippi, Montana, Nebraska, Nevada, New Mexico, New York, North Carolina, North Dakota, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Texas, Utah, Virginia, Washington, Wisconsin, and Wyoming.

¹⁰¹ Miriam Rosenthal, "Update/Enumerate: Final Report," Census 2000 Evaluation No. F.12., December 10, 2002.

¹⁰² In 1990, the USPS delivered Advance Census Reports (ACRs) to all residential addresses in their list/enumerate delivery areas and enumerators collected the questionnaires at the time of enumeration. However, for Census 2000, ACRs were eliminated because L/E areas were delineated at the block level. Carrier routes did not necessarily fall into entire ZIP Codes, so the Census Bureau was not able to tell the USPS where to deliver ACRs. As a result, enumerators enumerated all housing units in their areas using enumerator questionnaires.

assigned the highest priority for enumeration using the L/E method. Once the target counties were identified, additional characteristics—such as weather, limited/seasonal accessibility, long distances between post offices, land uses that precluded or restricted housing units, and percentage of vacant and seasonal housing units—were factored into the effort. The Census Bureau’s Geography Division created block files for these counties so that regional staff could identify the blocks being enumerated using the L/E methodology.

Beginning March 13, 2000, enumerators visited housing units in the L/E areas of the country to conduct interviews using enumerator questionnaires. An enumerator canvassed an assigned area on a block-by-block basis, listed addresses, map-spotted living quarters on the census map, and completed a questionnaire (short- or long-form questionnaire) for each housing unit, including vacant housing units.¹⁰³ If the unit was designated on the address register (AR) for a long-form questionnaire (indicated by the letter “L” in Box 11 of the address listing page), the enumerator used this form to complete the interview.

If, on the first visit, an enumerator was unable to contact a household member who was at least 15 years of age, the enumerator recorded the address, or a physical location description, or both in the AR. The enumerator also assigned a map-spot number, map-spotted the housing unit on the block map, and applied ID labels to the questionnaire and the corresponding address line in the AR. He or she also filled out the “record of contact” portion on the front of the questionnaire to indicate the need of a callback and left a Form D-26, Notice of Visit, at the unit before moving to the next address in the assignment area. Included on the Notice of Visit form were the geographic codes for the housing unit and the enumerator’s name, telephone number, and best time to be reached. The enumerator left the notice where the housing unit inhabitants were most likely to find it (but not in the mailbox). After the initial visit, the enumerator could conduct a telephone interview when the respondent called or by obtaining the housing unit’s telephone number from a local directory or neighbor. Enumerators were expected to make up to three telephone callbacks at different times of the day.

If the enumerator could not contact the respondent and complete a questionnaire after the three callback attempts, the enumerator made two additional personal visits to the housing unit. As a last resort, the enumerator could contact a neighbor or other knowledgeable person to obtain information if contact with a member of the housing unit was not possible.¹⁰⁴

Field Follow-Up

Field follow-up operations were conducted upon completion of L/E. During this phase of the process, enumerators revisited addresses resampled as long forms in the sample tolerance check, housing units identified during the merge operation as missing, and nonseasonal vacant units. Enumerators used enumerator questionnaires to conduct interviews for all three types of follow-up cases. Completed questionnaires were returned to the office, where they were checked in and out of the local census office. After checkout they were shipped (via overnight delivery) to the National Processing Center for data capture.

NONRESPONSE FOLLOW-UP (NRFU)

Nonresponse follow-up (NRFU) was an attempt to obtain completed questionnaires from households in mailback areas that neither responded by mail nor submitted responses via the Internet or Telephone Questionnaire Assistance (TQA) interview. Questionnaires not checked in when the NRFU universe selection process began were identified for NRFU. The NRFU selection process began on April 11, 2000, and continued for just over a week. The Census Bureau updated the decennial master address file (DMAF) before identifying the NRFU universe. The mailback areas

¹⁰³ For living quarters without house-number/street-name addresses, the enumerator had to enter a location description in the address register to help the follow-up operations identify the exact location. The enumerator also updated the census maps.

¹⁰⁴ U.S. Census Bureau, “Census 2000 List/Enumerate Program Master Plan,” February 4, 2000.

comprised 119,090,016 addresses (including Puerto Rico) potentially eligible for follow-up. According to NRFU specifications, the Decennial Systems and Contracts Management Office used the DMAF to identify the initial workload of 44,928,883 addresses, and a file was created for printing the address registers.

The Technologies Management Office released the files of census cases requiring follow-up to the local census offices (LCOs). A review of late mail returns identified 2,555,918 addresses that were checked in between April 11 and April 18, 2000, inclusively. A list of these addresses was sent to the appropriate LCOs for manual removal from the printed address registers. The resulting NRFU workload, which included Puerto Rico, was 42,372,965 addresses.¹⁰⁵

The NRFU operation was scheduled for April 27 through July 7, 2000; however, the actual start and finish dates were April 27 and June 26, with the remaining follow-up cases sent to coverage improvement follow-up (CIFU). The check-in process for NRFU, as reported in the Operations Control System 2000 (OCS 2000), began April 21, the date the first NRFU enumerator questionnaire (EQ) was checked into the OCS 2000, and ended on September 7. Based on OCS 2000 data, the duration of the NRFU operation was approximately 127 days.¹⁰⁶ NRFU exceeded its total planned budget of \$1.1 billion by \$78,946,983 (7.23 percent). An internal assessment attributed this overspending to overstaffing, lower than anticipated production rates, and a redistribution of funds for reinterview operations.¹⁰⁷

Enumeration Procedures

During NRFU, enumerators visited each nonresponding address to determine occupancy status as of Census Day. The Census Day unit status of a housing unit indicated one of three possible conditions: *occupied* by the current household or a different household, *vacant*, or *nonexistent*. Enumerators were instructed to determine the occupancy status of the housing unit, complete the appropriate EQ, and enter an occupancy status code on the address listing page for the unit.

For occupied units, enumerators completed short- or long-form EQs (depending on whether the unit was designated to be in the census long-form sample), collected unreturned mailout questionnaires and Be Counted forms, and conducted necessary interviews to obtain household information.

For housing units that were vacant on Census Day, enumerators determined if a unit was a regular vacant unit, such as a home for sale or rent, or if it was occupied by a household that had a usual home elsewhere. For a unit with regular vacant status, the enumerator completed the appropriate long- or short-form EQ, and for a unit where the whole household had a usual home elsewhere (WHUHE), the enumerator completed the interview summary for the short-form EQ, listing the unit as vacant with population code "00." For a WHUHE housing unit with a long-form EQ, the enumerator completed both the short-form interview summary and a short-form questionnaire to obtain Census Day information for the household's usual address.

Addresses classified as nonexistent were those that enumerators determined did not qualify as housing units as of Census Day. An address was classified as nonexistent if it was demolished or burned out, condemned, under construction, or nonresidential. Other nonexistent addresses included those that enumerators were unable to locate and duplicate addresses identified by enumerators in the NRFU address list. Enumerators marked nonexistent addresses for deletion from the address list.¹⁰⁸

¹⁰⁵ Darlene A. Moul, "Nonresponse Followup for Census 2000," Census 2000 Evaluation No. H.5., July 25, 2002, p. v.

¹⁰⁶ While the OCS 2000 reported check-ins as late as September 7, according to the DMAF, nothing was checked in after August 25, thus there is an unresolved discrepancy between the two data sources.

¹⁰⁷ U.S. Census Bureau, "Assessment Report for Nonresponse Followup, Final," Census 2000 Informational Memorandum No. 127, August 5, 2002, p. 3.

¹⁰⁸ Although enumerators did not actively look for missing housing units, if an enumerator discovered one, he or she could add the address to the list for enumeration. U.S. Census Bureau, "Program Master Plan, Nonresponse Followup, Revision 1," December 2000, pp. 10–12.

To obtain information about a household, the enumerator was required to speak with a knowledgeable respondent, age 15 or older.¹⁰⁹ A knowledgeable respondent was generally a member of the household if the unit was occupied, but a neighbor, building superintendent, or other non-household respondent could supply the information if a respondent from the follow-up household was not available. If the household members were on vacation, for example, a knowledgeable nonhousehold respondent could supply sufficient information to complete the questionnaire and exceed the partial interview standards.¹¹⁰

Enumerators were required to make a conscientious effort to obtain completed questionnaires and to keep records of both personal visits and telephone attempts. Enumerators were required to make up to three personal visits and three phone calls for a maximum of six attempts to complete questionnaires for occupied units and units that appeared occupied. If, after the required three personal attempts at varying times, an enumerator was unable to find a household member at home, the enumerator interviewed some other knowledgeable individual to obtain the Census Day status of the address. Such individuals were also known as “proxy” respondents. An enumerator was permitted to interview a proxy respondent on the first visit to a unit that was obviously vacant or should be deleted. Whenever possible, enumerators were encouraged to complete entire interviews although partial interviews were often accepted.¹¹¹

Final Attempt

Once a crew leader’s district reached a 95 percent completion rate, final attempt procedures were implemented. Final attempt procedures were designed to ensure that an enumerator visited, or called by phone if available, each unenumerated unit at least three times during NRFU to obtain a completed interview before a proxy interview or less-than-complete information was obtained. During this operation, an enumerator made one final visit to each address to obtain a complete interview or, at a minimum, the unit status and population count.

Review and Check-In

Enumerators turned in completed questionnaires and pay and work records to their crew leaders daily. Crew leaders reviewed these forms against a checklist of specifications to ensure that they were properly completed, then initialed and dated the certification section of the EQs. Vetted EQs went through assignment control in the LCOs, where assignment control clerks reviewed them to check the completion of such critical items as the:

- Questionnaire label.
- Enumerator’s signature and crew leader’s initials in the certification item.
- Introduction questions (S2–S5).
- Coverage questions (C1 and C2) as appropriate.¹¹²
- Interview summary items (unit status, population count, and if applicable, partial interview, refusal, and closeout).

Questionnaires that failed the review and required resolution were returned to the enumerators through their field operations supervisors. Questionnaires that passed the review were routed to the OCS 2000 for automated check-in. During the check-in operation, the OCS 2000 selected cases for the reinterview program (see below). Questionnaires selected were routed to the reinterview section of the LCOs for data transcription. Upon completion of transcription, the original

¹⁰⁹ “Knowledgeable” meant that a person knew about the household that lived at the address on April 1, 2000, and/or the housing unit as it existed on April 1, 2000.

¹¹⁰ A partial interview was an interview in which the enumerator obtained less than the minimum amount of information required for a complete interview, but obtained at least unit status and population count from the household member or nonhousehold respondent. See U.S. Census Bureau, “Program Master Plan, Nonresponse Followup, Revision 1,” December 2000, p. 14.

¹¹¹ *Ibid.*, p. 9.

¹¹² Coverage question C1 verified that the list of household members on the questionnaire included all the household members who should be counted. Coverage question C2 verified that the household members listed on the questionnaire did not contain anyone who should not be counted.

forms were routed to the OCS 2000 for check-in. Reinterviews were assigned to reinterview clerks for further processing. Reinterviews were conducted using a D-806, Reinterview Questionnaire. All questionnaires were eventually assigned a check-out status and shipped to the appropriate data capture center (DCC).

Special Data Collection Methods for Targeted Areas

The Census Bureau planned to overcome barriers to successful enumeration and improve coverage in Census 2000 by implementing special data collection methods for population groups and geographic areas that historically had a disproportionate share of people missed in previous censuses. Regional census center (RCC) staffs identified such areas by combining their knowledge of local conditions with data drawn from a planning database that correlated various housing, demographic, and socioeconomic variables with nonresponse and undercount rates. Three special enumeration methods were devised for NRFU field operations to improve respondent cooperation and to address concerns about the personal safety of enumerators in these hard-to-enumerate areas. These methods were blitz enumeration, paired enumeration, and the use of local facilitators.

During blitz enumeration, a crew of enumerators conducted enumeration activities in a very compressed time schedule (generally two or three days) under the close supervision of a crew leader, who remained on-site to resolve problems and to assist with respondents who were reluctant to participate in the census. The objective was to create a substantial census presence (particularly in hard-to-enumerate apartment buildings) and complete the large caseload in one massive sweep. Blitz enumeration proved successful in areas with complex households, low levels of cooperation, multiunit buildings, a large number of renters, or low enumerator productivity. While many enumerators who conducted blitz enumeration thought it was beneficial and that it improved overall enumeration in the targeted areas, it resulted in higher rates of refusal, partial interviews, final attempts, and population-unknown cases than both regularly enumerated units and those enumerated using other special methods.

Paired enumeration was used largely to provide support in areas where the safety of enumerators was a concern. One enumerator conducted the actual interview while the other enumerator monitored the surrounding environment and provided support functions as needed. The enumerators would alternate performing interview or support activities at every other household to ensure each retained his or her interviewing skills. Paired enumeration was used also in rural areas containing hard-to-locate housing units. In this situation, one member of the team served as a navigator while the other person drove the car. Paired enumeration not only helped enumerators feel safe in these areas, but also resulted in fewer refusals, partial interviews, and final attempts.

Local facilitators, also known as cultural facilitators, were generally well-known residents, such as community activists, religious leaders, and recognized local figures, who helped facilitate the completion of NRFU. They were sworn in as special sworn status individuals to protect the confidentiality of census information, and they provided assistance such as introducing enumerators to respondents, providing translation services, convincing residents to cooperate, and helping enumerators to find hidden living quarters. They were paid on a contract basis at the rate of an enumerator's hourly pay. This was perhaps the most effective of special enumeration methods. Use of local facilitators resulted in the lowest refusal rates, partial interviews, and population-unknown cases.¹¹³

Approximately 1.7 million (4 percent) of the NRFU cases were enumerated using one of these special methods, and the completeness of the data collected in targeted areas (6.64 percent cases less than complete) was comparable to nontargeted areas (5.93 percent of cases less than complete). Given that targeted areas were expected to provide less complete data, these figures suggest that the use of special methods was effective in increasing both the quantity and the quality of NRFU interviews completed.¹¹⁴

¹¹³ Local facilitator enumeration did have much higher final attempt rates than regular enumeration.

¹¹⁴ Fred R. Borsa and Christine L. Hough, *Data Collection in Census 2000*, Census 2000 Topic Report No. 13, TR-13 (Washington, DC: U.S. Census Bureau, 2004) pp. 24–25.

Supplemental Campaigns

To complete NRFU operations and ensure a census count as complete as possible, the Census Bureau conducted three supplemental campaigns. These included the Be Counted campaign, follow-up for POP 99 housing units, and residual nonresponse follow-up.

“Be Counted” campaign. During the 1970, 1980, and 1990 censuses, the Census Bureau used a post-NRFU campaign called “Were You Counted?” that allowed people who believed they were not counted an opportunity to participate in the census. The Were You Counted campaign resulted in forms being printed in local newspapers and other media. People who believed they were not counted could complete and return a Were You Counted form.¹¹⁵

The Census 2000 Be Counted campaign was similar to the Were You Counted campaign in that it was designed as a special tool. This tool was used to count those who did not receive a census questionnaire, count those who believed they were not included on any other census form, encourage participation of the traditionally undercounted, and provide a means to count those with no usual residence. Although not as widely distributed as the Were You Counted forms, Be Counted forms (BCFs) were available at approximately 85,000 sites and at the Questionnaire Assistance Centers (QACs). They were available in English, Spanish, Chinese, Korean, Tagalog, and Vietnamese. The Census Bureau printed and distributed about 16 million forms in anticipation of receiving 1 million completed forms.

BCFs were placed on March 31 and were removed from the sites on April 17, 2000. These dates coincided with Census Day and the start of NRFU. Respondents were able to call the TQA number and, if they met certain criteria, could provide their short-form data via telephone interview.¹¹⁶ A respondent who did not know his or her census ID could request a form, and one form would be mailed to the respondent’s address. Forms received for people with no usual residence were processed as part of the service-based enumeration (SBE) population.

Addresses provided on the BCFs were matched and geocoded to addresses on the master address file (MAF) to determine whether they should be included in the census. BCF addresses that matched those in the MAF were linked to the IDs on the DMAF with corresponding addresses. BCF addresses that did not match existing MAF records were geocoded. Addresses that matched MAF records that had not been selected for the census were sent to the field for verification, as were the geocoded nonmatches.¹¹⁷ Field verification consisted of an enumerator visiting the address provided on the BCF and determining the status of the address as existing or nonexistent or determining it to be a duplicate of an address already in the DMAF. For verified addresses, information was collected and included in the census. Duplicate and nonexistent addresses were deleted. BCFs added 560,880 people to the census. This, combined with other coverage improvement programs, resulted in improved coverage of groups traditionally undercounted in previous censuses.

POP 99. The POP 99 supplemental operation was the reenumeration of housing units that enumerators identified as occupied during NRFU but did not provide population counts as of Census Day. During this operation, enumerators revisited addresses for which no counts of the population were provided. The workload for POP 99s for Census 2000 was 589,232 housing units.¹¹⁸

Residual nonresponse follow-up (R-NRFU). This supplemental operation was designed to identify and collect information from households for which EQs were lost. In R-NRFU cases, addresses had been checked out as complete by LCOs but did not continue through to data capture at the DCCs. Given that these addresses were not checked in at the DCCs, they were not included in the initial screening for CIFU cases. Since CIFU had developed in a wave format, the Census Bureau developed the R-NRFU operation to account for these lost addresses. R-NRFU identified and successfully reenumerated 121,792 households.

¹¹⁵ The 1980 Were You Counted evaluation estimated that 62,000 forms, covering 140,000 persons, were received. Of these, 71,000 were added to the census after unduplication. In 1990, the Census Bureau received about 352,800 forms, from which about 260,000 persons were added to the census.

¹¹⁶ See above section on Telephone Questionnaire Assistance in this chapter.

¹¹⁷ For information on geocoding, see Chapter 7, “Census Geography and the Geographic Support System.”

¹¹⁸ U.S. Census Bureau, “Program Master Plan, Nonresponse Followup, Revision 1,” December 2000, p. 38.

QUALITY ASSURANCE

Quality assurance programs were developed to ensure the accuracy and quality of the data collected in each of the enumeration operations. These programs consisted of initial and weekly reviews of enumerators' work by crew leaders, as well as office review of address binders, registers, and maps. Crew leaders provided enumerators with immediate feedback following the reviews. Questionnaires, address binders, and address registers were reviewed to verify completeness, and a sample of addresses was revisited to determine how accurately enumerators listed and collected data from the units.¹¹⁹

Crew leaders reviewed enumerators' questionnaires for update/leave (U/L), urban update/leave (UU/L), update/enumerate (U/E), and leave/enumerate (L/E) operations. Completed questionnaires were returned to the appropriate local census office (LCO) on a flow basis, where the assignment control unit reviewed them and forwarded acceptable questionnaires to the check-in area. Questionnaires went through an edit to detect instances of duplication and inconsistency between the interview summary items (unit status, population, and type of vacant) during questionnaire check-in.¹²⁰

LCO assignment control staff attempted to resolve instances of duplicate questionnaires. Office staff also reviewed Form D-929, Merge Error List, to identify cases that were not wanded-in properly. The Operations Control System (OCS 2000) performed an automated merge that flagged IDs wanded-in at only one of the three wanding stages (check-in registers, check-in questionnaires, and check out to data capture center). The merge operation allowed office staff to identify housing units requiring additional fieldwork.

Upon completion of a regional census center's (RCC) L/E workload, RCC staff conducted a sample tolerance check (STC) for the entire LCO. The STC checked to ensure that the proper proportion of the population in each assignment area had been enumerated using the long-form questionnaire. Assignment areas that failed the STC were resampled using STC software. Short-form questionnaire cases that were resampled as long-form questionnaire cases were returned to the field to obtain the necessary long-form data. Long-form questionnaire cases that were resampled as short-form questionnaire cases were not returned to the field. Instead they were resolved through a computerized conversion of long-form questionnaire data to short-form data (also referred to as 100 percent data) known as truncation.¹²¹

The Census Bureau also conducted a quality control program for group quarters (GQ). The GQ Reinterview program targeted large (with a Census Day population of 100 or greater) and small GQs that failed the population estimate check. For each GQ selected, an office clerk contacted the GQ contact person to determine if an enumerator had visited the GQ and if the total number of residents recorded by the enumerator on the Individual Census Report was correct. If the GQ failed reinterview, the clerk flagged the location for rework or reenumeration. The GQ Reinterview

¹¹⁹ For specifications of QA procedures by enumeration method, see Howard Hogan to Brian Monaghan, "Quality Assurance Specifications for Detecting Non-intentional Errors for the Census 2000 List/Enumerate Operation," Decennial Statistical Studies Division (DSSD) Census 2000 Procedures and Operations Memorandum No. II-3, May 20, 1999; Christine Lynch to Brian Monaghan, "Specifications for the Quality Assurance for the Census 2000 Urban Update/Leave Operation," DSSD Census 2000 Procedures and Operations Memorandum No. II-15 (revised), December 13, 1999; Broderick E. Oliver to Rajendra P. Singh, "Profile of the Census 2000 Update/Leave Quality Control Program," DSSD Census 2000 Procedures and Operations Memorandum No. KK-F-03, August 20, 2003; Christine Lynch to Brian Monaghan, "Specifications for the Quality Assurance for the Census 2000 Update/Enumerate Operation," DSSD Census 2000 Procedures and Operations Memorandum No. II-11 (revised), January 31, 2000; Kimberly D. Nether and Broderick E. Oliver to Rajendra P. Singh, "Profile of the Census 2000 Update/Enumerate Quality Control Program," DSSD Census 2000 Procedures and Operations Memorandum No. KK-F-09, March 17, 2004.

¹²⁰ U.S. Census Bureau, "Census 2000 Update/Enumerate PMP," October 26, 2000, p. 3; U.S. Census Bureau, "Census 2000 Urban Update/Leave PMP," December 21, 2000, pp. 4, 9–10; U.S. Census Bureau, "Census 2000 Update/Leave PMP," December 7, 2000, pp. 11–12.

¹²¹ During truncation, the Decennial Systems and Contracts Management Office discarded sample data for housing units that should not have been included in the long-form questionnaire sample.

program identified 145 GQs that had to be reenumerated because of significant differences between the census information obtained by the enumerators and that reported by the GQ contacts during reinterview. As a result of this program, at least 15,430 additional people were added to the GQ count.¹²²

The Census Bureau implemented several quality assurance (QA) measures to determine the effectiveness of nonresponse follow-up (NRFU) operations and evaluate the adequacy of the program design, training materials, and procedures of NRFU. The first addressed concerns over NRFU software, address files, and data collection materials. While not a formal part of the software quality assurance programs, the agency conducted a test of NRFU software before deployment. Despite this testing, some error conditions, while not critical, remained undiscovered until early in NRFU field operations.

Other QA measures focused on LCO operations, including the review of questionnaires and address binders as well as the oversight of OCS 2000 data entry to identify double keying errors. In addition, LCO staffs used OCS 2000 to print labels for the enumerator questionnaires (EQs) indicating the census ID for housing units, and the Decennial Statistical Studies Division designed a QA measure to ensure that these labels/IDs were not only correctly placed on the EQs but that the total number of EQs equaled the number of follow-up addresses for a specified assignment area on the assignment directory listing.

To identify enumerators who produced data errors, the Census Bureau implemented a reinterview program that was conducted concurrently with regular data collection activities. Reinterview cases were identified during EQ check-in. For each selected case, the reinterview section of the LCO prepared a D-806, Reinterview and Reconciliation Questionnaire, and made no more than six attempts to contact the household by telephone. A household that could not be contacted by telephone was assigned to a reinterview enumerator who made no more than three personal visits to complete an interview. The interview consisted of obtaining the Census Day status for the housing unit and, if occupied, the household roster. The information collected by the reinterview enumerator was compared with the original roster information and discrepancies noted. If the discrepancies failed the criteria check, the reinterviewer attempted to determine why the discrepancies existed. Some reasons for discrepancies included misinterpretation of whom to include as a household member, carelessness, and falsification. When all reinterview cases were completed, the office operations supervisor (OOS) recorded the results on a Form D-191, Reinterview Control Record, provided feedback to the enumerator, and took appropriate action. Reinterview questionnaires and control records were then shipped to the National Processing Center for processing.

The three components of the reinterview program were random sample, administrative test, and supplemental reinterview. All enumerators were selected for random sample reinterview. Seven cases were selected for reinterview from each enumerator in order to identify enumerators who falsified data. If the reinterview and reconciliation questionnaires indicated that an enumerator falsified data, the enumerator was removed from the operation and all of his or her prior work was to be redone by another enumerator.

The administrative test compared each enumerator's work characteristics to the work characteristics of the other enumerators within the crew leader district (CLD). An enumerator's performance level was evaluated weekly for each of the following performance indicators on the D-908, Administrative Reinterview Trouble Report: average population per household, vacancy rate, partial interview rate, delete rate, and population-count-of-one rate. This report showed the enumerator's name, average/ratio, and the CLD average/ratio of each work characteristic out of tolerance.¹²³

¹²² For more information on GQ Reinterview, see Broderick Oliver to Rajendra P. Singh, "Profile of the Census 2000 Group Quarters Reinterview Operation," DSSD Census 2000 Procedures and Operations Memorandum No. KK-F-02, December 18, 2002, and Christine Lynch to Brian Monaghan, "Specifications for Group Quarters Reinterview and the Quality Assurance for Census 2000 Group Quarters Enumeration," DSSD Census 2000 Procedures and Operations Memorandum No. II-10, July 12, 1999.

¹²³ Administrative reinterview trouble reports also indicated the date the sample was generated, the CLD code, the field operations supervisor code, the number of short and long forms used in the equation, and the RCC code.

Enumerators whose performance was determined to be out of tolerance, with no apparent justification, were manually flagged for reinterview. Once flagged, the next ten cases for that enumerator were designated for reinterview.

Supplemental reinterview allowed the OOS to spot-check the work of enumerators. At any time, the OOS was able to select additional cases for reinterview by entering the enumerator's name on the Reinterview Selection Record in the OCS 2000. The use of supplemental reinterview granted supervisors greater leeway in their oversight of enumerators' work.¹²⁴

Reenumeration in Hialeah, Florida

During Census 2000, the Census Bureau encountered a challenging situation in Hialeah, FL (LCO 2928), where, despite the establishment of such quality assurance procedures, the LCO manager's failure to implement QA measures properly necessitated the largest census recount in the country. On May 30, 2000, Congresswoman Carrie Meek forwarded to the U.S. Department of Commerce's Office of Inspector General (OIG) an anonymous complaint her office had received from a census employee in the Homestead, FL, LCO. The complaint alleged that Homestead enumerators had been ordered to falsify information they reported on census questionnaires and that the manager of the Hialeah LCO—whose employees were assisting the Homestead LCO with its NRFU workload—had encouraged his employees to do whatever was necessary, including falsifying data on questionnaires, to complete their work quickly. It further alleged that the 209 Hialeah enumerators who had been reassigned to the Homestead office completed questionnaires with “John Doe” and “Jane Doe” and used abbreviated enumeration procedures. The OIG immediately began investigating NRFU procedures, questionnaires completed by Hialeah enumerators, and QA documentation and procedures.

The OIG reviewed Homestead questionnaires completed by Hialeah enumerators and QA documentation at Hialeah and interviewed the Hialeah LCO manager; the area manager; staff at the south Florida offices, including Homestead, Hialeah, and Broward South; regional personnel in Atlanta, GA; and headquarters staff in Suitland, MD. The OIG concluded that QA procedures had not been properly implemented by the Hialeah LCO manager. For over 71,000 questionnaires, Hialeah-trained enumerators began final attempt procedures before the CLD reached its final attempt threshold of a 95 percent completion rate. As the OIG reported its findings and recommendations to the Census Bureau, the agency took a series of actions to ensure the integrity of the data collected from these offices. At Homestead, all questionnaires completed by Hialeah enumerators were set aside and thoroughly reviewed; approximately 1,400 housing units were reenumerated. At Broward South, all 3,200 housing units enumerated by Hialeah enumerators were reenumerated, and at Hialeah, approximately 64,000 units—the entire NRFU workload—were reenumerated.¹²⁵

SPECIALIZED ENUMERATION PROCEDURES

During Census 2000, the Census Bureau implemented a comprehensive set of procedures to enumerate people living in nontraditional housing units. These included people who lived in group quarters, people without housing, people who lived at migrant and seasonal farm worker camps, people living on military installations and ships, and federal employees and their dependents living overseas. Special procedures were also applied to enumerate those who lived in unique areas of the country, such as remote Alaska.

Remote Alaska Enumeration

The concentrated populations and city-style addresses of several Alaskan cities and their suburbs encouraged the Census Bureau to designate them as mailout/mailback (MO/MB) areas. Included in this category were the state's two largest cities—Anchorage and Fairbanks—and smaller cities

¹²⁴ U.S. Census Bureau, “Program Master Plan, Nonresponse Followup, Revision 1,” December 2000, pp. 23–25.

¹²⁵ Darlene A. Moul, “Nonresponse Followup for Census 2000,” Census 2000 Evaluation No. H.5., July 25, 2002, p. 5; U.S. Department of Commerce, Office of Inspector General, Office of Audits, Economics and Statistics Audits Division, *Bureau of the Census: Re-enumeration at Three Local Census Offices in Florida: Hialeah, Broward South, and Homestead*, Final Audit Report No. ESD-13215-0-0001/September 2000.

including Sitka, Haines, and Juneau. Areas not included in the MO/MB enumeration participated in the census through the update/leave (U/L) and list/enumerate (L/E) methods (which were also used in sparsely populated areas of the lower 48 states). The U/L method was used in portions of Bethel, Nome, Valdez, and another 12 cities; L/E was conducted in much of southeast Alaska. The timing of most of these operations was the same as for the other states, although enumeration of remote areas using a modified version of L/E procedures began earlier.

Covering populations ranging from a few people to several hundred, Alaska's remote enumeration was unique. Roads linking the widely scattered communities were rare, so most of these communities were accessible only by small-engine airplane, snowmobile, four-wheel-drive vehicle, dogsled, or some combination thereof.

The timing of the spring thaw (or "breakup" as it is known locally) called for the enumeration of the remote areas to begin in late January to allow for travel during periods when conditions were most favorable. Further, the spring thaw not only made travel more difficult or impossible, it also spurred Alaska Natives to leave home for fishing and hunting expeditions.

Remote area enumeration was coordinated by the Anchorage-based Alaska local census office and its satellite offices in Fairbanks and Juneau. Twelve nonprofit and 12 Alaska Native Regional Corporations comprised geographic entities that conducted business and nonprofit affairs for Alaska Natives. The Census Bureau worked through the corresponding Tribal Government Liaison Program to create a partnership that encouraged participation in the census.

Field staff made advance visits from October through December 1999 to prepare for remote area enumeration. During these visits staff obtained information about the villages from village leaders and created "village profiles" detailing the location of lodging, restaurants, etc. Using standard questionnaires, field staff conducted remote enumeration in three waves beginning January 18, February 22, and March 13, 2000, respectively. Despite collecting the data in January, all census questions were answered in relation to Census Day as in the lower 48 states, that is as of April 1, 2000. Each team leader conducted on-the-job training, supervised enumeration and address listing, and, once the enumeration of a village was complete, met with the village leader or designee to sign a Confidentiality Agreement and review the address listing page. Once the address list validation process was complete, the team leader transmitted the Confidentiality Agreement, along with the address register, to the LCO.¹²⁶

Overseas Counts Program

The Census Bureau worked with federal departments and agencies with overseas employees to obtain counts by home state of U.S. Armed Forces personnel and federal civilian employees stationed overseas and their dependents living with them. These counts were based primarily on the administrative records used by the departments and agencies for payroll and personnel purposes. Included in these counts were members of the U.S. Armed Forces on military vessels assigned to a home port in a foreign country. Active duty personnel temporarily stationed overseas were not included in the overseas counts; they were included with the U.S. resident population. Also excluded from the overseas counts were private U.S. citizens living abroad who were not affiliated with the federal government (either as employees or their dependents) and crews of U.S. merchant ships engaged in foreign transportation.¹²⁷ In Census 2000, "overseas" was defined as anywhere outside the 50 states and the District of Columbia. Thus, the Commonwealth of Puerto Rico, the U.S. Virgin Islands, and the Pacific Island Areas were considered to be overseas. The overseas counts were used solely for reapportioning seats in the U.S. House of Representatives. They were not used for redistricting nor included in the counts used for funds allocation.¹²⁸

¹²⁶ U.S. Census Bureau, "Program Master Plan: Census 2000 Remote Alaska Program," Census 2000 Informational Memorandum No. 48, February 28, 2000, pp. 1–5.

¹²⁷ U.S. Census Bureau, "Census 2000 Overseas Enumeration Program Master Plan," undated; U.S. Census Bureau Decennial Management Division, "Overseas Apportionment Counts by U.S. Armed Forces and Civilian Personnel," Census 2000 Informational Memorandum No. 90, January 11, 2001.

¹²⁸ For more information on enumeration in Puerto Rico and the Island Areas, see Chapter 12, "Puerto Rico and the Island Areas."

Congressional Enumeration

Because members of Congress may have multiple residences (generally in a district or home state and also in the Washington, DC, metropolitan area), the Census Bureau implemented special procedures to ensure that all addresses were included in the address files; count members of Congress at their home state addresses; count their family members and unrelated household members at their appropriate residences; ensure that members of Congress and their households were counted only once; and provide members of Congress the opportunity to receive their home state census forms at their Capitol Hill offices. The Census Bureau obtained both the home state and local residence addresses for members of Congress. The Census Bureau created a system whereby specially designated headquarters staff received and reviewed congressional forms and sent them to a data capture center.¹²⁹

Island Areas

The Decennial Management Division (DMD) conducted the island area (IA) Census 2000 in partnership with the government of each IA to ensure that it met the legal requirements set forth in Title 13 of the U.S. Code as well as the specific data needs of the IAs. DMD was responsible for the development of outreach and promotion plans, enumeration procedures, and the data products program. It also supplied forms, questionnaires, materials, and the necessary funds for the IA governments to conduct all data collection activities.

L/E was the basic enumeration strategy employed. As in 1990, all people and housing units were enumerated using a long-form questionnaire. Enumerators visited every housing unit and picked up completed unaddressed questionnaires and Advance Census Reports (ACRs) that had been delivered by the U.S. Postal Service. If an ACR was not completed, an enumerator conducted a personal interview with a household resident to complete it. Enumerators also developed address lists for their assigned areas and map-spotted the locations of living quarters. For special population groups, including those living in group quarters and those with no usual residence, other data collection strategies, such as service-based enumeration and team enumeration, were employed where necessary.¹³⁰

GROUP QUARTERS ENUMERATION

The Census Bureau implemented a comprehensive set of procedures to enumerate people who did not live or stay in traditional housing units in Census 2000. This included people who lived or stayed in group quarters (GQ) (e.g., nursing homes, prisons, group homes, college dormitories, and military quarters and ships), were without conventional housing (e.g., emergency and transitional shelters), or were living in migrant and seasonal farm worker dormitories.

Administrative and geographical entities designated by the Census Bureau as “special places” contained various types of GQs that varied widely from one another. Some had many GQs and large populations, while others contained but a single GQ or very few people; some types of GQs relied heavily on enumeration through administrative data maintained at the GQ, while others more commonly used respondent-filled forms. Additionally, certain types of GQs were more likely to have persons from household questionnaires included in their final tabulations, more likely to have persons counted twice within a GQ, or more likely to have had a greater proportion of persons imputed due to differences in questionnaire counts at different stages of processing.¹³¹ GQ enumeration was conducted by the staff at the local census offices (LCOs). Starting in January 2000, census workers made advance visits to the GQs in their areas to discuss the upcoming enumeration with faculty and staff. These visits promoted participation in the census and identified difficulties that might be encountered during the enumeration.

¹²⁹ U.S. Census Bureau, Decennial Management Division, “Program Master Plan: Census 2000 Congressional Enumeration,” Census 2000 Informational Memorandum No. 138, June 5, 2003, p. 4.

¹³⁰ U.S. Census Bureau, “Program Master Plan: Census 2000 Island Areas,” Census 2000 Informational Memorandum No. 109, March 2001, pp. 28–33. For more information on IA enumeration, see Chapter 12, “Puerto Rico and the Island Areas.”

¹³¹ Kimball Jonas, “Revision 1: Group Quarters Enumeration, Final Report,” Census 2000 Evaluation No. E.5., August 6, 2003, p. v.

From April 1 to May 6, 2000, census workers enumerated people in each GQ by listing all the residents and distributing questionnaire packets. When needed, enumerators provided assistance in completing the questionnaires. Some facilities, such as jails and prisons, were self-enumerated. Some employees in these facilities were awarded special sworn status to ensure confidentiality of data received and to conduct the enumeration following census procedures.

The four main types of GQ questionnaires were the Individual Census Report (ICR), Military Census Report (MCR), Shipboard Census Report (SCR), and Individual Census Questionnaire (ICQ). The ICR was used to enumerate most of the GQ population. The MCR, as the name implies, was used solely to enumerate armed forces personnel. The SCR was used to enumerate both military and civilian shipboard residents. The ICQ was used solely for enumeration of people who had no usual home. ICQs were used at soup kitchens and regularly scheduled mobile food vans.

Special Place Facility Questionnaire Operation

Prior to enumerating, the Census Bureau used a Special Place Facility Questionnaire operation to gather information about both GQs and housing units in each special place. The operation collected and updated existing name and address information for each special place and associated GQ and housing units, identified contact people at each location, determined the type of special place/group quarters, assigned a group quarters type code, determined availability of administrative records, and collected other administrative information. The operation relied upon computer-assisted telephone interviewing (CATI) to collect most of the information, but some was gathered by personal visits using paper Special Place Facility Questionnaires.¹³²

Military/Maritime/Military Vessels Enumeration

In April and May 2000, the Census Bureau enumerated people living on U.S. military installations and maritime vessels during Census 2000. As part of this effort, the Census Bureau worked with the U.S. Department of Defense and the U.S. Coast Guard to identify housing units and other living quarters on the installations and ships assigned to a home port in the United States. Different enumeration methodologies, such as mailing census questionnaires to housing units on installations and enumerating people at their workstations, were used. The Census Bureau also worked with the U.S. Maritime Administration and others to identify maritime vessels in operation at the time of the census and mailed enumeration materials to these vessels for completion.¹³³

As in previous censuses, military bases, as well as both military and civilian ships, were self-enumerated facilities in Census 2000. Enumeration on military bases was supervised by project officers and conducted by unit representatives of each military unit. Project officers and unit representatives were armed forces personnel who, along with clerks who handled the questionnaires on base, were sworn in and trained by census representatives. LCOs hired and trained these Census Bureau representatives. LCO special places operation supervisors (SPOSSs) coordinated and reviewed their activities. In February 2000, SPOSSs and census representatives conducted advance visits to subject installations during which they swore in project officers, reviewed enumeration procedures, verified the list and geocodes of GQs, and updated military installation maps.

Census Bureau staff gave MCR and ICR questionnaires and other enumeration materials to project officers who distributed them to unit representatives.¹³⁴ Unit representatives, in turn, distributed the questionnaires to their units, collected the questionnaires and reviewed them for completeness, followed up on missing and incomplete questionnaires, and returned the completed materials to the project officers. After another review by on-base clerks, the project officers returned the questionnaires and other enumeration materials to Census Bureau representatives, who reviewed them and returned them to the LCOs where they were checked-in.

¹³² U.S. Census Bureau, "Program Master Plan: Census 2000 Special Places/Group Quarters Inventory Development," Census 2000 Informational Memorandum No. 113, July 2001.

¹³³ U.S. Census Bureau, "Program Master Plan: Census 2000 Military Installation Enumeration," October 2001; U.S. Census Bureau, "Census 2000 Military/Maritime Vessel Enumeration Overview," Census 2000 Informational Memorandum No. 108, June 21, 2001.

¹³⁴ ICRs were used to enumerate civilians living on military bases.

Enumeration aboard military and civilian ships was coordinated by the National Processing Center (NPC). After receiving a list from the Department of Defense and the U.S. Department of Transportation of military vessels and their assigned home ports, mailing addresses, and estimated personnel, the NPC prepared kits with enumeration materials and manuals, which were mailed to each vessel on January 24, 2000. The commanding officer of each military vessel appointed a project officer to conduct vessel enumeration. The project officer was responsible for receiving census materials, appointing division representatives, and obtaining lists organized by division of personnel assigned to the vessel. On March 31, the project officer distributed personnel lists and enumeration materials to division representatives who distributed MCRs and SCRs in envelopes and Privacy Act notices to personnel in their divisions by April 3.¹³⁵ The sampling procedure used for land-based military applied to shipboard personnel. One in six persons was asked to complete the entire SCR rather than the seven basic questions.

Division representatives gave instructions to complete the SCR or MCR, seal it, and return it to the division representative by April 4. Questionnaires were checked against the personnel list as they were returned to division representatives. Division representatives followed up on nonrespondents, collected remaining questionnaires, and completed SCRs based on administrative records for persons absent from the vessels. After verifying that division representatives had returned their assigned questionnaires and Form D-44 reporting the division enumeration results, the project officer mailed all materials to the NPC by April 10. Any vessels not responding by April 28 were contacted by the Field Division (FLD) and their respective liaison for follow-up.¹³⁶

To enumerate maritime vessels, the Census Bureau first needed to identify and locate such vessels. Beginning on April 27, 1999, letters were dispatched to seven major maritime associations—the U.S. Maritime Administration; the National Oceanic and Atmospheric Administration; the National Marine Fisheries Service; the Alaska Department of Fish and Game, Commercial Fisheries Division; the U.S. Tuna Foundation in San Diego; the Military Sea Lift Command of the Department of the Navy; and the Lake Carriers Association. The letters requested that each association assist the Census Bureau’s FLD and NPC in conducting an inventory of maritime vessels by sending the NPC lists of the vessels for which each was responsible.

On April 1, ships’ captains distributed SCRs in envelopes and Privacy Act notices to officers, crew members, and passengers who then completed and sealed the SCRs. Each captain collected the questionnaires and completed a Census 2000 Location Report for American Flag Vessels, then returned these forms to the NPC.¹³⁷

Service-Based Enumeration (SBE)

Service-based enumeration (SBE) was designed to enumerate people who did not live in conventional housing and may have been missed in the traditional enumeration of housing units and group quarters. During SBE, the Census Bureau enumerated people at emergency and transitional shelters, targeted nonsheltered outdoor locations, soup kitchens, and regularly scheduled mobile food van stops. Also included in the SBE universe were those who indicated in the address section of Be Counted forms that they had “no address on April 1, 2000.” Enumeration of the three major SBE categories was conducted on three separate days at the end of March 2000.

On March 27, people at emergency and transitional shelters were enumerated. A separate ICR was completed for each person. Every sixth person was asked to complete a long-form questionnaire. Each respondent was asked to complete the questionnaire and return it to the enumerator in a sealed envelope.

On March 28, the Census Bureau enumerated people at soup kitchens and mobile food vans that operated on a regular schedule. While conceived as separate operations with distinct training materials, the soup kitchen and regularly scheduled mobile food van enumerations were often

¹³⁵ In January 2000, the U.S. Marine Corps liaison requested that Marine Expeditionary Units aboard Navy vessels be counted with their home bases. As a result, marines aboard Navy vessels were asked to complete MCRs to be mailed separately to the Field Division for processing.

¹³⁶ U.S. Census Bureau, “Census 2000 Military/Maritime Vessel Enumeration Overview,” May 24, 2001, pp. 3–9.

¹³⁷ *Ibid.*, pp. 9–12.

conducted by the same enumerators at different times during the day. Enumerators conducted interviews using ICQs at soup kitchens during the meal where the largest number of clients was served. A separate ICQ was used to enumerate each adult and child. Once again, every sixth person was asked to complete a long-form questionnaire. At mobile food vans that operated on a regular schedule, enumerators interviewed each person using separate short-form ICQs.

People at targeted nonsheltered outdoor locations were enumerated on March 29. For this operation, the Census Bureau used partnerships with “gatekeepers” or contacts familiar with the location. These gatekeepers helped identify these locations, and during enumeration, they accompanied the enumerators. In these areas, enumerators were instructed to list each person on a GQ listing sheet, provide the respondent with a Privacy Act notice, and interview each adult and child using the short-form ICR.¹³⁸

The Census Bureau identified 14,817 SBE sites, of which 51 percent were shelters in use during Census 2000. Of the total 283,898 people tabulated in the census at SBE locations, 31,994 people were included in the SBE counts as a result of the Be Counted program. In total, SBE operations added 283,898 people to the Census 2000 tabulations. Of the total, 65 percent were tabulated at shelters, 27 percent were tabulated at soup kitchens and regularly scheduled food vans, and 8 percent were tabulated at targeted nonsheltered outdoor locations.

Because the SBE accounted only for people at these facilities on the day of enumeration, the Census Bureau planned to apply multiplicity estimation to account for people who did not use the facilities on the days of enumeration. Data quality concerns, however, precluded correcting the count of persons actually enumerated using multiplicity estimation.¹³⁹ The multiplicity estimation procedure was based on information provided by those who were counted, that is, the number of times they reported having used the service facilities in the week prior to enumeration.¹⁴⁰ The plan was that an estimate of people not counted on the day of enumeration would be added to the count of people who were counted. Though multiplicity estimates tested well in the 1998 dress rehearsal, the Census Bureau discovered that during Census 2000 a question pertaining to facility usage upon which the multiplicity estimates were based had a low response rate. More troubling, however, was the discovery that respondents, particularly those in shelters, did not provide accurate answers to questions about facility usage. In New York City, for example, city employees collected administrative data in 15 percent of the city’s shelters—the largest shelters in the city—in lieu of collecting data on enumeration day using the proper forms. In this instance, usage questions were not asked for these shelters. Instead, the administrative data were transcribed to shelter forms with the understanding that the usage questions would be left blank. During its review of the data, the Census Bureau discovered that a substantial number of these forms not only contained answers to the usage questions, but that in every instance the response was “1,” which would have resulted in a multiplicity weight of 7. The Census Bureau’s initial response to this apparent response bias was to effectively remove from the multiplicity estimation all those shelters enumerated through administrative records. However, unacceptably high levels of response bias and nonresponse to facility usage questions in SBE enumeration prompted the Census Bureau, out of concerns over the quality of the data collected, to abandon its plans to use multiplicity estimation.¹⁴¹

¹³⁸ A person staying at a shelter was enumerated at the shelter location. A person enumerated at a soup kitchen or mobile food van location was counted at the enumeration location or at a usual address if the respondent provided one. A person at a targeted nonsheltered outdoor location was counted at the enumeration location. Tracey McNally, “Service-Based Enumeration Final Report,” Census 2000 Evaluation No. E.6., November 6, 2002.

¹³⁹ U.S. Census Bureau, “Service-Based Enumeration in Census 2000: Multiplicity Estimation,” Census 2000 Decision Memorandum No. 100, February 22, 2000.

¹⁴⁰ The multiplicity estimate was inversely proportional to the usage question response. Persons responding “1” got an effective weight of 7, while persons responding “7” got an effective weight of 1.

¹⁴¹ U.S. General Accounting Office, *Decennial Census: Methods for Collecting and Reporting Data on the Homeless and Others without Conventional Housing Need Refinement*, GAO-03-227, January 2003; National Research Council, *The 2000 Census: Counting Under Adversity* (Washington, DC: The National Academies Press, 2004), pp. 151–156. For more information on the data products from SBE, see Chapter 9, “Data Products and Dissemination.” Richard A. Griffin, Decennial Statistical Studies Division (DSSD) Census 2000 Procedures and Operations Memorandum No. B-15, February 28, 2001, pp. 1–6.

Transient Night (T-Night) Operation

Census staff conducted a Transient Night (T-Night) operation, designed to enumerate people at locations where residents were highly transient in nature. T-Night enumerators visited and interviewed people occupying campgrounds, commercial/public fairs, carnivals, racetracks, military hotels, marinas, and RV parks between 4 p.m. and 10 p.m. on March 31, 2000.¹⁴² Every person enumerated on T-Night had the opportunity to report a usual residence.

On T-Night, an enumerator visited each assigned T-Night place, met with contact people at the site to explain the purpose of the visit, offered the Privacy Act notice, answered questions, and verified information about the site. The enumerator then completed the appropriate enumerator questionnaire (short or long) for each unit, site, or boat slip in the living quarters at the assigned location.¹⁴³ Other types of special places, such as migrant worker camps, college dormitories, and detention centers, were enumerated on an ongoing basis from April 1 to April 30.

COVERAGE IMPROVEMENT

All censuses before 2000 included a net undercount, and recent censuses have estimated a differential undercount of specific minority populations and other subgroups such as renters, young adult males, and children. The need to improve census coverage to correct, or at least to reduce the undercount, was first identified by George Washington after the first census in 1790. While he complained that the 1790 census count of 3.9 million was too low, it was considered credible enough for apportionment.

Although demographers were aware of the problem, it was not until the 1940s that they began to gain a much clearer understanding of the scope and nature of the census undercount. When demographers compared the 1940 census counts of draft-age men to the Selective Service registration of October 1940, two interesting patterns surfaced. First, the draft registration revealed some 425,000 more men than the census, which yielded an undercount of 2.8 percent for this group. In particular, roughly 229,000 more Black men were recorded in draft registration than in the census, which yielded an undercount of 13.0 percent. Demographers also demonstrated that Black men from urban states registered for the draft in dramatically greater numbers than expected. These findings were confirmed and further refined by later demographic analyses using more modern statistical methodology.

The decennial undercount strongly influenced census design. In an effort to decrease the undercount, the Census Bureau added operations or programs specifically designed to improve coverage. Many of these coverage improvement operations/programs have been characterized by a strategy of inclusion designed to “widen the net” to capture more and more of the undercounted populations. As a result, the total net undercount over the past several censuses has steadily declined, except for the 1990 census, when the net undercount was slightly higher than that of the 1980 census. The relatively high differential undercount of the total Black male population, however, has changed very little during this time period.

In response to the presence of a continued undercount, plans for each successive census employed the strategy of inclusion, although each census used a different combination of coverage improvement operations/programs. Since differential undercount has been even more constant than overall undercount, each census included coverage improvement operations specifically targeting undercounted populations. For example, in the 1990 census, the Census Bureau implemented the parolee/probationer coverage improvement operation to target that hard-to-enumerate population. For Census 2000, the Census Bureau targeted hard-to-enumerate populations using service-based enumeration.¹⁴⁴

¹⁴² In some cases where there were a large number of RVs in an RV park, the enumeration lasted until it was completed and sometimes exceeded the 10 p.m. time limit.

¹⁴³ U.S. Census Bureau, “Census 2000 Operational Plan,” DMD/01-1419, December 2000, p. IX-4.

¹⁴⁴ Service-based enumeration was designed to count people without conventional housing by conducting enumeration at service areas such as shelters, soup kitchens, and the like.

Census 2000 Operations to Reduce Undercount

To minimize the undercount to the extent practicable, many of the operations in Census 2000, including the construction of the address frame, were designed to count the American population with a degree of redundancy built into the enumeration process. Many respondents had an opportunity to answer the census in several different ways. In addition to the basic mailback response option, many respondents also could respond by way of the Internet, telephone, individual enumeration, or completion of Be Counted forms (BCFs) located at private businesses, churches, community organizations, departments of motor vehicles, libraries, post offices, Questionnaire Assistance Centers, and other sites such as schools or municipal buildings. While these operations were designed to reduce overall undercount and improve overall accuracy, the resulting redundancy contributed to counting some respondents more than once. As a result, procedures to unduplicate housing units were also built in where needed, though the unduplication operations were not completely successful. The enumeration process, along with duplication in the housing-unit frame, produced an overall net overcount in Census 2000 of 0.48 percent, with a correlation bias adjustment as measured by the Accuracy and Coverage Evaluation (A.C.E.) Revision II.¹⁴⁵

Enumeration Baseline

The enumeration baseline established during the last four decennial censuses focused on a basic enumeration approach that combined a mailout/mailback methodology with a personal visit to nonrespondents. A paper questionnaire was mailed to a residence, with instructions to complete the form and mail it back to the Census Bureau. In variations of this approach for Census 2000, some questionnaires were delivered to residents by Census Bureau staff, some were left at post offices or other local sites, or some were sent to residents by request; all of these were to be completed and mailed back. Nonresponding households were visited by enumerators who completed the questionnaire for the household or housing unit. The mailback approach was also supplemented by complementary methods such as list/enumerate (L/E) and update/enumerate (U/E), which closely resembled past conventional census methods, and the Internet and telephone response options. After the completion of nonresponse follow-up (NRFU), the Census Bureau identified housing units that it believed should be visited in a number of review, verification, and “clean-up” operations designed to resolve discrepancies in housing-unit status on the questionnaire and improve coverage and the census estimate. This “Quality Counts” campaign was conducted in July and August 2000 and consisted of three coverage improvement/coverage measurement operations: coverage edit follow-up, coverage improvement follow-up, and the A.C.E. These operations included a telephone follow-up program, an enumerator-based follow-up program, and a post-enumeration survey that were added to the basic enumeration approach to ensure the completeness of the data collected for every household.¹⁴⁶

Coverage Edit Follow-Up (CEFU)

A coverage edit follow-up (CEFU) operation was conducted as part of Census 2000. This telephone operation was used to improve data quality and coverage within households in two ways. First, CEFU was used to collect person data for all persons in excess of the six who could be listed on the mailback census forms. Second, it resolved count discrepancies between the respondent-reported household population count and the actual number of data-defined persons recorded on the census form. A person record was determined to have been data defined during previous Census processing based on the number of data items captured for him or her. Prior to collecting person data, telephone enumerators asked a series of probe questions in all CEFU cases. These questions were designed to encourage a respondent to identify persons who should be added to or deleted from the household roster as reported on the respondent’s census mailback form.

¹⁴⁵ For more information on A.C.E., see Chapter 10, “Testing, Experimentation, Evaluation, and Coverage Measurement Programs.” The method of demographic analysis, however, produced an overall net undercount of 0.12 percent, substantially lower than the estimated net undercount of 1.65 in 1990. For more information on demographic analysis, see U.S. Census Bureau, Decennial Statistical Studies Division (DSSD) A.C.E. Revision II Memorandum Series #PP-36 “A.C.E. Revision II—Study Plan for Comparison of A.C.E. Revision II Results with Demographic Analysis,” December 31, 2002.

¹⁴⁶ Jon R. Clark and Darlene A. Moul, *Coverage Improvement in Census 2000 Enumeration*, Census 2000 Topic Report No. 10 (Washington, DC: U.S. Census Bureau, 2004), p. 3.

The eligible universe for CEFU consisted of all mail return short and long forms (SFs and LFs) as well as certain BCFs and Internet Data Collection (IDC) responses processed by June 8, 2000. There were versions of these types of Census 2000 forms in several languages, including Spanish, Chinese, Korean, Tagalog, and Vietnamese, as well as the standard English form. The forms in both Spanish and English used in Puerto Rico were also eligible for CEFU. A computer edit of these cases was done to identify households eligible for CEFU.

Enumerator forms used for NRFU, coverage improvement follow-up, and the U/E, L/E, and Remote Alaska operations were not eligible for CEFU because additional follow-up in these cases was not necessary. In those operations, conducted by enumerators through personal visits, information was collected for household members in large households using continuation forms. Also, crew leaders were to have screened enumerator forms for count discrepancies and returned any to the field for rework. Enumerator questionnaires included coverage questions not on the forms eligible for CEFU to help ensure the household rosters were correct.¹⁴⁷

These coverage edits relied on comparisons of respondent-supplied and computer-interpreted data. The Census 2000 coverage edit failures were determined using the respondent-reported household size, the number of data-defined persons on the roster, and the number of names on the continuation roster. There were two types of coverage edit failures: count discrepancy follow-up cases and large household follow-up (LHHFU) cases.

A count discrepancy in which there were more data-defined persons than the reported household size on the form (for SFs, LFs, BCFs, and IDCs) was described as a high data-defined persons (HDDP) count discrepancy. An HDDP count discrepancy would be identified, for example, if the household size was listed as four by the respondent, but six persons were data defined on the form. A count discrepancy in which fewer data-defined persons were identified than were reported on the form was described as a low data-defined persons (LDDP) count discrepancy. An LDDP count discrepancy was identified if, for example, a household size was listed as three by the respondent, but only two persons were data defined on the form.

There were two reasons for edit failures requiring LHHFU. Forms (SF, LF, and IDC) on which the reported household size or the sum of data-defined persons and continuation roster names was greater than six were described as large households. BCFs failed as large household cases if the reported household size or the sum of data-defined persons and continuation roster persons was greater than five. Forms (SF, LF, and IDC) on which exactly six people were listed but the total person count was left blank were identified as possible large households failures.

Conducting CEFU Interviews

Census Bureau staff specified the instrument requirements and selected the cases for CEFU from the universe of eligible cases. The actual follow-up of these cases, however, was contracted to Electronic Data Systems (EDS). EDS assembled the resources to conduct the entire telephone follow-up operation by creating a computer-assisted telephone interview (CATI) instrument; reserving and monitoring the work of multiple call centers; obtaining and training telephone interviewers; and creating and controlling the data-flow infrastructure from receipt of input files to return of the completed cases to the Census Bureau.

The CEFU effort attempted to resolve cases identified for follow-up by telephone. Telephone interviewers, also known as agents, used a browser-based desktop application. The instrument included a series of help sources called the knowledge database. There were no field visits or enumerator follow-ups for CEFU cases that were not resolved over the telephone.

In contrast to the CEFU operation in the 1990 census, the CEFU operation in Census 2000 was precisely scripted. Questions were asked verbatim to ensure consistency from interview to interview, especially since interviewing occurred at 13 different call centers. In addition, telephone interviewers did not have all the information from the complete questionnaires; instead, they had only the relevant data from the questionnaires.

¹⁴⁷ Dave Sheppard, "Coverage Edit Followup: Final Report," Census 2000 Evaluation No. I.1, July 29, 2003.

The interviewing procedure began when the auto dialer system attempted to contact a household in the CEFU universe. If the telephone was not answered, the case was recycled for calls at later dates. If a household was reached, the telephone interviewer determined whether the correct household was reached and, if so, whether an eligible respondent was available to conduct the interview at that time.

According to the Census Bureau's requirements, only a person listed as "person one" or "person two" on the household roster of the mailback form was eligible to respond to the CEFU interview. This was done to increase the likelihood that the respondent would be knowledgeable enough about the household to provide correct responses. If an eligible respondent was available, the interview was conducted. If not, the case was recycled for additional calls at a later date.

The interview began with the telephone interviewer reading the respondent-reported household roster to the eligible respondent. The telephone interviewer then asked nine questions designed to ensure that the household roster was complete and correct. The first five of these questions were based on the Census 2000 residence rules and designed to determine if additional people should be added to the household roster. The last four questions were designed to determine if people already on the household roster should not be listed according to the Census 2000 residence rules.

For each of these nine coverage probe questions, a similar flow of questions was followed. For example, there were questions designed to add people left off the mailback Census 2000 form in error. After being read the household roster, the respondent was asked if a person with particular characteristics (child, roommate, etc.) was living or staying there around the beginning of April and was not included on that roster. If so, that person's name was requested. If a name was offered, the interviewer confirmed with the respondent that this person was living or staying there most of the time as of April 1. This multistage approach allowed the respondent to consider more possible residents while considering the criteria within the follow-up questions.

In addition, the respondent could interrupt the interview at any point to make corrections to the household roster. Telephone interviewers would then take the appropriate action using one of four interrupt options: adding a name to the roster, deleting a name from the roster, indicating that more than one roster name represents one particular household member, and editing the name of a person on the household roster. Upon the completion of this action, the interview was resumed where it left off.

Once all the probe questions were asked and answered, the case was considered count complete, with confidence that the number of persons on the household roster was correct. If information needed to be collected for one or more of the persons on the household roster, it was collected after the nine probe questions were asked. If a person on the roster was confirmed to be a delete or a duplicate, a flag was set and the person record was deleted. Otherwise, the CEFU interview ended.

A contingency, referred to as Phase Two, was implemented between August 1 and August 12, 2000. Phase Two was designed to raise the overall completion rate. It was thought this could be achieved by contacting the noninterviews and by improving the coverage of the non-English speaking population. The requirements for reallocating cases that needed to be retried, ensuring the allocation of remaining cases, and closing out the operation were specified in advance.

Coverage Improvement Follow-Up (CIFU)

The operational plan for Census 2000 coverage improvement follow-up (CIFU) was similar to the 1980 and 1990 plans in that most of the CIFU universe consisted of units classified as either vacant or delete in NRFU that were not also determined in other operations to be ineligible for CIFU. The exceptions included units that were identified as vacant or delete in two prior census operations and units identified as seasonal vacants. The CIFU universe also included addresses that required follow-up but were identified too late to be included in the NRFU. Additional components of the CIFU universe included housing units added from the new construction operation; units added from the update/leave and urban update/leave operations; blank mail returns; lost

mail returns; nonrespondents in Panels 7, 8, and 9 of the response mode and incentive experiment; U.S. Postal Service delivery sequence file (DSF) additions from February 2000 and April 2000; and units added from the Local Update of Census Addresses 1998 and 1999 appeals.

NRFU units from the Hialeah, FL, local census office (LCO) 2928 were also included in the CIFU operation.¹⁴⁸ This LCO did not follow the NRFU final attempt procedures and its corner-cutting led census officials to review information gathered from approximately 71,000 households. In the beginning, the Census Bureau enumerated 20 percent of the city portion of the LCO and sampled the remaining 80 percent. Due to irregularities found in the sample reenumeration, the agency decided to reenumerate the entire LCO. Consequently, an operational plan was developed to combine NRFU and CIFU for this LCO since there was no time in the schedule to conduct separate operations; additional mail-return cuts reduced the NRFU workload by several thousand housing units. Also included in the CIFU workload were a few miscellaneous units that were POP 99s (housing units identified during NRFU as occupied but with no population count identified) or residual NRFU returns.

The CIFU operation was conducted in three separate waves as groups of LCOs completed NRFU. The first wave, which included 342 LCOs, started the CIFU operation on June 26 and finished on July 26, 2000. Wave Two began CIFU on July 10 and finished on August 10. This wave included 175 LCOs. Finally, Wave Three, which included three LCOs (2520, 2525, and 2928), started CIFU on July 30 and finished on August 23.¹⁴⁹

CIFU data collection process. Enumerators visited the CIFU units to determine occupancy status as of Census Day. As with NRFU, Census Day housing-unit status was described as occupied, vacant, or nonexistent. Addresses classified as nonexistent were units enumerators determined did not qualify as housing units as of Census Day and were therefore coded for deletion. Based on status, the enumerators completed the applicable items on the appropriate enumerator questionnaire (EQ). Enumerators initially visited each CIFU address in person; occupied units were allowed up to three personal visits and three phone calls. After the required number of attempts, if an enumerator could not contact a household member at a follow-up address, the enumerator attempted to obtain Census Day status of the unit from a proxy respondent. For units that were obviously vacant or should be deleted, enumerators could interview a proxy respondent on the first visit.

Although the Census Bureau emphasized obtaining complete interviews, partial interviews were accepted in some instances.¹⁵⁰ Completed questionnaires were processed through the assignment control unit in each LCO. Assignment control clerks reviewed the questionnaires to ensure the critical items were completed. Critical items included the questionnaire label; the enumerator's signature and crew leader's initials in the certification item; introduction questions S2–S5, as appropriate; coverage questions C1 and C2, as appropriate; and interview summary items (A) unit status, (B) POP count, and if applicable, (G) partial interview or (H) refusal. Questionnaires failing this review were returned to the enumerators; questionnaires passing this review were routed to the Operations Control System (OCS 2000) for automated check-in. All questionnaires were eventually checked-out using the OCS 2000 and shipped to the appropriate data capture center for data capture.

CIFU quality assurance program. The quality assurance program for CIFU had several objectives. To minimize the number of mislabeled questionnaires, labels were reviewed before being distributed to enumerators. In an effort to ensure that questionnaires were completed correctly, the Census Bureau hired experienced enumerators for CIFU operations, reviewed all questionnaires for completeness, and verified the correct classifications on a sample of housing units. In addition to questionnaire review, specific data items from questionnaires were reviewed in order to minimize the number of data-capture errors on data entered into OCS 2000.

¹⁴⁸ Each LCO was assigned a numeric code to designate its location and track its activities.

¹⁴⁹ Darlene A. Moul, "Coverage Improvement Followup: Final Report," Census 2000 Evaluation No. I.4., May 9, 2003; Darlene A. Moul, "Nonresponse Followup for Census 2000," Census 2000 Evaluation No. H.5., July 25, 2002.

¹⁵⁰ The CIFU Program Master Plan (PMP) defines a partial interview as "an interview in which the enumerator was unable to obtain the minimum amount of information from a household member or a non-household (proxy) respondent but obtained at least Unit Status and Population Count."

Cases eligible for quality assurance dependent review included all the CIFU universe components, except the vacant and deleted housing units identified in NRFU, which were identified by an asterisk on the questionnaire label and address listing pages. As each questionnaire was submitted by an enumerator, the crew leader examined the census ID on the questionnaire. If an asterisk followed the ID number, the housing unit was eligible for the dependent review. If the housing unit was occupied, no additional action was necessary in this phase. If the housing unit was coded as vacant or delete, it was revisited by the crew leader and a decision regarding the correctness of the original classification of the housing unit was noted. When a new questionnaire was used for a vacant or delete case, it was coded as a “replacement” in Item H of the interview summary section of the EQ.

CIFU operations covered 3.9 million vacant units and 2.6 million delete units. Approximately 21.9 percent of the vacant units were converted to occupied and 24.6 percent of the deletes were converted to occupied, resulting in a net gain of approximately 3.1 million people. In addition, more than 88 percent of the lost mail returns and 81.2 percent of the blank mail returns yielded valid housing units. Like NRFU, CIFU succeeded in enumerating a higher percentage of the groups that were typically undercounted (e.g. males, young people, Hispanics, Blacks, and other races). At a cost (stateside) of \$202.4 million, CIFU resulted in substantial improvements in coverage.¹⁵¹

ACCURACY AND COVERAGE EVALUATION (A.C.E.)

The Accuracy and Coverage Evaluation (A.C.E.) was an independent post-enumeration survey designed to measure coverage error. An initial A.C.E. sample of block clusters was drawn, and housing units within the sampled block clusters were listed. This universe was reduced through subsampling operations, and the residents of remaining housing units were interviewed during the A.C.E. person interview.

The A.C.E. was designed to use dual system estimation to measure coverage error. This estimation method assumes two independent lists of the population—one drawn from the original census enumerations, and the other that consists of people represented by the sample selected frame for the A.C.E. survey. For the 2000 A.C.E., the Census Bureau selected a stratified random sample of blocks designed to be representative of racial and ethnic composition, tenure (owner or renter), and other variables. The final sample consisted of approximately 11,800 block clusters with approximately 314,000 housing units. It was designed to provide sufficient precision to estimate the true population for groupings of the population known as post-strata. Each person belonged to one and only one poststratum. Post-strata were constructed with the goal of grouping individuals who had similar probabilities of having been included in the initial census. Census 2000 post-stratification variables included race, ethnicity, age, sex, tenure, mail return rate, and metropolitan status/census enumeration method. The Census Bureau estimated overcounts and undercounts for each poststratum by comparing the estimated true population based on the dual system estimate for each poststratum to the number of individuals counted in the initial census enumeration for each poststratum.

Ensuring that the A.C.E. and the initial census were operationally independent was essential to the proper conduct of the A.C.E. Independence required that the probability of a particular household or person being included in the A.C.E. was not affected by the initial census operations and that the probability of people being included in the initial census was not affected by A.C.E. operations.

The A.C.E. independent interview was conducted by separately trained field staff using computer-assisted personal interview (CAPI) technology. Some interviews were done in an early telephone phase, and others were done later by personal visit. CAPI refers to a method of data collection

¹⁵¹ For more information on QA specifications for CIFU, see Howard Hogan to Brian Monaghan, “Quality Assurance Specifications for the Census 2000 Coverage Improvement Followup Operation,” DSSD Census 2000 Procedures and Operations Memoranda No. II-14 Revision #2, June 7, 2000; Kimberly Nether to Rajendra P. Singh, “Profile of the Census 2000 Coverage Improvement Followup Quality Control Program,” DSSD Census 2000 Procedures and Operations Memoranda No. KK-F-04, September 17, 2003; Howard Hogan to Michael Longini, “Quality Assurance Requirements for the Census 2000 Coverage Improvement Followup Quality Assurance Operation,” DSSD Census 2000 Procedures and Operations Memoranda No. II-16 (revised), June 7, 2000.

that used a laptop computer. The questions to be asked were displayed on the screen and responses were entered directly into the computer. Whenever possible, a telephone interview using CAPI was attempted for households for which the census questionnaire had been completed and a telephone number had been obtained. This interview was conducted concurrently with the initial census follow-up of nonrespondent households (NRFU). Door-to-door interviewing with CAPI did not begin until the initial census NRFU was nearly completed in a given block cluster. An A.C.E. enumerator attempted to secure an in-person interview with a household member; the enumerator would interview a knowledgeable proxy respondent only if a household respondent was not available.¹⁵²

The A.C.E. was a continuation of the Census Bureau's efforts—began following the 1950 census—to conduct a formal study of coverage of the population. The stated intent of the effort was to improve census designs and to measure and perhaps correct the resulting undercount. For Census 2000, the A.C.E. was designed to serve two purposes. The A.C.E. sought to measure and assess coverage of the population, both total and in various subdivisions such as race, ethnicity, sex, geographical areas, and socioeconomic groupings, as well as to acquire data that could serve as the basis for correcting census counts. Although early planning of the A.C.E. considered using dual system estimation to produce a “one number census,” the 1999 Supreme Court ruling on the use of sampling for congressional apportionment necessitated that the survey be redesigned to focus on nonapportionment uses.¹⁵³

CLOSEOUT

During Census 2000 the Census Bureau leased and operated 520 local census offices (LCOs) to conduct the data collection operations in the field. By October 13, 2000, field operations were concluding and LCOs were closing as field verification was completed. Closeout of these offices was a coordinated effort across the 12 regional census centers (RCCs), the Puerto Rico Area Office, headquarters, and the General Services Administration regional offices.

LCOs were closed in groupings called waves. The first wave closed on August 31, and the last wave closed October 26, 2000 (see Table 5-6). The closeout process began 45 days before each anticipated lease termination date. Every 15 days, beginning in mid-July and running through mid-September, the Census Bureau selected the next group of LCOs to be closed. Accuracy and Coverage Evaluation regional offices were not part of this phase of closeout; they were closed in the spring of 2001.¹⁵⁴

¹⁵² Kenneth Prewitt, “Accuracy and Coverage Evaluation: Statement on the Feasibility of Using Statistical Methods to Improve the Accuracy of Census 2000,” U.S. Census Bureau, June 2000.

¹⁵³ U.S. Census Bureau, *Accuracy and Coverage Evaluation of Census 2000: Design and Methodology*, DSSD/03-DM, September 2004, pp. 1-1-1-5. See Chapter 10, “Testing, Experimentation, Evaluation, and Coverage Measurement Programs” and Chapter 11, “Legal Issues,” for more information on sampling, estimation, and the debate over sampling.

¹⁵⁴ U.S. Census Bureau, “Executive State of the Census Report as of October 13, 2000,” Report No. 35, October 20, 2000, p. 16; U.S. Census Bureau, “Executive State of the Census Report as of September 22, 2000,” Report No. 32, September 29, 2000, p. 20; U.S. Census Bureau, “Executive State of the Census Report as of September 15, 2000,” Report No. 31, September 22, 2000, p. 18; U.S. Census Bureau, “Executive State of the Census Report as of September 29, 2000,” Report No. 33, October 6, 2000, p. 17; U.S. Census Bureau, “Executive State of the Census Report as of November 3, 2000,” Report No. 38, November 9, 2000, p. 18.

Table 5-6.
Local Census Office Closeout Schedule

Wave	Total number of LCOs	Planned closeout date	Actual closeout date
1	10	August 31, 2000	August 31, 2000
2	158	September 15, 2000	September 15, 2000
3	309	September 30, 2000	September 30, 2000
4	36	October 13, 2000	October 13, 2000
5	7	October 31, 2000	October 26, 2000

When an LCO completed all field operations, the office manager was responsible for preparing the office for closeout. During closeout, the office manager ensured that the LCO staff shredded sensitive materials and packed and shipped all specified materials, including administrative materials, to the National Processing Center warehouse or other designated location. The Field Division provided LCOs with detailed instructions and checklists for closeout activities. In addition to the removal of materials and supplies, which began during the first three weeks of the 45-day closure period, closeout procedures included the removal and return of leased furniture, office equipment, automation equipment, and telecommunications systems.¹⁵⁵

Closing of the LCOs was followed by the closing of the RCCs. Unlike LCOs, which followed a predetermined closeout schedule, RCCs closed as they completed field operations. New York touched off the RCC closeout process with its closing on October 31, 2000. It was followed by the closing of the Kansas City and Chicago RCCs in December 2000. The final RCC to complete field operations was Charlotte, NC. (See Appendix B for full closeout schedule.)¹⁵⁶

¹⁵⁵ U.S. Census Bureau, "Program Master Plan for Field Office Management and Administration," p. 16.

¹⁵⁶ At the end of the census, the Census Bureau and General Services Administration (GSA) conducted a rent reconciliation. It was found that GSA had overcharged the Census Bureau for services. The two agencies devised a repayment strategy. U.S. General Accounting Office, "2000 Census Analysis of Fiscal Year 2000 Budget and Internal Control Weaknesses at the U.S. Census Bureau," GAO-02-30, December 2001, p. 14.

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Chapter 6: Data Capture and Processing

INTRODUCTION

The interaction of two complementary trends defined Census 2000 data processing. An unprecedented reliance on automation in the collection and capture of census information combined with an array of response methods, including paper questionnaires, telephone interviews, Internet questionnaires, and “Be Counted” forms, to create an intricate web of duplicate data to be disentangled during the processing phase. Census 2000 data processing consisted of two distinct components: data capture and headquarters processing.

Paper questionnaires arrived at one of the U.S. Census Bureau’s data capture centers and were shepherded, both manually and mechanically, through the data capture process. They were sorted, scanned, and passed through a digital imaging device. Next they went through a system that used optical mark recognition to read categorical (checkbox type) responses and used optical character recognition to, when possible, interpret and automatically convert written responses to a machine-readable format, American Standard Code for Information Interchange (ASCII), for later review and use. Responses not readable by the device were manually keyed and converted to ASCII. Once captured, the data were transferred to headquarters to complete the processing needed to create the final census data products.

At headquarters, response data from all sources were compiled into the decennial response file. A screening algorithm called the primary selection algorithm was applied to the file in order to identify single housing units with more than one response, to compare multiple responses, and to determine which responses would represent the unit. Decennial response file write-in responses were coded, and the final version of the decennial response file as well as the decennial master address file were used in combination to create the census unedited file. The census unedited file combined individual response data (including names) with address status and operational data from the decennial master address file for every housing unit and persons living in group quarters.¹ Data gained through the statistical process editing and imputation were used to complete partial responses and correct inconsistencies.² The coding process provided numeric codes to arrange and classify written responses about race and Hispanic origin for tabulation. Finally, the Census Bureau assigned tabulation geography codes to the responses contained in the 100 percent census edited file to produce the 100 percent edited detail file. The Census Bureau then applied disclosure avoidance techniques to the individual responses contained in the 100 percent edited detail file and used the resulting data to produce Census 2000 data products and other tabulations based on 100 percent items. A separate process was used to create the sample edited detail file, which included sample data about housing units, their residents, and the group quarters population enumerated on long forms—about 1 in 6 housing units and group quarters persons nationwide.

¹ All people not living in housing units are classified by the Census Bureau as living in group quarters. Two general types of group quarters are recognized: institutional (e.g., nursing homes, mental hospitals, and prison wards) and noninstitutional (e.g., college or university dormitories, military barracks, group homes, and shelters). Group quarters may have housing units on the premises for staff or guests. Much of the processing (including unduplication) pertaining to group quarters was conducted independently of that for the housing unit universe. For more information about the enumeration of group quarters, see Chapter 5, “Data Collection.”

² Imputation relies on the tendency of households of the same size within a small geographic area to be similar in most characteristics. For example, the value of “rented” is likely to be imputed for a housing unit not reporting on owner/renter status in a neighborhood with multiunits or apartments where other respondents reported “rented” on the census questionnaire. There are two major types of imputation: (1) allocation, in which missing values for individual items are filled in on the basis of other reported information for the person or household (or from other persons or households with similar characteristics) and (2) substitution, in which *all* of the information for all the people in a household is created from other persons or households with similar characteristics. The imputation process is discussed in greater detail later in this chapter.

DATA CAPTURE OUTSOURCING

Marking a significant departure from past practices, the Census Bureau outsourced the two major components of the Census 2000 data capture program. The two components were the Data Capture System 2000 (DCS2000), which was awarded to Lockheed Martin Corp., and the data capture services contract (DCSC), awarded to TRW Inc. Lockheed Martin provided the equipment for imaging and data keying as well as the processing systems for the four data capture centers. TRW provided staff and services for data capture, facilities management, office equipment, supplies, and office automation for three of the data capture centers (DCCs). A fourth DCC was managed by the Census Bureau's National Processing Center (NPC).³

In past censuses, in-house technical experts designed, developed, deployed, and maintained the Census Bureau's data capture system. During the 1990 census, the internally developed FACT90 system successfully combined a film optical sensing device for input to computers (FOSDIC) and automated camera technology for data capture marking a significant advance in census data capture with the first use of concurrent processing.⁴ FACT90 photographed census questionnaires and passed the processed microfilm through the FOSDIC system, which used optical mark recognition (OMR) to distinguish differences in marks on the page images and convert the data to machine-readable code. Handwritten responses were sent to workstations where they were keyed manually.⁵

Despite the technological successes of the FACT90 system, a significant undercount and larger than expected total operational cost of the census troubled many in Congress. In October 1991, Congress passed the Decennial Census Improvement Act (Public Law 102-135) instructing the Census Bureau to work closely with the National Academy of Sciences (NAS) to redesign, or in the parlance of the day, "reengineer," the census to focus on cost-effective methods and greater statistical accuracy. NAS and the Census Bureau agreed on a plan combining traditional enumeration of 90 percent of the population with a "statistically accurate" count of the remaining 10 percent based on a sampling of nonrespondents during nonresponse follow-up (NRFU). Endorsed by several scientific organizations, this plan also called for a separate survey, based on a sample size of 750,000 households, designed to use statistical adjustment to correct for the anticipated undercount.⁶

By 1993, with planning for Census 2000 underway and the deadline for the 1995 Census Test rapidly approaching, the Census Bureau's Technical Services Division (TSD) faced substantial challenges. The Clinton Administration's efforts to streamline the government, a hiring freeze, and the Census Bureau's reduced budget combined to severely restrict plans for hiring experts or to provide necessary resources or training of personnel responsible for researching and developing the state-of-the-art system for electronic imaging needed for data capture.⁷ To meet these challenges, TSD formed a unique research and development partnership with a leading imaging expert, the Rochester Institute of Technology Research Corporation (RITRC). This partnership provided TSD

³ Titan Systems Corporation/System Resources Division, Kevin A. Shaw, "Census 2000 Data Capture System Requirements Study," Census 2000 Evaluation No. R.3.d., August 23, 2002, p. 1.

⁴ The FOSDIC optical mark recognition system—used since the 1960 census—located information on the questionnaires by calibrating the pages on the microfilm roll, referring to three marks to check the vertical and horizontal dimensions. Once it detected the data marks, FOSDIC used light sensors to measure the contrast in light intensity between the page and the filled-in dots (dark and light images, respectively, on the microfilm frame), identifying the answers on the questionnaire.

⁵ For more information on the FACT90 system and data capture, see *1990 Census of Population and Housing History, Part C*, 1990 CPH-R-2C, (Washington, DC: Government Printing Office, 1995), pp. 8-6-8-29; John S. Rotegard, Alan J. Berlinger, Paul R. Friday, U.S. Census Bureau, "Data Capture and Questionnaire Printing for the 1990 Decennial Census," undated, Census Authors Collection, #2666, Census Bureau Library, Suitland, MD; Paul Friday, Technical Services Division, U.S. Census Bureau, "Automation of the 1990 Data Collection and Data Capture Processes," planning paper, January 1984, Census Authors Collection #6348, Census Bureau Library, Suitland, MD.

⁶ "Decennial Census Improvement Act of 1991," Public Law No. 102-135, 105 Stat. 635 (1991); National Research Council, Duane L. Steffey and Norman M. Bradburn, eds., *Counting People in the Information Age*, (Washington, DC: National Academy Press, 1994); U.S. Census Monitoring Board, Presidential Members, report to Congress, February 1, 1999, (Government Printing Office, Washington, DC), pp. 1-2; Martha Farnsworth Riche, New York, to Shannon L. Parsley, Suitland, MD, U.S. Census Bureau, letter, September 22, 2005.

⁷ Until its dissolution in 1996, the Technical Services Division designed, developed, deployed, and produced automated technology for census data processing.

employees with training in the latest computer languages and digital imaging technologies required to write the functional specifications for the Census 2000 data capture system. In return, RITRC gained valuable insights from Census Bureau personnel in the business of paper handling and designing and conducting censuses and surveys.⁸ In addition to its partnership with RITRC, the Census Bureau commissioned a number of assessments of available data collection technologies and, in cooperation with the National Institute of Standards and Technology (NIST), sponsored ongoing research into optical character recognition (OCR).⁹

OCR technology uses optical scanning and software designed to interpret handwritten characters. Source materials are scanned and converted to bitmapped digital images that consist of collections of pixels. OCR software processes a scanned image, differentiating between images and text to determine what letters are represented in the light and dark areas. OCR engines apply algorithms to analyze the stroke edge of a character, match the results to known characters in predetermined dictionaries, and make a guess as to the character represented. The computer's guess is expressed in a confidence interval assigned to the character interpretation by averaging the results from all the algorithms. While it is possible to adjust the scanning resolution or refine the files referenced by OCR software to increase accuracy, it is important to note that smudges, stray marks, or background color can fool the recognition software.¹⁰ OCR interprets fields independently, where the keying process permits keyers to interpret responses in a way that reflects the document in its entirety, including handwriting quality, and in the context in which the questionnaire is completed.

During the 1995 Census Test, Census Bureau personnel designed and tested a prototype digital imaging system combining OMR and OCR. The test assessed the feasibility of using digital imaging technology that combined, where necessary, customized commercial off-the-shelf software (COTS) with agency-developed programs to capture data from respondent-friendly census forms. Test results showed that the scanning project was a success. Despite considerable technological concerns about the accuracy of OCR, the prototype, including the mechanical forms feeder and the electronic imaging unit, proved "capable of handling the required volume and producing the image quality necessary to capture data electronically." In the final report on the prototype, technical experts from Recognition Research Inc., as well as imaging expert Jon Geist of NIST and the developer of the IDIAP Research Institute OCR engine, Thomas Breuel,¹¹ while emphasizing the importance of "human recognition" in the data capture process, agreed the 1995 test proved the agency could "use user-friendly forms while significantly reducing the data capture costs."¹² Citing the importance of institutional knowledge, these experts contended that while the technology

⁸ Ann Gwynn, "Partnership Agreement Big Step Towards Improving Data Capture Technology for 2000 Census," *U.S. Census Bureau IT Bulletin*, March 28, 1995, pp. 1–3; U.S. Census Bureau, "1993 Information Technology Plan," April 3, 1992, pp. 9–13. The partnership with RITRC was not a formal contract but was based on a memorandum of understanding.

⁹ Synectics for Management Decisions Inc., "Assessing Data Capture Technologies for the Year 2000 Census," report submitted to U.S. Census Bureau (Contract No. 50-YABC-3-66005), January 1994; Ogden Government Services and IDC Government, "U.S. Bureau of the Census Technology Assessment of Data Collection Technologies for the Year 2000: Final Technology Assessment Report," Deliverable No. 4 Data Collection Technologies Report and Recommendations, prepared for U.S. Census Bureau Year 2000 staff (Contract No. GSOOK90AJD0621), April 19, 1993; R. Allen Wilkinson, et al., "The First Census Optical Character Recognition System Conference," NISTIR 4912, August 1992; Jon Geist, et al., "The Second Census Optical Character Recognition Systems Conference," NISTIR 5452, May 1994.

¹⁰ For more information on questionnaire design and its influence on data capture, see Chapter 3, "Population and Housing Questions."

¹¹ The IDIAP Research Institute, initially referred to as "Institut Dalle Molle d'Intelligence Artificielle Perceptive" (Dalle Molle Institute for Perceptual Artificial Intelligence), was founded in 1991 by the Dalle Molle Foundation as the third of three research institutes in Switzerland. Dr. Thomas Breuel served as a consultant to the U.S. Census Bureau between 1994 and 1996 before working at the IBM Almaden Research Center, where he provided technological support for IBM's DCS2000 team in its bid for the DCS2000 contract. See also Thomas M. Breuel, "Applying Handwriting Recognition to U.S. Census Forms," in Appendix C of U.S. Census Bureau, "Electronic Imaging and Data Capture System Prototype for the 1995 Census Test," Final Report, February 1996 and Thomas M. Breuel, "Applying Handwriting Recognition to U.S. Census Forms," Proceedings of Second Asian Conference on Computer Vision, ACCV '95, Vol. 3, 1995, pp. 383–87.

¹² Jon Geist, "Evaluation Report for Processing Office #A85: Preparation and Preliminary Scoring of the Evaluation File for the 1995 Census Test of Image-Based Capture Technologies," October 31, 1995, p. 8, in Appendix D of U.S. Census Bureau, "Electronic Imaging and Data Capture System Prototype for the 1995 Census Test," Final Report, February 1996.

was available and usable through private industry, the greatest risk was not the technology but rather “the ability of the [Census] Bureau to adequately manage this revolutionary change.”¹³

The 1990s saw rapid technological advances and increased support of a businesslike approach to government called “privatization.” The National Performance Review urged executive agencies to improve their programs or reduce costs through collaboration with or transfer of certain government activities to private sector firms.¹⁴ By the fall of 1995, Census Bureau officials were discussing a variety of ways to privatize Census 2000 activities. Included as “candidates for divestiture” were field data collection, payroll support, telecommunications, printing, promotion, quality assurance, and technology systems integration. Noting that outsourcing data capture and related decennial systems would be a significant departure from the agency’s history of utilizing in-house expertise, Census Bureau officials nonetheless promoted a divestiture of computer software design, engineering, installation, and testing.¹⁵

In 1995, the Census Bureau established the Decennial Systems and Contracts Management Office (DSCMO) to manage Census 2000 contracts.¹⁶ Early in 1996, the Census Bureau commissioned Advanced Resource Technologies Inc. (ARTI) to conduct a benefit/cost analysis (BCA) of feasible approaches to performing data capture for Census 2000. With a focus on maximizing the quality of the data captured in a cost-efficient manner, this study compared the costs, risks, and benefits of three alternatives for data capture architecture, including digital imaging using OMR and OCR, the updating of the FACT90 system, and manual data entry. The BCA determined that digital imaging represented the least expensive alternative, requiring only four data capture centers (DCCs) with a staff of approximately 2,160 keyers, and an estimated total life cycle cost of \$113 million. However, given the system architecture’s complexity and the fact that the technology was untested in census operations, the digital imaging alternative also presented a substantial technological and operational risk.¹⁷ The second alternative, updating the FACT90 system, relied on high-speed cameras filming each form and used the FOSDIC OMR device to capture check mark responses from the forms. Workstations would then be used to key handwritten data from the paper forms. This alternative required seven DCCs and approximately 7,060 keyers. Although this alternative proved successful in previous censuses, the FACT90 system required some restructuring to incorporate new optics technology and to accommodate the redesigned census forms and the anticipated increase in the workload for Census 2000. ARTI noted that at the writing of the BCA, the Census Bureau had not begun a redesign and refurbishment effort. The third alternative, manual keying, presented the least amount of technical risk to the Census Bureau. However, it would require eight DCCs and over 8,000 data entry clerks; accordingly, ARTI stated that manual

¹³ Recognition Research Incorporated, “1995 Decennial Census Prototype: Final Report,” November 6, 1995 pp. 23–24 in Appendix B of U.S. Census Bureau, “Electronic Imaging and Data Capture System Prototype for the 1995 Census Test,” Final Report, February 1996. For technical information on the 1995 Census Test, see Chapter 2, “Planning the Census.”

¹⁴ Created on March 3, 1993, the National Partnership for Reinventing Government (NPR), originally the National Performance Review, was the Clinton-Gore Administration’s interagency task force to reform and streamline federal government activities by promoting efficiency and cost-reducing practices.

¹⁵ John H. Thompson, U.S. Census Bureau, “Census 2000: The Divestiture of Decennial Program Activities,” 2000 Decennial Census Decennial Management Division Memorandum (N.E.C.) No. 95-05, November 29, 1995, pp. 1–7.

¹⁶ Established in 1995, DSCMO was responsible for contracting for Census 2000. According to the Department Organizational Orders, “The Decennial Systems and Contracts Management Office shall manage the development and implementation of major Census 2000 contracts, including development and implementation of data capture system, acquisition and hardware, software, telecommunications, and integration services required to support the temporary offices, acquisition of other support such as printing of census forms, and conduct of telephone questionnaire assistance; ensure that all requirements, functions, and system interfaces for contracted systems are identified and compatible; ensure that all hardware and software are adequate and that all charges are controlled; monitor the cost and schedule, and technical performance milestones for each system, and ensure that appropriate standards and supportability requirements are established and met; manage the development of software and systems necessary to support processing and tabulation of census data; be responsible for integration of systems necessary to support collection, processing, and tabulation systems, including management of a Beta site contract to support this integration effort.” U.S. Department of Commerce, Bureau of Economic Affairs, Bureau of the Census, Department Organizational Order 35-2B, Amendment 3, effective date: April 2, 1999.

¹⁷ The digital imaging alternative was given a weighted risk rating of second out of the three alternatives examined, with FACT90 refurbishment ranking highest. Advanced Resource Technologies Inc., *Benefit/Cost Analysis of the 2000 Census Data Capture Scenario*, Vol. 1, Final, February 1996, pp. 8-1–8-22.

keying presented greater operational costs. In its conclusion, ARTI recommended that the Census Bureau use imaging technology for data capture for Census 2000. It advised the agency to reduce the level of technical risk associated with this alternative by “implementing such an architecture and using it for some other large production census or survey application scheduled for, ideally two or three years prior to the 2000 census.”¹⁸ Census Bureau officials accepted the ARTI recommendations.¹⁹

Between February and August 1996, Census Bureau experts developed requirements and specifications for an appropriate optical scanning system and related equipment, discussed alternative contracting procedures, and designated the parameters of a system to capture information contained in tens of millions of census forms the agency would receive during Census 2000. The agency initially planned to use a “fly-off” acquisition strategy in which two contractors’ DCS2000 prototypes would be completed during the development phase. By May 1996, the Census Bureau changed its acquisition strategy in favor of a single-vendor approach.²⁰ In its assessment of the DCS2000 acquisition procedures, the Office of Inspector General (OIG) of the U.S. Department of Commerce endorsed the Census Bureau’s decision to outsource data capture but recommended placing greater emphasis on technical content requirements in its vendor selection process rather than on past performance and oral presentations.²¹

The Census Bureau revised its solicitation in line with OIG recommendations. In August 1996, the Census Bureau formally invited private sector firms to submit bids for a state-of-the-art data capture system for Census 2000. Bidders were directed to the Census Bureau Procurement Office for information relating to the contract and to K. Bradley Paxton of RITRC for technical information and blueprints for the DS250—the paper transport system used in Census Bureau imaging and microfilming projects.²²

To be awarded the DCS2000 contract, the selected bidder’s system required the ability to capture information from an estimated 1 billion pages of census forms within a 99-day period (March 8 to July 1, 2000), as well as:

- The ability to begin processing at peak performance levels on March 8, 2000, with no phase-in period.
- The flexibility to handle forms of variable length and format.²³

The Census Bureau also required the DCS2000 system to contain five specific subsystems and use commercially available software where feasible. The component subsystems were:

- *Check-in*: The hardware and software necessary to read and store unique bar code identifiers on incoming envelopes and provide daily check-in rates and related data to the Census Bureau.
- *Imaging*: The subsystem to scan completed census forms and prepare the resulting images for the optical recognition and key-from-image processes. Proposals were to take into consideration the Census Bureau’s goal of automating data capture, including minimizing the number of people required to key data into the system.

¹⁸ Advanced Resource Technologies Inc., *Benefit/Cost Analysis of the 2000 Census Data Capture Scenario*, Vol. 1, Final, February 1996, p. xii.

¹⁹ John H. Thompson to Robert Marx, U.S. Census Bureau, “Recommendation that the Census Bureau Use Imaging Technology to Perform the Data Capture Function for the 2000 Census,” DMD Decision Memorandum No. 1, February 21, 1996 (originally issued as DMD to Director Memorandum No. 96-09).

²⁰ Robert W. Marx, Associate Director for Decennial Census to Division Chiefs Council, et al., “DCS2000 Contract—Decision to Use Single Vendor Approach,” memorandum, May 17, 1996; Office of Inspector General, “Bureau of the Census: Data Capture System 2000 Needs Acquisition and Management Improvements, Final Report,” OSE-7329-6-0001, July 1996.

²¹ Office of Inspector General, “Bureau of the Census: Data Capture System 2000 Needs Acquisition and Management Improvements, Final Report,” OSE-7329-6-0001, July 1996, pp. 6–9.

²² “DCS2000 SOL 52-SOBC-6-00003: Solicitation for Data Capture System for the Year 2000 Decennial Census,” *Commerce Business Daily*, PSA No. 1652, August 6, 1996. For more information on the requirements and deliverables detailed in the DCS2000 contract, see statement of work for contract No. 50-YABC-7-66010.

²³ Since the content and format of Census 2000 data-collection forms would not be finalized until 1999, and data capture workloads would differ substantially from one DCC to another, it was necessary for DCS2000 to be a scalable system capable of capturing data from questionnaires of different lengths and layouts.

-
- *Optical recognition*: The subsystem using OMR and OCR to read and interpret handwritten responses on questionnaire images.
 - *Key from image (KFI)*: The subsystem where data from scanned images rejected by OCR and OMR would be keyed.
 - *Automated edit resolution*: A subsystem to identify missing names and data from images of scanned questionnaires or from ASCII files created from those images.²⁴

In addition, the solicitation required a workflow management system that allowed for control of each subsystem and the exchange of information among them.

Four companies submitted proposals for DCS2000 to the Census Bureau by October 1996. The Census Bureau used three primary criteria to determine the winning bid. These were past performance on similar efforts; the capabilities of key people, including their roles in previous efforts; and the ability to plan, design, and demonstrate products and processes during preaward demonstrations.²⁵ After 6 months of evaluation, the Census Bureau awarded the DCS2000 contract, valued at \$150.5 million, to Lockheed Martin Mission Systems on March 21, 1997.²⁶

In addition to the contract for the data capture system, the Census Bureau awarded to TRW in February 1998 the data capture services contract (DCSC), which included the acquisition, build-out, operation, and closeout of data capture facilities. Both contracts included a cost-plus award fee with elements of firm-fixed price in order to share risk between the government and the contractors.²⁷

The DCS2000 solicitation specified a two-phase process. The first phase covered the design and development of a prototype DCS2000 system at the Census Bureau's computer facility in Bowie, MD. Extending from March 21, 1997, to July 31, 1998, Phase 1 included several demonstrations designed to allow the Census Bureau to assess Lockheed Martin's progress in designing, constructing, operating, and refining the preproduction data capture system to be used in the Census 2000 Dress Rehearsal in 1998. Phase 2 of the contract was the development and deployment of the full-scale production version to be used for Census 2000.

The DCS2000 contract specified that the data capture system would be developed in four increments during Phase 1, with each increment adding capabilities to the system. Interim releases of the system would follow the completion of each increment. Each release would be subject to a milestone demonstration referred to as Levels B, C, and D. The Level B demonstration focused on basic scanning and forms processing capabilities. This demonstration consisted of a practice run processing 1,064 census forms to test the imaging, optical recognition, key-from-image, and workflow management subsystems. Among the problems discovered in the demonstrations were pages sticking together and duplication of identification codes.

The Level C demonstration was to test the system's ability to process 10,000 census short forms and 2,000 long forms in one workday consisting of two 8-hour shifts. Initially the Census Bureau intended to provide the contractor with 12,000 forms from a census test planned for 1997. Lack of funding required the agency to substitute a limited test deck of 2,000 forms completed by census staff.

²⁴ The Census Bureau promised to work with the contractor during the first 60 days following the award to develop a methodology for identifying and resolving edit failures.

²⁵ Titan Systems Corporation/System Resources Division, Kevin A. Shaw, "Census 2000 Data Capture System Requirements Study," Census 2000 Evaluation No. R.3.d., August 23, 2002, p. 11.

²⁶ U.S. Census Bureau, "Program Master Plan: Data Capture Systems and Operations," March 30, 2001, pp. 2-3; Titan Systems Corporation/System Resources Division, Kevin A. Shaw, "Census 2000 Data Capture System Requirements Study," Census 2000 Evaluation No. R.3.d., August 23, 2002, p. 10; Carolyn Hirschman, "Head Count: Census Bureau Taps Data Management Tools," *Washington Technology*, August 2, 1999; Pamela Bowers, "The Bureau of the Census Delivers the First System to Use Digital Imaging Technologies to Process Forms," *Crosstalk: The Journal of Defense Software Engineering*, January 2002, pp. 12-13. The DCS2000 contract was awarded in accordance with information systems acquisition guidelines established by the U.S. Office of Management and Budget in Memorandum No. M-97-02, October 25, 1996, under the Information Technology Management Reform Act of 1995 (40 U.S. Code 1401 et seq.) and Executive Order 13011 regarding federal information technology management, *Federal Register*, Vol. 61, No. 140, July 19, 1996, pp. 37657-62.

²⁷ U.S. Census Bureau, "Program Master Plan: Data Capture Systems and Operations," Census 2000 Informational Memorandum No. 107, March 30, 2001, pp. 2-3.

According to the DCS2000 contract, the Census 2000 Dress Rehearsal would serve as the Level D demonstration.²⁸ The dress rehearsal provided the Census Bureau its first opportunity to test the new system with questionnaires completed by the public. Analysis of dress rehearsal results revealed a number of problems with the data capture system including:

- Missing data.
- Misinterpretation of responses.
- Sorter jams.
- A field-error rate for write-in responses of 3.01 percent.²⁹

According to the OIG, however, these tests were too limited in size and scope to replicate the actual operational environment for the DCS2000. Specifically, the DCS2000 system tested in the dress rehearsal lacked its full complement of equipment (e.g., scanners and workstations). This, combined with continued changes in system requirements and the abandonment of an agreed-upon software and hardware test process, meant DCS2000 could not be considered a fully operational production system.³⁰

The Census Bureau responded with efforts to improve its management of the DCS2000 contract and system development. This included replacing the statement of work (SOW), which was used to outline the tasks in the DCS2000 contract with a Functional Baseline (FBL) document. Because the FBL lacked specifics needed for effective management, the Census Bureau and Lockheed Martin continued to negotiate refinements of system requirements as needed throughout the course of the project.³¹

On October 30, 1998, DSCMO established a Requirements Change Request Management Process mandating that any change to system requirements undergo a review by the Census Operational Managers (COM) and the Issue Resolution/Change Control Board (IR/CCB). Both groups consisted of assistant division chiefs from the Decennial Management Division (DMD) and all lead census managers involved in decennial operations. These bodies evaluated the budgetary and operational risks posed by proposed requirements changes and then either rejected the proposed change or referred it to the assistant to the associate director (AAD) for the Decennial Census for final disposition. In addition to the change-control process, the Data Capture Programming Office (DCPO) of the Census Bureau and Lockheed Martin compiled and updated a list of outstanding requirements, schedules for defining such requirements, and cost estimates for accommodating those requirements not included in baseline funding.³²

After several modifications of the system requirements, software, and the DCS2000 contract, the Census Bureau tested the DCS2000 system in a production setting. Beginning on July 12, 1999, the Company Statistics Division of the Census Bureau's Economic Directorate used Lockheed Martin's system to test data capture using the 1997 Survey of Minority-Owned Business Enterprises and the 1997 Survey of Women-Owned Business Enterprises (SMOBE/SWOBE). From July 26 to 30, an end-to-end test of the Lockheed Martin system conducted at the National Processing Center

²⁸ See statement of work in Contract No. 50-YABC-7-66010. Refer also to Lockheed Martin Mission Systems, "DCS2000 System Acceptance Test Plan," Contract No. 50-YABC-7-66010, Document No. DCS-98-044, submitted to U.S. Census Bureau, May 29, 1998, and attached government comments from Alan Berlinger, Decennial Systems Contract Management Office, U.S. Census Bureau, to Nancy E. Robinson, Lockheed Martin Federal Systems, "System Acceptance Test Plan Draft," ID# DCS2K-98-573, undated.

²⁹ Kevin D. Haley, Decennial Statistical Studies Division, U.S. Census Bureau, "Quality of the Data Capture System," Census 2000 Dress Rehearsal Evaluation Memorandum H3, July 1999, pp. i-vi; Lockheed Martin Mission Systems, "DCS2000 System Development Plan: Final," Contract No. 50-YABC-7-66010, Document No. DCS-97-072, submitted to U.S. Census Bureau, July 31, 1998, pp. 45-48, 90-92.

³⁰ U.S. Department of Commerce, Office of Inspector General, "Bureau of the Census: Data Capture System 2000 Requirements and Testing Issues Caused Dress Rehearsal Problems," final Inspection Report No. OSE-10846, January 1999.

³¹ Titan Systems Corporation/System Resources Division, Kevin A. Shaw, "Census 2000 Data Capture System Requirements Study," Census 2000 Evaluation No. R.3.d., August 23, 2002, pp. 1-4.

³² Kenneth Prewitt, Director, U.S. Census Bureau, to Judith J. Gordon, Assistant Inspector General for Systems Evaluation, U.S. Department of Commerce, (January 26, 1999), Appendix A of U.S. Department of Commerce, Office of Inspector General, "Bureau of the Census: Data Capture System 2000 Requirements and Testing Issues Caused Dress Rehearsal Problems," Final Inspection Report No. OSE-10846, January 1999.

(NPC) revealed several problems with the prototype. On August 2, NPC staff processed a batch of 1,200 forms completely through the DCS2000 system. The NPC’s quality assurance staff assessed data quality by reviewing for each form the images and the information guaranteed confidential under Title 13 (T-13) of the U.S. Code.

During biweekly meetings, the SMOBE/SWOBE and DSCMO staffs expressed concerns to Lockheed Martin about the number of false positive OMR errors and trouble tickets issued by NPC staff and Lockheed Martin staff since the start of production. The trouble tickets revealed “various problems with the sorters; cases found in the database with a check-in date and no T-13 data; cases with T-13 data but no check-in date; inconsistencies between the counts in the database and the production reports, and several problems with the checkout operation used to verify the [Census] Bureau’s receipt of the data record for each processed form.” In response to the evaluations of test decks and production reports, Lockheed Martin modified its program and software, including refining the truth files and dictionaries used by the system to interpret the characters in write-in responses.³³ After investigating the sources of these problems, NPC staff recommended several software and hardware enhancements to Lockheed Martin. NPC staff also devised and recommended an independent quality assurance (QA) procedure during which Census Bureau personnel would pull a stratified sample of the daily receipts, key the responses from the paper forms into an NPC system, and run a simple matching program to analyze discrepancies between the daily files provided by Lockheed Martin and the data keyed by NPC staff. NPC made recommendations about how to improve the system’s capacity to alert staff about errors. Provided these recommendations did not constitute major system design changes or increase the risks associated with the cost or production schedule for the DCS2000, they were to be incorporated into the first build for the decennial census.³⁴

Once DCS2000 was installed in the DCCs for Census 2000, system testing proceeded through a series of stages (see Table 6-1). The first of these was the site acceptance test (SiteAT) at which the contractor, with occasional assistance from Census Bureau personnel, confirmed that the system and subsystems met specifications and that required functions had not regressed or reverted since the system acceptance tests.

Table 6-1.
Data Capture Center DCS 2000 Testing Schedule

DCC site	Site acceptance test		Operational test dry run		Four-site preproduction test	
	Planned	Actual	Planned	Actual	Planned	Actual
Baltimore, MD	7/8/1999	8/6/1999	8/9/1999	10/1/1999	2/22/2000	2/25/2000
NPC	12/2/1999	12/17/1999	1/3/2000	2/11/2000	2/22/2000	2/25/2000
Pomona, CA	9/20/1999	10/7/1999	10/18/1999	11/19/1999	2/22/2000	2/25/2000
Phoenix, AZ	12/3/1999	12/3/1999	11/29/1999	2/4/1999	2/22/2000	2/25/2000

Source: U.S. Census Bureau, “Program Master Plan: Data Capture Systems and Operations,” Census 2000 Informational Memorandum No. 107, March 30, 2001, Attachment B: Master Activity Schedule for Data Capture as of 3/30/2001.

Upon completion of the SiteAT, TRW staff activated the system to prove that it met performance standards and ran the operational test dry run (OTDR). The OTDRs provided formal controlled environments in which every component of data capture operations was implemented, practiced, and evaluated. The contractors provided evaluations of the following individual elements based on OTDR results:³⁵

- Executing and recruiting the screening plan.

³³ Ruth A. Runyan, Assistant Division Chief, Surveys and Programs, Company Statistics Division, U.S. Census Bureau, to Ewen M. Wilson, Chief, Company Statistics Division, U.S. Census Bureau, “Summary of Phase II Operations/Response Rates, 1997 Survey of Minority-Owned Business Enterprises (SMOBE) and 1997 Survey of Women-Owned Business Enterprises (SWOBE),” memorandum, April 15, 2000, p. 3.

³⁴ Ruth A. Runyan, Assistant Division Chief, Surveys and Programs, Company Statistics Division, U.S. Census Bureau, to Ewen M. Wilson, Chief, Company Statistics Division, U.S. Census Bureau, “Summary of Phase II Operations/Response Rates, 1997 Survey of Minority-Owned Business Enterprises (SMOBE) and 1997 Survey of Women-Owned Business Enterprises (SWOBE),” memorandum, April 15, 2000, p. 2.

³⁵ U.S. Census Bureau, “Program Master Plan: Data Capture Systems and Operations,” Census 2000 Informational Memorandum No. 107, March 30, 2001, pp. 53–54.

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- Training methods and materials.
 - Application of concepts and procedures outlined in the *Data Capture Operations Manual*.
 - Assessment of QA measures.
 - Communications with the Operations Control Center.
 - Disaster recovery.

The OTDR as well as other tests in the Baltimore and Pomona DCCs demonstrated that keying took approximately twice as long as original projections, which were based on a keying rate of 8,500 keystrokes per hour. Census Bureau staff attributed the increased time requirement to a greater-than-expected level of critical QA work sent to keyers and to the discovery that keying rates were approximately half of the original projections.³⁶ The Census Bureau and the contractor adopted a two-pass data capture operation to avoid a dramatic processing slow down.³⁷ During Pass 1, only responses to 100 percent census items rejected by the OCR software were keyed from the digital images.³⁸ The second pass operation included a rerun of the long-form questionnaire images through OMR and OCR interpretation and the keying of write-in responses rejected by OCR.³⁹

Testing and requirements changes slowed development of the DCS2000, putting it 4 months behind schedule in late 1999. Nonetheless, in its assessment of the system, the GAO acknowledged the progress made by the Census Bureau and Lockheed Martin on the system's development. By January 7, 2000, the Census Bureau reported that "21 of 23 software releases had been completed and 6 of 10 major test events had been completed . . . [and] all DCS2000 hardware [was] installed at all sites." GAO reminded the production team that the March 6 project deadline was less than 2 months away. Further delay, said the GAO, might endanger the execution of a production-scale test of the final system, which in turn could pose a risk to the effectiveness of the Census 2000 data capture process. The Census Bureau generally concurred with the GAO's observations and noted that the agency had implemented a formal risk management program as well as a more stringent requirements management process to ensure that only those changes that were "justified on the basis of costs, benefits, and risks [were] approved and made."⁴⁰ As late as January 24, Census Bureau officials continued to express concerns about QA procedures, and they proposed a method by which NPC staff could monitor the quality of data capture. The proposed method suggested pulling sample images during the first pass and comparing them with the T-13 data captured by DCS2000. NPC would then monitor second-pass data capture by preparing keyed-in samples for comparison with T-13 and long-form data.⁴¹ In addition, the Census Bureau and the contractors scheduled a four-site preproduction test to assess the system's readiness prior to its coming on line.

Conducted on February 25, 2000, the four-site preproduction test was designed to demonstrate simultaneous operation at all four DCCs. Employing the DCS2000 equipment (including the final software) and the operations staff, all support staff and infrastructure, and the major interfaces

³⁶ Critical fields included the race check-box question. If a multiple response was detected for this question, the field was designated as "low confidence" and sent to an operator for manual keying.

³⁷ According to the U.S. Government Accounting Office (GAO), "changing DCS2000 to the two-pass approach resulted in estimated cost increases of \$33 million for additional system development, hardware, integration, testing, and support by the development contractor [Lockheed Martin]; and \$12 million for the contractor that operates the DCCs to keep the centers operational longer than originally planned [TRW]." U.S. General Accounting Office, "2000 Census: Update on Data Capture Operations and System," GAO/AIMD-00-324R, September 29, 2000, p. 4.

³⁸ Pass 1 of data capture began March 6 and concluded September 15, 2000. Pass 2 began on August 28 and ended on November 15, 2000.

³⁹ U.S. Census Bureau, "Program Master Plan: Data Capture Systems and Operations," Census 2000 Informational Memorandum No. 107, March 30, 2001, pp. 1-2. "100 percent data" refers to the six basic questions that appeared on both long- and short-form questionnaires, these questions ask about relationship, sex, age, race, ethnicity, and tenure.

⁴⁰ U.S. General Accounting Office, Report to the Subcommittee on the Census, Committee on Government Reform, House of Representatives, "2000 Census: New Data Capture System Progress and Risks," GAO/AIMD-00-61, February 2000, pp. 3-17.

⁴¹ Howard Hogan, Chief, Decennial Statistical Studies Division (DSSD), U.S. Census Bureau, "Proposal for Quality Assurance of Census 2000 Data Capture," DSSD Census 2000 Procedures and Operations Memorandum Series No. JJ-8, January 24, 2000.

with the Census Bureau and the Operations Control Center, the test ran regular 8-hour shifts with a minimum of 6.5 productive hours per day for 4 days at each of the four DCCs. The goal was to process approximately the same number of forms per shift as predicted during the Census 2000 data capture operations at each site. The three major objectives included tests of the following:

- *Operations:* Practice all procedure-based floor operations that were directly connected to moving census materials. This included the work of operations personnel, supervisors, and managers.
- *System:* Test all hardware and final software directly related to the collection and transmission of census data. Perform a final shakeout of the DCS2000 software using the production D.23 software release. Verify that all form templates and functionality were correct. Transmit daily T-13 data files to headquarters data processing from each of the four sites via the automated DCS2000 data transmission process.
- *Support:* Test all personnel, processes, procedures, hardware and software related to supporting the operations, including on-site support, operations help desk, and system technical support.⁴²

Upon completion of the tests, the contractor modified the system as needed and the DCS2000 was deployed for Census 2000 data capture on March 6, 2000. During Census 2000, agency personnel and TRW contractors operating the DCCs processed approximately 150 million forms using technologies developed and maintained by private firms. Following its mandate from Congress and the Administration, the Census Bureau applied private sector business practices to establish and maintain partnerships with contractors. The agency and TRW established consistent operational procedures for the DCCs, and keying approaches were modified to meet production schedules. To mitigate risks to the data capture program, control costs, and manage the numerous system requirements changes that were required throughout the development and testing of the DCS2000, the Census Bureau implemented a control process that tracked and evaluated changes. Census Bureau change control was complemented by similar efforts by Lockheed Martin and TRW. The effort required to complete the necessary assessments of change requests, however, diverted resources from the development and testing process.⁴³

The use of OCR and an outsourced data capture system marked significant departures from past technologies and practices. These changes resulted in a variety of unanticipated costs. The experience of outsourcing data capture for Census 2000 highlighted the Census Bureau's difficulties in capitalizing on or effectively managing the institutional knowledge and experience of its own personnel. This was due, in part, to the agency's limited documentation of user requirements from past censuses as well as its lack of experience working with contractors. Such difficulties, however, were more broadly indicative of a shift in institutional culture.⁴⁴

Limited utilization of institutional knowledge and a lack of documentation of decennial census requirements contributed to difficulties with three critical components of the data capture program: system requirements definition; rules for keying in data; and the establishment of QA processes.⁴⁵ While the Census Bureau planning for Census 2000 included a process to control changes, many Census Bureau actions were viewed by employees and evaluators as reactive rather than proactive. Frequent changes to the system requirements that were originally outlined in the request for proposals and the contract presented considerable difficulties. With each software release and subsequent test, the contractors and the Census Bureau identified new problems requiring system changes to meet production requirements and deadlines.

In addition to system requirements, keying rules and QA played a critical role in data capture. During Census 2000, when the DCS2000 could not identify a number or write-in character, an image of the field was forwarded to a keyer for entry. When an entire questionnaire could not be imaged,

⁴² U.S. Census Bureau, "Program Master Plan: Data Capture Systems and Operations," Census 2000 Informational Memorandum No. 107, March 30, 2001, p. 54.

⁴³ Titan Systems Corporation/System Resources Division, Kevin A. Shaw, "Census 2000 Data Capture System Requirements Study," Census 2000 Evaluation No. R.3.d, August 23, 2002, pp. 1–12.

⁴⁴ IBM Business Consulting Services, "Management Evaluation of Census 2000, Final Report," Census 2000 Evaluation Q.1, October 8, 2003, pp. 67–71.

⁴⁵ Titan Systems Corporation/System Resources Division, Kevin A. Shaw, "Census 2000 Data Capture System Requirements Study," Census 2000 Evaluation No. R.3.d, August 23, 2002, p. 6.

keyers entered data from the document itself. A number of other questionnaires were not imaged but were keyed directly from the relevant document. Initially, keying rules similar to those used in the 1990 census were proposed for Census 2000; however, philosophical differences among Census Bureau experts in content and processing on the amount of interpretation that should be done by the keyer proved a stumbling block.⁴⁶ The method used by NPC keyers with years of experience interpreting responses was not readily translatable by contractors new to the job and with minimal supervision or guidance, and so a “key what you see” that did not provide for interpretation of respondent intent was adopted. Adding to the confusion, keying rules continued to change even after production began and between first- and second-pass operations.

Differences over QA procedures also presented challenges to the program. Although Census Bureau QA specialists provided contractors with recommendations for improving QA procedures, these were received late in the process. Specialists were informed that implementing such procedures would require software redesign. As a result, primary contractors developed internal QA programs, and philosophical differences between agency QA specialists and program managers over the implementation of QA contributed to uncertainty among QA specialists. Time limitations and other factors required the use of process workarounds that did not always meet the Census Bureau’s QA requirements.⁴⁷

Such differences in the interpretation of procedures and system requirements not only contributed to misunderstandings between agency personnel and contractors, but increased program costs. Often, the modifications necessary for a timely and successful data capture program fell outside the original contractual obligations. In a number of circumstances, the increased resources required to accommodate these system or program changes required change orders, or modifications of the contracts, which were awarded on a “cost plus” basis. Change orders were priced separately from the original contracts, and they added to the contracts’ scope and value.⁴⁸ By December 2001, the Census Bureau reported the combined total cost of the data capture contracts at \$552 million, with \$237,564,461 awarded to Lockheed Martin Mission Systems for the DCS2000 (Phases 1 and 2), and \$314,282,740 awarded to TRW for the DCSC.⁴⁹ Table 6-2 includes those modifications that most significantly increased costs of the data capture program.

⁴⁶ Keying rules submitted by Census Bureau subject-matter experts instructed keyers how to interpret responses rather than using a “key what you see” method. These rules were not incorporated into Census 2000 keying procedures. See Howard Hogan, Chief, DSSD, John F. Long, Chief, Population, and Daniel H. Weinberg, Chief, Housing and Household Economics Statistics, U.S. Census Bureau, to Preston Jay Waite, Assistant to the Associate Director for Decennial Census, U.S. Census Bureau, “Special Keying Data Capture Procedures and Instructions for Data Capture System 2000,” memorandum, April 20, 1999.

⁴⁷ Titan Systems Corporation/System Resources Division, Kevin A. Shaw, “Census 2000 Data Capture System Requirements Study,” Census 2000 Evaluation No. R.3.d., August 23, 2002, pp. 1–12.

⁴⁸ IBM Business Consulting Services, “Management Evaluation of Census 2000, Final Report,” Census 2000 Evaluation Q.1, October 8, 2003, pp. 67–71.

⁴⁹ Titan Systems Corporation/System Resources Division, Kevin A. Shaw, “Census 2000 Data Capture System Requirements Study,” Census 2000 Evaluation No. R.3.d., August 23, 2002, pp. 1–12; U.S. U.S. General Accounting Office, “2000 Census: Analysis of Fiscal Year 2000 Budget and Internal Control Weaknesses at the U.S. Census Bureau,” Appendix IV: Comments from the Department of Commerce, U.S. Census Bureau, GAO-02-30, December 2001. A third phase was added to the DCS2000 contract to prepare DCS2000 images and an index to those 625 million form images for microfilm. This was to meet federal archiving requirements. See National Archives and Records Administration, SF-115 for Job No. N1-29-00-2, “Census 2000 Comprehensive Record Schedule,” June 14, 2000, and “Extension to Contract No. 50-YABC-7-66010 for the Transition of the Production DCS2000 Systems to a Post-Decennial Environment,” *Commerce Business Daily*, PSA No. 2737, November 30, 2000.

Table 6-2.
Data Capture Contract Costs
 [In dollars]

DCS2000 Contract	
Original contract baseline	48,971,085
Modification	Cost
Phase 1 system requirements based on functional baseline	24,028,427
Phase 2 system development	64,333,746
Six-person form	9,329,010
Data capture audit resolution	1,491,472
Additional workstations for Baltimore and Phoenix DCCs	2,888,333
Additional hardware for Baltimore and Phoenix DCCs	4,645,602
Bar code capture development and questionnaire changes	2,791,875
System modifications based on a traditional census	19,676,102
System and operational changes from a one-pass to a two-pass system	32,843,120
Phase 3 image retrieval system development for archiving	17,000,000
Phase 3 microfilming of questionnaire images for archiving	27,000,000
Final estimated cost (FY2003)	219,746,000
Data Capture Services Contract	
Original contract baseline	187,872,104
Modification	Cost
Life-cycle cost-estimated baseline	40,834,005
Six-person form, traditional census, and two-pass processing changes	91,238,630
Lease for Lanham office	1,537,673
Four-site production test	2,000,000
Document destruction at the DCCs	1,042,511
Enumerator forms storage based on Congressional request to investigate possible fraud	2,000,000
Administrative changes resulting in decrease in costs	-3,242,957
Final budgeted total	314,279,740

Source: U.S. Census Bureau, "Assessment Report: Data Capture of Paper Questionnaires, Final," Census 2000 Informational Memorandum No. 135, February 19, 2003, pp. 19, 27–29.

Despite such challenges, the use of contractors provided a number of benefits. Contractors brought considerable expertise and resources, contributing to the timely completion of data capture for Census 2000. The Census Bureau's first foray into outsourcing on this scale revealed a number of shortcomings, which encouraged it to alter its approach to program development and decision-making practices.

AUTOMATION INFRASTRUCTURE

The Census Bureau based its automation of the data capture and headquarters (HQ) processing programs largely upon the interaction of three major census systems, each with its own sub-systems:

- Data Capture System 2000 (DCS2000)
- HQ processing
- Management Information System (MIS2000)

The data capture services contract (DCSC) management information system (DMIS), a management information system contained within the data capture centers (DCCs), also played a part. The DCS2000's primary function was to capture Title 13 data from census forms as American Standard Code for Information Interchange (ASCII) text. DCCs received forms mailed back from respondents as well as other types of forms from field offices. At the DCCs, these forms were checked-in, sorted, and scanned to produce a digital image of the form. The scanned images underwent optical mark recognition (OMR) and optical character recognition (OCR) interpretation to obtain the Title 13 ASCII data. On a daily basis, DCCs transmitted ASCII data collected from the census forms

to Census Bureau headquarters for further processing. The MIS2000 and DMIS provided performance metrics, workflow reports, tracking and problem identification, and other information to aid management in making decisions regarding data capture and processing activities at HQ and within the DCCs.

Data Capture System 2000 (DCS2000)

The DCCs used the DCS2000 to complete the initial process of data capture. This system, which was developed, deployed, and maintained by Lockheed Martin, was used to image questionnaires and convert the responses to ASCII data by combining customized commercial off-the-shelf (COTS) software (see Table 6-3), Docutronix sorters, bar code scanners and printers, Kodak scanners, and Dell workstations operating on a Windows NT platform. Two secure T1 lines enabled this system to interface with two other census systems—HQ processing and MIS 2000.

Table 6-3.
DCS2000 Software

Name/Title	Application
Captiva Software	Form-processing and data-entry interface for rejection, repair, and key verification
Staffware	Workflow management software
FAQSS	OMR software
CGK	OCR software
Oracle	Database
Legato	Backup and storage software
Docutronix System Mail 2000 S/W VDD	Used for letter- and flat-sorter data controller
Kodak Adrenaline Runtime	Used to support advanced cleanup of images
Microsoft Windows NT	Used for data receipt and verification, external interface server, site workflow server, status database server, master message-oriented middleware, database server
NetHasp Server Key Authentication Software	
Tivoli Software Suite	Used to provide a unified, standard management approach to DCS2000 computing environments

Three subsystems—data receipt and verification (DRV), processing cluster, and system administration—performed the DCS2000’s basic functions.

The DRV subsystem collected and sorted census forms from mailout/mailback and update/leave operations according to type and priority. Once collected, a form was checked in by reading the form bar code through the envelope window. Each form was printed with an interleaved 2 of 5 bar code with a 2-digit check digit that ensured the bar code would be read correctly. The check-in subsystem stored the unique identifier represented by the bar code in a check-in file that was transmitted daily to the HQ processing system’s decennial master control to identify which addresses on the decennial master address file (DMAF) had returned questionnaires.

The DRV created a check-in file for both mail and nonmail returns to transfer to HQ for each of the following three check-in categories:

- **DCC box check-in from DCS2000 to HQ processing/Decennial Management Control (DMC):** One check-in file reflected daily activity related to boxes of enumerator forms received at a DCC from the local census offices (LCOs). Check-in files for boxes shipped from the LCOs contained a record for each box received at a DCC. Information pertaining to the shipment was reported to HQ and to the LCOs.
- **Exception check-in address information from DCS2000 to HQ processing/DMC:** Separate check-in files were created for census forms that were incomplete, lacked IDs, or were unreadable and therefore required manual sorting and check-in. These files consisted of records containing the census or processing ID and the geographic or address fields captured from each add or list/enumerate form at the exception check-in.

- **Mail return check-in from DCS2000 to HQ processing/DMC:** Check-in files were created for census forms returned by respondents to the DCCs through the United States Postal Service (USPS). These files were used to update the DMAF and thereby exclude those households from the list of nonrespondents.

After creating and updating the check-in file, clerks prepared the forms for imaging within a processing cluster.

Processing clusters were autonomous units of image processing constructed around the capacity of three scanners. Processing cluster operations included workflow management, form scanning, optical recognition, and manual keying. Each DCC had as many clusters as necessary to process its workload. Equipment was distributed to accommodate the DCC's workload (see Table 6-4). The Baltimore and Phoenix DCCs contained 15 clusters. The Pomona DCC contained 14 clusters, and the National Processing Center (NPC) DCC contained 10 clusters. Clerks input questionnaires that were completed and returned in envelopes via the USPS (including undeliverable as addressed returns at NPC) and questionnaires that were returned to the LCOs then sent to the DCCs via FedEx. Divided into four modules, the processing cluster included workflow management, imaging, optical recognition, and key from image (KFI).

Table 6-4.
Equipment by DCC Site and Cluster

Equipment	Baltimore, MD	Phoenix, AZ	Pomona, CA	NPC-DCC
Mail sorters	9 per site	7 per site	8 per site	6 per site
Manual/exception check-in workstations	12 per site	15 per site	13 per site	7 per site
Check-out workstations	81 per site	74 per site	79 per site	48 per site
Equipment	Units per cluster	Units per cluster	Units per cluster	Units per cluster
Doc prep supervisor workstations	6	6	6	6
Scanners	3	3	3	3
Scanner controllers or key controllers	3	3	3	3
Automated image quality assessment (AIQA) servers	4	4	4	4
Cluster workflow server	1	1	1	1
OCR servers	3	3	3	3
OMR servers	6	6	6	6
KFI workstations	21	21	21	21
Key from paper (KFP) workstations	4	4	4	4
Audit resolution workstations	6	6	6	6

The workflow management module managed and controlled the work performed by the imaging, optical recognition, and KFI modules. It also controlled sequences of cluster processing and balanced the cluster workload. The module also provided management metrics, supported assignment of work, and monitored quality by performing quality analysis and quality checks.

The imaging module captured digital images of census forms once they were received and processed by the DRV. This module created digital images from paper forms of various sizes ranging to a maximum of 11 inches wide by 25.5 inches long. Single-pass scanning of dual-sided, single-sheet forms at a rate of one short form per second produced a digital image of the paper form. Automated image quality assessment servers were then used to verify the quality of the image by checking the level of gray and white pixels in the image keys. Keyers worked within the imaging module to key in paper forms that optical character recognition (OCR) could not interpret. This module also controlled and stored images of paper forms once they were scanned and processed. An imaging subsystem created at least two copies of the full digital image, which were saved for backup purposes to two separate digital tapes.

The next step in the processing cluster was optical recognition. This module converted scanned images of census forms to ASCII text using bar code recognition, OCR, and OMR. Used by the optical recognition subsystem, bar code recognition distinguished between multiple bar code identifiers located on the images. This provided the automated capability for image indexing using the bar codes to identify each form entered into the system.

OMR software captured the data on questions that respondents answered by marking checkboxes. This software determined whether or not a box was checked, without regard to the possibility of multiple boxes within a question being checked. OMR was not able to distinguish responses where only a single entry was requested and appropriate. (Multiple responses were usually the result of respondent confusion or lack of compliance with the questionnaire wording.) Critical fields with multiple responses were sent to KFI for verification. When respondents checked multiple boxes, OMR passed the answers on to optical answer recognition where additional software applied algorithms to determine the single correct box, or answer, to the question. The OAR possessed the capability to logically determine the correct answer to a multiple-choice question based upon respondent-provided information on the form.⁵⁰

The OCR component of the optical recognition module interpreted write-in entries by respondents and provided the output in ASCII format.⁵¹ OCR matched its interpretation of write-in responses to information from data dictionaries provided by the Census Bureau. Updated on a continuing basis, these data dictionaries were designed to maximize OCR “hit rates” by providing the system with common responses against which it could compare its interpretation (see Table 6-5).⁵²

Table 6-5.
Data Dictionaries Supporting the OCR Subsystem

American Indian tribes	Female first names	Occupation
Ancestry	Foreign country names	Place names
Asian and Pacific Islanders	Hispanic origin	Relationship
County names	Kind of industry	State names
Duties	Languages	Surnames
Employer name	Male first names	

Source: U.S. Census Bureau, “Program Master Plan: Data Capture Systems and Operations,” Census 2000 Informational Memorandum No. 107, March 30, 2001, p. 26.

The KFI module supported the optical recognition module and was the final component of the processing cluster. Forms containing characters or marks that were assigned a low confidence level and flagged by the recognition software required additional processing. The KFI module employed keyers using workstations to manually edit all fields containing flagged characters or marks. Through recognition repair, operators keyed numeric census IDs for those bar codes that were either not recognized or rejected by the software. This subsystem also used a quality assurance (QA) process called “recognition verification” in which clerks rekeyed selected forms to verify the results of the OCR/OMR processes. An audit resolution subsystem provided an automated form-editing capability to identify and route to keying workstations forms that contained erroneous data on persons living in the housing unit.⁵³

The third subsystem of the DCS2000, system administration, administered and controlled the operations of all DCCs and delivered final output to HQ. This subsystem controlled the sequences of site-level processes and reconfigured and balanced site workload. It also monitored resource performance and support diagnostics, supported backup and recovery, provided security management and management metrics, and served as the interface through which data were forwarded to HQ processing.

⁵⁰ U.S. Census Bureau, “Program Master Plan: Data Capture Systems and Operations,” Census 2000 Informational Memorandum No. 107, March 30, 2001, p. 25.

⁵¹ All alphanumeric fields were sent to keying.

⁵² For more detailed description of the OCR and OMR processes and the DCS2000, see the “Data Capture Outsourcing” section of this chapter.

⁵³ U.S. Census Bureau, “Program Master Plan: Data Capture Systems and Operations,” Census 2000 Informational Memorandum No. 107, March 30, 2001, p. 27.

Headquarters Processing

The HQ processing system controlled, managed, and processed Census 2000 data. HQ processing was not a single system, but rather a coordinating mechanism for several unique census applications used to perform various data processing and controlling operations on data collected by Census 2000 systems and by the Accuracy and Coverage Evaluation (A.C.E.) survey. Census Bureau technical staff developed each of the HQ processing applications using programming languages such as FORTRAN, Pascal, Borland Delphi, C, and C++. HQ processing applications were mainframe-based at the Bowie Computing Center (BCC) in Bowie, MD, and the National Processing Center (NPC) in Jeffersonville, IN. A wide area network using a T1 frame relay network connected HQ processing components at HQ and NPC to each other and to regional census centers and LCOs. This network of applications, systems, and processes interfaced with eight major census systems and was grouped into three operational categories: address list capture operations (ALCO), decennial management control (DMC), and postresponse processing system.⁵⁴

ALCO included the following series of operations performed at the NPC, many of which were to refine, update, and edit the address listing for rural and suburban areas prior to conducting the census:

- **Address listing data capture:** This involved keying in data from the bound address listing pages received from operations conducted in the field to identify addresses and locations. Specific activities included check-in, document preparation, keying, quality assurance, and reporting.
- **Address listing map-spot digitizing:** Each address register book included block maps used by data collection personnel in census field offices to place map-spot indicators for each housing unit. Once NPC checked in an address register, its maps were scanned, and each map-spot was digitized from the resulting image. NPC personnel then added or modified features in the Topologically Integrated Geographic Encoding and Referencing (TIGER®) system according to the annotations on the census address list block maps. They also resolved map-spot mismatches between the Master Address File Update File and TIGER®. The digitized versions of these maps were converted to ASCII data and sent to the Census Bureau's Geography Division for processing.
- **Block canvassing data capture:** Block canvassing validated city-style address areas and added new addresses to the master address file (MAF). Census workers updated a listing of known addresses with additions, deletions, and corrections for a census block. The listing was sent to NPC for capture of the address changes.
- **Address list review (ALR) data capture:** This partnership program gave local and tribal governments the opportunity to review and update the MAF. The data capture operation was conducted at each stage of the ALR program: submissions by local and tribal governments of new addresses, submission of the new addresses to the field for verification or recanvass, adjudication of address differences, and final submission of addresses reflecting the results of any appeals.
- **Update/leave (U/L) address book data capture:** Census workers used U/L address registers to hand-deliver census forms, and they updated the registers with additions, deletions, and corrections as needed. These address registers were sent to the NPC, where address changes were made using keying from the paper (KFP).
- **List/enumerate (L/E) address listing data capture:** Census workers used blank L/E address books to record addresses, then map-spotted housing units, and finally captured the data on census questionnaires. The NPC used KFP to capture addresses from the L/E address listing operation. These listing books were labeled with control bar codes. Data from the questionnaires were also captured by NPC using KFP.

⁵⁴ U.S. Census Bureau, "System Architecture," Version 2.0, September 2000, pp. 10-1–10-14.

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- **Update/enumerate (U/E) address list data capture:** Census workers used U/E address books to record additions, deletions, and corrections for a block. The listing books were labeled with control bar codes. Data were captured on census questionnaires. The listing books and questionnaires were sent to DCCs for capture using KFP or scanning.
 - **Quality Improvement Program (QIP) address listing data capture:** The QIP operation involved conducting an independent listing of housing units for comparison with the MAF to determine the quality of the census address base.
 - **Island Areas address listing data capture:** Addresses from the Island Areas address listing operation were captured by NPC using KFP. The listing books were labeled using control bar codes. Data from the Island Areas questionnaires were also captured by NPC using KFP.
 - **A.C.E. address listing data capture:** Addresses from the A.C.E. independent listing operation were captured by NPC.
 - **A.C.E. map scanning:** Census workers digitally scanned A.C.E. address listing maps to provide electronic copies. The electronic images were used to assist those performing the A.C.E. address matching operation.
 - **Group quarters (GQ) capture:** Completed GQ questionnaires were sent to the NPC for data capture. Forms used in the most populous types of GQs—those forms expected to have more than a million responses—were captured in the DCS2000 environment. The remaining GQ forms were captured by a keying operation outside the DCS2000 environment. HQ processing was responsible for capturing these low-volume forms in a KFP operation.

The second operational category of the HQ processing system was decennial management control (DMC). DMC was a complex network of operations controls that collected and processed data associated with Census 2000 activities. DMC enabled interactions with the MAF, Operations Control System (OCS) 2000, and DCCs; the Telephone Questionnaire Assistance (TQA), Internet Questionnaire Assistance (IQA), and coverage edit follow-up programs; and the responsible divisions. DMC controlled the following operations:

- **Decennial master address file (DMAF) creation:** The DMAF was a series of files that constituted the foundation for the operation used to control and track census operations. The MAF was the base file used to create the DMAF. The DMAF files were partitioned by state and indexed by region. The geographic reference file and the MAF were inputs to the DMAF that were provided to partition the DMAF and facilitate a faster interface for collection and processing operations during the census data collection and postprocessing operations.
- **DMAF updates:** MAF refresh files, as well as OCS 2000, TQA, IQA, and DCS2000 status updates were used to update the DMAF at specific points in the processing.
- **Form type sampling:** The census collected some data on everyone, called “100 percent” data, and collected some data only from a sample of people. The short-form census questionnaire asked only those questions that collected the 100 percent data, while the long-form questionnaire asked questions that collected both the 100 percent and the sample data. Addresses considered to be valid prior to the beginning of census data collection were chosen to receive sample forms (the long form) based on the population size of the governmental unit where they were located. The selected addresses were identified on the DMAF as units to receive long forms.
- **Creation of address file tapes:** A private contractor printed, addressed, and mailed census forms. Before this could be done, however, it was necessary to extract, organize, and deliver to the contractor files of addresses from the DMAF. Included in these files was the information necessary to place bar codes on the forms. These bar codes indicated the geographic area, census identification, form type, and other information required to control and prioritize data capture in the DCCs and control data collection activities.
- **Mail return surname determination:** In certain areas, identification of housing units on the ground was difficult and presented a considerable challenge, particularly during nonresponse follow-up (NRFU). These included rural areas that rely heavily on rural route/box number

addresses and multiunit structures in more urban areas. USPS misdeliveries of census questionnaires could occur at these types of addresses. During the follow-up operation, the Census Bureau provided enumerators with the name of the first person enumerated on the questionnaires that respondents from units with rural addresses and in multiunit structures returned by mail. The surname identification operation flagged the addresses and the MAF IDs of units that required surname capture. This information was included in the NRFU assignment address registers to help enumerators determine which units had already been enumerated by mail and which ones needed to be enumerated in NRFU.

- **Data Capture System (DCS2000)/Data Capture Services Contract (DCSC):** Captured files, control information, and QA and workflow status information for the four DCCs were transmitted to HQ. The interface used for this purpose defined the requirements for and method of transferring the files and the interactions necessary to acknowledge their receipt.
- **Check-in of undeliverable as addressed (UAA) returns:** The check-in of UAA returns included the capture of the census ID for each such questionnaire package. Check-in information was then used to update the DMAF with the status of the address.
- **Receipt of check-in files for mailback and enumerator returns:** These check-in operations included using laser sorters to capture the IDs of questionnaires returned by respondents and those completed by enumeration. Mail responses came from questionnaire mailouts, Be Counted forms (BCFs), TQA responses, and the Internet. The check-in data were used to update the DMAF for use in defining the responding universe.
- **Receipt of data capture files for mailback and enumerator returns:** HQ received these data capture files, which included response codes created from mail returns and enumerator short- and long-form questionnaires as well as those of BCFs or TQA and IQA responses. These records were loaded into the decennial response file.
- **Decennial response file (DRF) processing:** The DRF contained all responses to the census. The DRF processed data records from DCS2000, the Internet, TQA, NPC, and GQ keying, and it stored results from the mail response data capture, BCFs, enumerator forms, and GQ forms. DRF processing was a two-stage operation. The first stage (DRF1) involved handling the raw responses from data capture and lasted through the end of data capture. Once all of the data records that had been assigned a MAF ID were accepted, the second stage (DRF2) began. The second stage linked together the information from various responses and restructured all the data in preparation for multiple-response processing.
- **Assignment of address identifiers:** Responses to the census that lacked address identifiers were sent to GEO for matching and assignment. These responses included telephone responses, BCFs, and additions from the U/L and NRFU operations. In GEO, a match operation checked to see if the address was already on the MAF. If not, a provisional MAF ID was assigned, which became permanent after the address was verified in the field. Verified addresses were also placed on the DMAF, allowing the response record to be added to the DRF1.
- **Nonresponse follow-up identification:** This operation identified all nonresponding addresses based on the mail return, TQA, and Internet check-in flags encountered in the DMAF. The addresses and surnames for this nonresponding universe were provided to the LCOs through OCS2000 for use in NRFU operations.
- **Late mail return:** After the NRFU universe was identified, but before the NRFU operation began, HQ processing provided LCOs with a list of responses received after the cut-off date for identifying nonresponding HUs. These were to be removed from the NRFU universe.
- **Coverage improvement follow-up (CIFU) operation:** CIFU was a procedure in which HUs with conflicting status information were followed up. HQ processing provided information to OCS2000 of housing units that had been checked in to a DCC, but for which data were not captured. This information was used in CIFU operations.

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- **Coverage edit follow-up (CEFU) operation:** CEFU was done to resolve forms that were incomplete or had coverage discrepancies. If a mail return or BCF response failed selected coverage edits, the respondent was contacted by phone for follow-up. Information received during CEFU was keyed into a data collection system that used computer-assisted telephone interviewing. The information was then sent back to the DRF.
 - **Decennial field interface (DFI):** DFI provided the framework for data collection control activities at the field offices. The DMC infrastructure provided OCS2000 with files used to control data collection operations.⁵⁵
 - **Address verification:** Responses from BCF and TQA generated possible new addresses for the MAF and DMAF and required address verification in the field. OCS2000 passed the assignments and results to and from the field offices and the DMAF.
 - **Receipt of check-in files for TQA responses:** TQA responses received by the postresponse processing system that did not have census MAF IDs were processed through the MAF/DMAF identification system before posting to the DMAF and DRF.

The postresponse processing system comprised a series of post-data-capture operations, including those required to resolve problems of multiple responses, correct status and count inconsistencies, code write-in responses, edit data, impute missing data, recode for tabulation, apply disclosure avoidance processes, and prepare the input files needed by the data access and dissemination system (DADS). Major postresponse processing operations included:

- **Multiple-response processing:** The multiple-response processing operation identified and flagged for removal person records and housing unit records that were redundant. The primary selection algorithm (PSA) processed data records in the DRF of housing units whose response records represented more than one enumeration of the unit. The algorithm identified the unique person records to be included in the census for each of these units and excluded records for persons enumerated more than once.
- **Census unedited file (CUF) creation:** Information from the DMAF control file and the PSA results were used to create the 100 percent census unedited file (HCUF). This file included housing units that were confirmed to exist and the occupants of those units (including people added through count imputation), as well as the people enumerated in GQs.
- **Edit and imputation for 100 percent data:** The census edited file (CEF) was created by applying a series of content edits to the 100 percent responses on the HCUF. CEF was imputed from donor records for missing and inconsistent responses.
- **Dual system estimation (DSE):** Matching results from the A.C.E. were returned to HQ from NPC on a flow basis. At HQ these data were prepared for estimation processing, and coverage estimates were produced for the Decennial Statistical Studies Division.
- **Create apportionment counts:** Final unadjusted person counts by state were tabulated and provided to the Census Bureau's Population Division for use in computing the assignment of congressional seats to the states. This process combined the count of persons in the response data with the count of persons provided by federal agencies for military and federal government employees overseas. The counts were accumulated and merged into totals for each state, the District of Columbia, and Puerto Rico. The counts were processed according to the apportionment algorithm to produce the number of representatives for each state.
- **Disclosure avoidance processing:** Disclosure avoidance techniques were applied to ensure the privacy and confidentiality of respondents.
- **Sample-data weight processing:** Weighted counts for the sample data were defined and produced.

⁵⁵ For more information on the DFI, see Chapter 5, "Data Collection."

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- **Edit and imputation for sample data:** The sample census edited file was created by applying a series of content edits to the sample data using donor records to impute missing and inconsistent data. The results of this process on sample records were appended to the file that contained all sample results.
 - **Computation of variance:** This operation included the calculation of confidence intervals that represented the statistical confidence bounds of the census sample data.
 - **Tabulation recoding:** Tabulation recodes were calculated to produce the variables required for specific tabulations. The tabulations were produced by HQ processing and the DADS.⁵⁶

Another component of the HQ processing system was automated coding. This process assigned specific codes to the write-in responses captured from the census forms. The data were matched against the dictionary and assigned a census code. The general coding operation assigned codes for responses on three write-in lines (Asian and Pacific Islander, American Indian, and “some other race”) and responses covering information about persons in the household (i.e., Hispanic origin, language, ancestry, and relationship). The geographic coding operation assigned codes for place of birth, place of work, and migration. Place-of-work and place-of-birth data were sent to GEO where they were matched against the appropriate dictionaries and then matched against the TIGER® database. Coding issues not resolved by GEO were sent to the NPC, and there data were matched against coding dictionaries and the TIGER® database for clerical review and final coding. The industry-and-occupation coding operation assigned codes to the industry-and-occupation responses to selected questions on the long-form questionnaire. These data were sent to the NPC, where they were matched against dictionaries for clerical review and coding resolution. Finally, all special place and group quarters (SP/GQ) information to be included in the DRF and DMAF was collected by combining inputs from an SP/GQ data system and the DCS2000 located at the NPC.

Management Information System (MIS2000)

In addition to transmitting census data, the DCS2000 provided HQ with performance metrics that were transmitted to the MIS2000. The MIS2000 was the official source of management information for Census 2000. The system provided data about the progress of the census using a database that collected information on scheduling, progress to date, and performance anomalies. The system also supported cost-modeling and other decision-support software. This information assisted managers in assessing and modifying operational plans, monitoring and managing operations and costs, and identifying problems.⁵⁷

DCSC Management Information System

Within each DCC, however, the DMIS provided management information and support. Developed, tested, and operated by the DCSC contractor, DMIS facilitated and supported the management of the four DCCs and the Operational Control Center. At the three contractor-operated DCCs, DMIS applications supported the following functions:⁵⁸

- Office automation
- Qualified applicant tracking system
- Security
- Time and attendance
- Payroll
- Problem referral system
- Tracking of risks, issues, deliverables, and action items

⁵⁶ For more information on DADS, see Chapter 10, “Testing, Experimentation, Evaluation, and Coverage Measurement Programs.”

⁵⁷ U.S. Census Bureau, “System Architecture,” Version 2.0, September 2000, pp. 9-1-9-12.

⁵⁸ At the NPC-DCC, DMIS provided the same functions with the exception of payroll, cost accounting and reporting, and time and attendance.

- Scheduling
- Operations management reports
- Cost accounting and reporting
- DCSC inventory control

Local vendors performed hardware maintenance for DMIS, and TRW’s program management office managed maintenance applications for the system.

ORGANIZATION AND LOGISTICS

In 1990, the Census Bureau’s use of automation in the field required the agency to recruit and test over 42,000 applicants and train approximately 10,000 temporary employees to staff seven processing offices. For Census 2000, the Census Bureau decided that the most cost-effective and efficient strategy was to outsource data capture and operate four data capture centers (DCCs). The DCCs required a combined staff of 8,735 full-time employees, including 2,970 staff for key-from-image inputting and 419 staff for key-from-paper inputting.⁵⁹ The Census Bureau awarded the data capture services contract (DCSC) to TRW Inc., which developed and implemented the day-to-day procedures for the DCCs. TRW provided the staff and facilities to house and operate the DCS2000 equipment at three sites (Baltimore, MD; Phoenix, AZ; and Pomona, CA).⁶⁰ For each of these locations, TRW worked with subcontractors who managed operations at the DCCs. These included Computer Sciences Corporation in Baltimore, NCS in Phoenix, and DynCorp in Pomona. The National Processing Center (NPC), the Census Bureau’s permanent facility in Jeffersonville, IN, served as the fourth data capture center site (NPC-DCC). To ensure consistency across DCCs, TRW supported select activities in the NPC-DCC, such as design and build-out, training, and basic procedures. Using procedures developed by TRW, NPC personnel developed and wrote processing operations specific to their DCC that included data capture of foreign-language questionnaires, Be Counted forms, and check-in of undeliverable as addressed (UAA) packages. The Census Bureau utilized NPC’s existing infrastructure and was responsible for the management, recruiting, and staffing of the NPC-DCC.

In addition to a substantial number of workers, each DCC required between 200,000 and 272,500 square feet of space.⁶¹ During peak operations—two shifts a day, 6 days a week—DCCs required staff as outlined in Table 6-6.

Table 6-6.
DCC Staff Requirements

Staff	Baltimore	Phoenix	Pomona	NPC
DCC site managers	2	2	2	1
Census Bureau representatives ⁶²	3	3	3	N/A
Other DCC managers and support staff ⁶³	82	77	108	30
Clerical labor	948	824	997	900

In addition to the capture of questionnaire data, each DCC was responsible for the following:

- *Facilities management:* Providing physical security, concession services, janitorial services, grounds maintenance, repairs, and utilities.

⁵⁹ U.S. Census Bureau, “Assessment Report: Data Capture of Paper Questionnaires, Final,” Census 2000 Informational Memorandum No. 135, February 19, 2003, p. 6.

⁶⁰ The Baltimore DCC site was physically located in Essex, MD, which is in Baltimore County, outside the city of Baltimore.

⁶¹ The NPC-DCC was approximately 150,000 to 170,000 square feet.

⁶² Included one senior site representative and two assistant site representatives.

⁶³ Included business staff, quality assurance (QA) management and staff, network administrators, facilities management staff, human resources management and recruiting staff, training management and staff, operational managers, TRW site representatives, and U.S. Postal Service/Federal Express liaisons.

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- *Document management*: Providing paper and/or electronic document management for all manuals, directories, regulations, procedural documents, and training materials.
 - *Inventory management*: Producing and submitting monthly control reports to the Census Bureau.
 - *Human resources*: Providing their own advertising, recruiting, hiring, and placing of staff.
 - *Training*: Training and training materials for all operations and positions.⁶⁴
 - *Forms disposal*: Maintaining census forms in storage after scanning until all subsequent data capture operations for the forms were completed and data transmission to headquarters was confirmed.
 - *Translation/transcription*: Translating and transcribing Asian-language versions of Census 2000 forms. (These services were available at the NPC-DCC only.)

Management Structure

The Census Bureau provided TRW and its subcontractors with on-site representatives who reported to the Operations Control Center (OCC) located in the Decennial Contracts Program Office in Lanham, MD.⁶⁵ Census Bureau representatives monitored daily operations and provided advice and technical support to contractor-managers about unforeseen matters regarding the handling of forms or Title 13 data.

TRW and its subcontractors provided the management and support staff at the Baltimore, Phoenix, and Pomona DCCs. At the head of the DCC management was the site manager. The site manager, who reported directly to the DCSC program manager, was responsible for directing, monitoring, and coordinating all work activities in the DCC, managing all employees and subcontractors, and providing the central client interface at the DCC level. The deputy site manager directed, organized, monitored, and coordinated all data capture operations at the DCC, and in the absence of the DCC site manager, the deputy assumed on-site management responsibility. The deputy site manager also directed the work of the staff scheduler and the U.S. Postal Service (USPS)/Federal Express (FedEx) liaison,⁶⁶ as well as managed the operations managers.

Each operations manager was responsible for one shift, directing the active processes and cooperating with other functional managers, as necessary, to ensure smooth work flow. DCCs employed three operations managers. Reporting to the operations managers were departmental managers. There were eight DCC departmental managers per shift; these managers directed all operations within the processing departments, including mail operations, warehouse operations, check-in, document preparation, imaging, key from image (two managers per shift), key from paper, and check-out. Each department had a first- and second-shift manager, and a third if needed.

DCCs also employed a number of specialized managers. The human resource manager coordinated the functions of employment, compensation, benefits, communications, employee relations, safety, health, and related areas. Human resource managers oversaw the work of two human resources representatives, eight recruiting specialists, three recruiting assistants, and two administrative assistants. The training manager, who also served as a training developer during the planning phase, directed the work of three lead trainers and five local training specialists. DCCs also employed a quality assurance manager who directed a staff of two analysts to ensure customer satisfaction and quality improvement in the processes and in the outcomes.

The DCC facility manager had responsibility for the entire DCC facility, including utility services, communications, shipping, receiving, and security. This manager was also responsible for the timely removal of paper waste and the proper and secure disposal of forms. A facility supervisor reported directly to the facility manager. This supervisor directed no less than eight personnel, including two help desk administrators, two security supervisors, two maintenance supervisors, and supervisors of subcontractor services.

⁶⁴ A subcontractor, Troy Systems, was responsible for the DCSC training program for all four DCCs.

⁶⁵ DCC was assigned three representatives on temporary duty from the Decennial Contracts Program Office.

⁶⁶ Federal Express is an overnight shipping company that was contracted to deliver completed questionnaires from the local census offices to the DCCs.

Finally, the business manager was responsible for program administration. This manager developed plans and budgets, monitored costs, provided statistical reports, prepared contract deliverables, and negotiated and managed subcontracts. The business team was made up of a business manager, management analyst, program controller (financial management), contracts and purchasing specialist, and two communications specialists. This team was responsible for maintaining the local area network, conducting file backups, restoring files as required, and operating the DCSC Management Information System.⁶⁷

NPC-DCC Management Structure

Management at the NPC-DCC differed slightly from that of the three contractor-operated DCCs. During a reorganization in 1999, the Census Bureau established the NPC-DCC with an assistant division chief for decennial data capture responsible for directing, monitoring, and coordinating all work activities at the NPC-DCC. The Census Bureau established two branches for the NPC-DCC, one for operations and one for administration. The chief of the Data Capture Operations Branch was responsible for questionnaire processing (i.e., mail prep, sorter check-in, manual/exception check-in, and document preparation), imaging operations (i.e., scanning and document analysis), key from image (KFI)/audit resolution (AR), and key from paper (KFP)/check-out operations. The chief of the Administrative Operations Branch was responsible for administrative support (e.g., staffing and scheduling), procedures and training, and workflow support (e.g., reports generation and questionnaire flow). In addition to these chiefs, the NPC-DCC employed a network administrator to provide assistance to managers.

DCC Support Staff

DCCs employed personnel to provide support to the management staff. These positions included a staff scheduler, a USPS/FedEx liaison, a community relations liaison, and a DCC management administrative assistant. The staff scheduler was responsible for the daily staffing of the workforce based upon projected needs and absenteeism patterns. The USPS/FedEx liaison established relationships with the local USPS and FedEx offices to ensure that schedules were instituted and met. The community relations liaison monitored relations with state and local governments, local Census Bureau offices, and the media. The DCC management administrative assistant provided day-to-day operational assistance to DCC managers.

Other on-site positions were created to complement, monitor, and facilitate the work of the DCC staff and management. TRW also provided on-site representatives who were responsible for ensuring that policies and procedures developed during the planning and preparation phases were consistently followed. Lockheed Martin Mission Systems provided on-site representatives, including managers and technicians who were responsible for maintaining and supporting the DCS2000. Lastly, DCC liaisons in the field served as the point of contact between the DCC and the local census office/regional census center (RCC), primarily monitoring FedEx shipments of enumerator questionnaires. These liaisons provided weekly summary reports regarding shipping progress to each RCC, headquarters management, and the DCC Census Bureau representatives.

DATA CAPTURE

During Census 2000, the DCCs captured data from 151.3 million paper questionnaires in a two-pass data capture process. Beginning on March 6 and concluding on September 15, 2000, the first pass captured all 100 percent data and all data from forms input by the key-from-paper (KFP) process. Pass 2, which began on August 28 and concluded on November 15, captured sample data from the images of each long form captured during Pass 1. DCC staff used the key-from-image (KFI) procedure to capture sample write-ins rejected by optical character recognition (OCR), and between August 28 and November 15 transmitted the Title 13 data to headquarters data processing. Table 6-7 illustrates the DCC's workload for Pass 1 and Pass 2.

⁶⁷ U.S. Census Bureau, "Program Master Plan: Data Capture Systems and Operations," Census 2000 Informational Memorandum No. 107, March 30, 2001, pp. 4–8.

Table 6-7.
Processing and Title 13 Transfer Data Capture Workload
 [In millions]

DCC	Pass 1	Pass 2
Baltimore	38.4 questionnaires	6.7 long forms
Phoenix	45.9 questionnaires	7.2 long forms
Pomona	43.9 questionnaires	7.3 long forms
NPC-DCC	23.1 questionnaires	2.7 long forms

Source: U.S. Census Bureau, "Assessment Report: Data Capture of Paper Questionnaires, Final," Census 2000 Informational Memorandum No. 135, February 19, 2003, pp. 9–10.

The data capture process began with mail-receipt and document preparation functions. Within 48 hours of receipt, DCC staff checked in forms mailed back by respondents. At mail-receipt stations, clerks unloaded census forms from delivery vehicles and prepared them for check-in, which consisted of capturing the bar code data on each form using laser sorters and transmitting that data to the Decennial Systems and Contracts Management Office (DSCMO). The check-in file was used to identify which addresses on the decennial master address file (DMAF) had returned their forms.

After check-in, forms proceeded to document preparation, where they were removed from their envelopes and prepared for scanning. The scanning process produced electronic images of the paper forms to be interpreted by optical mark recognition (OMR) and OCR. Fields eligible for imaging that could not be interpreted with a certain level of confidence were sent to KFI and manually keyed. Forms that could not be successfully imaged were sent to KFP, where clerks manually keyed the entire form.

Additionally, KFI included analysis and review of critical check-box questions. Forms then proceeded through an automated audit resolution (AR) process for identification and editing of erroneous population counts. Once through AR, these data were merged with other data and transmitted to headquarters (HQ). After HQ acknowledged receipt of the data, DCC staff performed a checkout function to ensure that DSCMO received acceptable output for every form sent through data capture.

Check-In and Document Preparation

During the mail-receipt operation, staff unloaded census forms from delivery vehicles, sorted forms by type into bins, and transported each to appropriate check-in stations. The check-in operation identified nonresponding addresses in order to determine the nonresponse follow-up (NRFU) universe. To accommodate other operational requirements, certain returns required priority processing. Priority forms included:

- **Be Counted forms:** (at the National Processing Center-data capture center [NPC-DCC] only) These forms received high priority because of the amount of subsequent processing required. Captured address information from the forms was sent to Geography Division (GEO). GEO matched and geocoded the addresses and assigned each a census ID for inclusion in the decennial master address file (DMAF).
- **Surname data capture:** As early as possible in the data capture process, DCC clerks captured the names of householders in multiunit dwellings, such as apartment buildings, and at rural style addresses. This enabled DSCMO to include them on the NRFU universe determination file.
- **Non-ID:** DCC clerks captured address information from returns without a bar-coded census ID, and GEO matched, geocoded, and assigned each a census ID for inclusion in the DMAF.

The check-in process also updated the status database with the DCS2000 check-in information. This established the tracking system used to monitor the progress of forms through the data capture process. The check-in operation began on March 6 and concluded on September 14, 2000. During that time, the operation processed over 161.6 million census forms, of which 9.3 million were returned to the DCC as being undeliverable as addressed (UAAs).

Census returns were sorted and checked in at three different stations. Short-form mail returns and short-form UAAs were directed to automated letter sorters, which sorted returns at an approximate rate of 16,100 envelopes per hour. Automated flat sorters, sorting at a rate of approximately 10,500 envelopes per hour, were used for long-form mail returns, long-form UAAs, and Be Counted forms. Enumerator returns, group quarter (GQ) forms, and other mail were sent to manual check-in.

Automated sorters separated forms by type and priority into specific output pockets. DCC staff selected sort plans that corresponded with the form types to be processed at the beginning of each shift.⁶⁸ Sort plans separated high priority forms such as BCFs and foreign-language forms from other forms to facilitate NRFU enumeration efforts. (NRFU interviewers used the surnames to help resolve apartment mix-ups and as an aid in locating nonresponding units.) Automated sorters read the unique bar codes through the envelope windows and sorted the envelopes into predetermined pockets. Sweeper clerks gathered the envelopes into trays, tagged the trays, and transported them to document preparation. Forms whose IDs were not read by the mail sorters on the initial pass were directed through the sorter for two additional passes. If the IDs could not be read, the forms were sent to manual check-in.

During manual check-in, clerks performed a procedure in which the census IDs of envelopes received in boxes from local census offices (LCOs) were scanned and the envelope contents verified. Forms sent to manual check-in included those from the list/enumerate (L/E) procedure (including Remote Alaska) and additions from update/enumerate, NRFU, and coverage improvement follow-up (CIFU), all of which arrived without bar code IDs. At workstations, clerks captured the addresses from these forms and assigned each a 14-digit processing ID bar code that was placed on the bottom right corner. Mail returns not successfully checked in by automated sorters were sent to check-in clerks who removed the forms from envelopes, organized them in trays according to form type, and sent them on to be scanned. Check-in clerks scanned or manually keyed the bar code from the forms and sorted them into new trays according to type and priority (BCFs were sorted by language). After each form was assigned a processing ID and its address data keyed, it was placed in a box and sent to document preparation.⁶⁹

Several form types identified during manual check-in were processed only at designated DCCs. These forms, including but not limited to Asian-language forms, GQ forms, experimental forms, and Puerto Rico forms, were identified as exceptions during check-in and forwarded to document preparation exception processing, where they were shipped to the correct DCC for processing. Table 6-8 illustrates the distribution of form types and their data capture locations.

Clerks removed envelopes, staples, and other materials during document preparation, and prepared forms for scanning by unfolding, flattening, and placing them in trays in batches of 500 sheets per tray. DCC procedures recommended, but did not require, a 48-hour acclimation period prior to scanning to allow the paper to flatten and normalize to the environmental conditions of the imaging area in order to reduce the frequency of scanner jams.

⁶⁸ Sort plans instructed the sorter on how to separate forms by type, priority, and the number and order of output pockets where the forms were to be delivered. At the contracted DCCs, sort plans remained constant for the short- and long-form mail returns. At the NPC-DCC, there were separate sort plans for different mail returns, UAA returns, and BCFs. A color-coded quality assurance (QA) test-deck was used to confirm proper functioning of the sorters at the beginning of each shift or whenever a sort plan changed.

⁶⁹ Address data for unassociated continuation forms were keyed and sent to GEO for geocoding.

Table 6-8.

Questionnaire Check-In and Data Capture by Method of Data Collection

Data collection method	Type of questionnaire	Check-in method	DCC where data capture took place
Mailout/mailback	Short and long forms	Sorter	All DCCs
Update/leave (stateside)	Short and long forms	Sorter	All DCCs
	Short and long forms—addresses added by enumerator	Manual check-in and address capture	Phoenix
Update/leave (Puerto Rico [PR])	PR short and long forms (Spanish)	Sorter	Pomona
	PR short and long forms (Spanish)—addresses added by enumerator	Manual check-in and address capture	Pomona
Update/enumerate	Short and long forms	Scanner	All DCCs
	Short and long forms—addresses added by enumerator	Manual check-in and address capture	All DCCs
Telephone questionnaire assistance (TQA) replacement (with housing unit ID)	Short and long forms	Sorter	Baltimore
	PR short and long forms (Spanish)	Sorter	Pomona
TQA replacement (without housing unit ID)	Short and long forms	Sorter—rejected and sent to manual check-in and address capture	Baltimore
	PR short and long forms (Spanish)	Manual check-in and address capture	Pomona
Spanish and foreign-language mailout (stateside)	Short and long forms (Spanish + 4 Asian languages)	Sorter	NPC—4 Asian languages Phoenix—Spanish
Translated or transcribed Asian-language forms	Corresponding English-language forms	Manual check-in	NPC
List/enumerate (stateside only)	Short and long forms	Manual check-in and address capture	All DCCs, except NPC
	Short and long continuation forms	Manual check-in and address capture	All DCCs, except NPC
Nonresponse follow-up and coverage improvement follow-up (stateside)	Enumerator Questionnaires (EQs)		
	Short and long forms	Scanner	All DCCs
	Short and long forms—addresses added by enumerator	Manual check-in and address capture	All DCCs
	Short and long continuation forms	Manual check-in	All DCCs

Table 6-8.

Questionnaire Check-In and Data Capture by Method of Data Collection—Con.

Data collection method	Type of questionnaire	Check-in method	DCC where data capture took place
Nonresponse follow-up and coverage improvement follow-up (PR)	EQs		
	PR short and long forms (Spanish) PR short and long forms (English)	Scanner	Pomona
	PR short and long forms (Spanish)—addresses added by enumerator PR short and long forms (English)—addresses added by enumerator	Manual check-in and address capture	Pomona
	Short and long continuation forms (Spanish) Short and long continuation forms (English)	Manual check-in	Pomona
Outlying areas of Alaska	Short and long forms	Manual check-in and address capture	Pomona
Be Counted forms (stateside)	English, Spanish, and 4 Asian-language forms	Sorter used for check-in counts by form type only. ID and address data captured during scanning	NPC
Translated or transcribed Asian-language forms	Corresponding English-language forms	Scanner	NPC
Be Counted forms (PR)	Spanish- and English-language forms	Sorter used for check-in counts by form type only; ID and address data captured during scanning	NPC
Undeliverable as addressed	Short and long forms	Sorter	NPC
Group quarters (stateside)	Individual Census Report (ICR) short and long forms ICR short and long forms (Spanish) Military Census Report (MCR)	Manual check-in of GQ cover sheets (D-352s); questionnaire IDs captured at scanning	NPC
	Shipboard Census Report (SCR) Individual Census Questionnaire (ICQ) short and long forms	Manual check-in of GQ cover sheets (D-352s) in the DCC	Data captured (keyed) at the NPC outside the NPC-DCC environment due to low form volume
Group quarters (PR)	ICR short and long forms (Spanish) ICR short and long forms (English) MCR (English) SCR (English) ICQ short and long forms (Spanish) ICQ short and long forms (English)	Manual check-in of GQ cover sheets (D-352s) in the NPC-DCC	Data captured (keyed) at the NPC outside the NPC-DCC environment

Imaging

The imaging process began with scanning. Clerks fed trays of census forms into a high-speed scanner. Software in the scanner prepared an image for processing by first registering it into the system. Registration of the image defined all OCR and OMR zone areas used to recognize information contained on the form. During the scanning process, clerks encountered a variety of problems, including scanner jams, multiple feeds, torn or unscannable forms, and duplicate batches. Scanner operators resolved these problems by stopping the machinery once the problem was

identified. Operators would then rework the batch or redirect the “problem” forms to document preparation exceptions processing for repair or to KFP.

Operators monitored image quality during the scanning process through a combination of manual review and automated document analysis. As the batches were scanned, operators reviewed the digital images on control monitors to identify flaws or deterioration in image quality. Operators could stop the process to identify and correct problems and then reprocess batches where problems were discovered. In addition to manual review, the scanning operation utilized automated image-quality assurance (AIQA) software to monitor image quality. The AIQA application performed form identification; image skew detection; and correction, cropping, and image rotation. This application also detected poor-quality images and corrected them where possible. Document analysts reviewed images that failed AIQA and could either override the AIQA assessment and accept the image for processing, correct the error if possible, or designate the image for reprocessing.

Optical Recognition

Once a digital image was created and accepted, it proceeded to optical recognition, where OMR and OCR software interpreted mark and write-in responses and converted the data to ASCII text.⁷⁰ The optical recognition subsystem performed OMR on the images of all multiple-choice questions. The OMR software determined whether a box was checked, without regard to the possibility of multiple boxes within a question being checked. OMR was not able to determine when a respondent had marked more than one checkbox for a question where a single entry was requested and appropriate. (These were usually the result of respondent confusion and/or lack of compliance with the questionnaire wording and/or design.) Critical fields with multiple responses were sent to KFI for verification. If multiple boxes were checked, OMR passed the answers on to optical answer recognition (OAR), where additional software applied algorithms and determined the single correct box, or answer, to the question. The OAR had the capability to determine the logically correct answer to a multiple-choice question based upon respondent-provided information on the form.

The optical recognition subsystem performed OCR to interpret responses in write-in boxes and then provided the output in ASCII format. This system also detected the presence or absence of write-ins for all open-ended questions and performed further processing through the OCR subsystem or through KFI. The OCR accuracy rates for required fields were 98 percent for alphabetic data and 98.5 percent for numeric data. All alphanumeric entries were sent to keying.

Keying

Keying operations included two processes—KFP and KFI—that employed traditional modes of data entry to compensate for the limitations of the automated technology. If a form could not be successfully imaged or processed through OMR/OCR and KFI, it was sent to KFP. There, clerks manually entered all the information from the form and sent it to a second keyer for verification and, if necessary, correction.

KFI operators interpreted and entered fields initially captured by imaging that did not meet an acceptable level of accuracy and were flagged as “low confidence” interpretations. The images of these fields were displayed on a monitor, and operators keyed all the characters as they understood them from the image. For several situations, keying rules were provided to assist the operators in interpreting the information. Operators also performed a check-box review of critical fields when OMR detected multiple responses.

Quality Assurance

Throughout the development, testing, and production stages of Census 2000, the Census Bureau and its contractor encountered difficulties in agreeing on how to define QA requirements. Discussions of data-quality standards, specifically relating to the questionnaire field-specific anomalies,

⁷⁰ For more information on OMR and OCR technology, see the “Data Capture Outsourcing” section of this chapter.

did not begin until after dress rehearsal concluded, leaving insufficient time for the development and testing of the field-level data-quality assurance subsystem advocated by the Decennial Statistical Studies Division (DSSD).⁷¹ Additional QA alternatives, including a proposal to add an on-site, real-time data-review capability to the DCS2000, were abandoned due to schedule demands and insufficient subject-matter staffing.⁷² Census Bureau and contractor QA specialists also disagreed over the quantitative and qualitative measures for QA. Such differences resulted in the implementation of a QA plan developed by the DCS2000 contractor based on what the contractor determined to be the Census Bureau's requirements.

The Census Bureau required that the OMR engine accurately interpret over 99 percent of the mark entries on the questionnaires (including blank fields being correctly interpreted as blanks), and the DCS2000 incorporated several automated quality checks on OMR. One method used test decks with known values that were run at the beginning of each day at all sites and on all scanners. The decks were then scored and evaluated to verify consistent OMR readings. An internal systems edit checked to see if a batch had an unusually high quantity of questions that were read with more than one box marked. Also, from each site, the DCS2000 contractor collected and reviewed samples of production batches containing different form types.

The OCR software attempted to identify alphabetic and numeric characters contained in the write-in boxes on the census questionnaires. The decision to accept the result of the OCR interpretation was based on a "confidence level" recorded by the OCR engine for each character. If the confidence level was equal to or greater than an established value that indicated a correctly identified character, it was accepted.

A sample of alphabetic and numeric characters, which was recognized with high confidence, was sent to keying for comparison to the original OCR results. The OCR was evaluated by sampling approximately 1 percent of the fields captured. This procedure required the keying of the sample fields by one or two keyers. The decision on the quality of the OCR depended on comparisons between the original batch and the results from Keyer 1 and Keyer 2. KFI employed a similar QA procedure. Approximately 10 percent of randomly selected data input by keyers was compared with the original "low confidence" OCR data. Once compared with the OCR data, if the mismatch rate exceeded a criterion, the batch was rejected and rekeyed.⁷³

During the dress rehearsal, the data capture audit resolution (DCAR) process was added to the DCS2000 design to address concerns over erroneous person records being created by stray marks, respondent confusion, and data capture errors. DCAR consisted of three phases:

- An automated review of the data used to set person panel and roster entries to identify valid and duplicate persons.
- An edit to compare respondent or enumerator responses on household size to a household population count derived from a tally of person panels and roster entries.
- A clerical review of images and an update of data for questionnaires on which response records had conflicting household size information.

This third phase consisted of two types of review: (1) audit count check, which required clerks to review and correct the OCR interpretation of the responses on household size only, and (2) audit status review, which once the count check was complete, required clerks to review the questionnaire image and to set the status of person panels and roster entries.⁷⁴ Of the 126,866,759 returns sent to DCAR, 97.89 percent passed the edit and did not require audit resolution. The

⁷¹ In some instances this lack of field-level QA prevented agency specialists from being able to monitor the quality of data capture. As a result, error rates for some questionnaire fields were 25 to 30 percent and, some rarely answered fields had error rates as high as 70 percent. For more information on data quality, see Joseph Conklin, "Evaluation of the Quality of the Data Capture System and the Impact of the Data Capture Mode on the Data Quality, Final Report," Census 2000 Evaluation K.1.b., March 12, 2003.

⁷² U.S. Census Bureau, "Assessment Report—Data Capture of Paper Questionnaires, Final," Census 2000 Informational Memorandum No. 135, February 19, 2003, pp. 19–20.

⁷³ The KFI QA criterion was determined by pooling the accuracy rates of OMR, OCR, and KFI.

⁷⁴ There were five status categories: valid, blank, invalid, duplicate, and cancel.

DCAR process improved the data quality of Census 2000 by providing a clerical review of OMR/OCR interpretations and correcting data on a considerable number of cases that would otherwise have added to the coverage edit follow-up workload.⁷⁵

While DCAR improved the accuracy of data capture operations, other schedule and contract management challenges prevented Census Bureau subject-matter and QA specialists from assessing data quality using real-time QA measures. Instead, DSSD performed its own check using a sample of image files and intermediate output from each of the DCCs. Following the census, DSSD evaluated the data quality of the DCS2000 using 768,000 short forms and 768,000 long forms, including mailout/mailback forms, enumerator forms, and update/leave forms. For this evaluation, the entire sample was run through the DCS2000, keyed from the digital images, and reviewed by NPC evaluators to determine how much the data captured through automated technology differed from the intent of the respondents.

This evaluation compared two types of errors across three modes of data capture (KFI, KFP, and OCR/OMR): (1) hard-match errors, which occurred when the content of a check-box field was captured incorrectly by the automated technology or by KFI, and (2) soft-match errors, which occurred when the content of a write-in field was captured incorrectly by either mode. The provisional findings of this evaluation were:

- OMR error rates ranged from 1.2 to 1.5 percent (97 percent confidence interval) for all check-box responses that the technology considered readable.
- OCR error rates ranged from 1.0 to 1.1 percent (97 percent confidence interval) for all write-in responses that the technology considered readable (79 percent of such responses).
- KFI error rates ranged from 4.8 to 5.3 percent (97 percent confidence interval) for the responses that the OMR or OCR technology rejected as unclear.

This evaluation also noted that error rates for individual items (defined as a specific response for a specific person line number on a specific form—2,996 in all) were particularly high for 150 person items. Appearing on at least 500 records in the evaluation, these items had error rates ranging from 8 percent to 91 percent.⁷⁶

While no data were available for comparing the accuracy of the Census 2000 data capture technology with the 1990 census technology, an assessment of the system used in the dress rehearsal established a performance standard for OMR and OCR in 1990 of a 2 percent error rate. According to DSSD's evaluation, the OMR and OCR error rates for Census 2000 fell well below this level.⁷⁷ According to this evaluation, across various modes of data capture, the most frequent reasons for failing to capture the intended responses were:

- *Extra check-box*: the output from the automated technology shows more check-boxes marked than are in the scanned image.
- *Missing characters*: the output from the automated technology has fewer characters than the scanned image.
- *Wrong character*: the output from the automated technology and the scanned image have the same number of characters, but the output disagrees with the image in one or more characters.

⁷⁵ Miriam Rosenthal, "DCS 2000 Data Capture Audit Resolution Process, Final Report," Census 2000 Evaluation No. K.1.a., October 24, 2003, pp. iv–3.

⁷⁶ Joseph Conklin, "Evaluation of the Quality of the Data Capture System and the Impact of the Data Capture Mode on the Data Quality, Final Report," Census 2000 Evaluation No. K.1.b., March 12, 2003, Table 8.

⁷⁷ Recent research by Census Bureau subject-matter specialists comparing person records from the sample census unedited file and sample census edited file with questionnaire images indicates that errors within the data capture system resulted in a discernable pattern of erroneous OMR interpretations of labor force responses on Individual Census Reports. See Susan Love and Don Dalzell, Housing and Household Economic Statistics Division, U.S. Census Bureau, "Final Report on the 'Williamsburg Pattern' in Census 2000 Labor Force Responses," memorandum for distribution, February 17, 2006.

In addition to DSSD's evaluation, Rochester Institute of Technology Research Corporation (RITRC) conducted an independent assessment of OCR and OMR accuracy. For this report, RITRC evaluated data quality by comparing "true data capture errors, human interpretation differences, cases of unclear respondent intent, and residual 'truth' errors." According to RITRC, OCR and OMR exceeded performance goals. This assessment rated accuracy for OCR, KFI, and OMR at 99.6 percent, 97.8 percent, and 99.8 percent, respectively. For merged data that combined OCR and KFI, RITRC rated overall write-in field accuracy at 99.3 percent.⁷⁸

Although these two assessments differed in their methods of evaluation, there were some consistencies in their recommendations. Both assert that OCR and OMR technology can be used successfully to process the census and decrease the amount of manual keying required. And both caution that the simplification of questionnaire design and the clear definition of system and QA requirements are critical to the successful use of automation.⁷⁹

Checkout

Checkout marked the final stage of the data capture process. After data capture and review were complete, clerks rescanned bar codes of all questionnaires to determine if the DCS2000 system had successfully created a capture record for each processed questionnaire. This rescanning also verified that DSCMO had received the associated Title 13 data. Forms containing image or data discrepancies were redirected back into the data capture process. Checkout consisted of two steps. First, clerks scanned or keyed the census ID bar code from each form and removed all forms lacking a Title 13 acknowledgment. During Step 2, these forms were sent for reprocessing as follows:

- KFP: damaged, completed with red ink, blank, or second time through checkout.
- Imaging: poor image, never scanned, double feed.
- Disposal or storage (KFP forms were stored indefinitely).
- Manual check-in.
- Reconstruction tray—long forms with lost form integrity to be rescanned.

After a successful checkout in which data were transmitted to headquarters and acknowledged, the forms were authorized for temporary storage and destruction.

Closeout

At the completion of data capture operations, the contractor requested approval from the Decennial Management Division (DMD) to close out the DCC. Each processing area in a DCC was responsible for ensuring that all equipment, supplies, and services were discontinued. Additionally, the phase-out plan for releasing the staff was initiated by the human resources personnel at the respective site. The following activities were performed at the conclusion of data capture at the DCCs:

- Each DCC made provisions for the disposition of all equipment, supplies, and facilities. Unless DMD directed otherwise, items were retained by the DCC contractor or were disposed of in an alternative manner.
- Each DCC arranged for the storage of documentation that might be required for future maintenance or auditing purposes. This documentation included contract deliverables and operational reports required by the Census Bureau.

⁷⁸ RIT Research Corporation, "DCS 2000 Data Quality, v.2.1, Final," September 20, 2002, pp. 1–3.

⁷⁹ Conklin notes that to assign a single-number accuracy rate to the performance of automation would obscure the considerable differences in accuracy rates among various error and form types. Joseph Conklin, "Evaluation of the Quality of the Data Capture System and the Impact of the Data Capture Mode on the Data Quality, Final Report," Census 2000 Evaluation No. K.1.b., March 12, 2003, p. 20.

- Each DCC completed a collection of metrics that assessed the performance of the operation. These metric reports were retained throughout the operation, and a cumulative report was provided to the program office of the data capture services contractor and to the Census Bureau.
- Each DCC prepared a project abstract that described the staffing, scope, span, time and length of effort, project costs, and customer references. The information contained in the abstract was to be used as a reference on the historical data of the project.
- Each DCC prepared and submitted a post-project review report describing the “lessons learned.”
- Each DCC removed all data from servers.

Forms Disposal

Once the processed questionnaires were verified as captured, they were shredded 15 days after receipt of data confirmation. Exceptions to this included enumerator questionnaires, Asian-language forms, and questionnaires that were keyed from paper. These were retained for various reasons. Congress and the Office of Inspector General required that all enumerator questionnaires be held for further review based on reports and evidence of possible fraud in census offices.⁸⁰ TRW Inc. created a library index of these questionnaires and stored them at NPC along with the forms that were keyed from paper. After approval by Congress in May 2001, the NPC destroyed these forms.⁸¹

Data Archiving

Under Title 44 of the U.S. Code, the Census Bureau is required to maintain confidentiality of individual decennial response data for 72 years, after which, the census schedules are released to the public. After the Census Bureau completed all computer processing to eliminate duplicate records or combine multiple returns from the same household, it provided the National Archives and Records Administration (NARA) with the Title 13 ASCII files. In discussions with Census Bureau officials in 1995, NARA indicated that a final edited (verified) master index file that could be used to retrieve census data by name, house number, street name, city, state, and ZIP Code would meet their “essential” archiving requirements. However, given the interest in genealogical research, NARA also stated that microfilm of the scanned images was “desirable.”⁸² Acknowledging that requiring microfilm of the questionnaire images would increase the cost of Census 2000, NARA agreed that the ASCII data (and other administrative and geography files) would be sufficient to meet federal archiving requirements.⁸³ In June of 2000, however, after responses from several professional groups and organizations representing records users, NARA requested microfilmed images of Census 2000 questionnaires.⁸⁴ To satisfy this requirement, the Census Bureau, in cooperation with NISH, awarded Business Technology Career Opportunities of Wichita, KS, and its partner, Service Source of Alexandria, VA, a \$27 million contract for transferring the 625 million page images from digital tape to microfilm.⁸⁵

⁸⁰ See Chapter 5, “Data Collection,” for more information on reenumeration in selected LCOs.

⁸¹ U.S. Census Bureau, “Assessment Report: Data Capture of Paper Questionnaires,” Census 2000 Informational Memorandum No.135, February 19, 2003, p. 14.

⁸² National Archives and Records Administration, “Preserving Census 2000 Records: A Report of the Census 2000 Working Group of the National Archives and Records Administration,” memorandum, College Park, MD, March 1, 1995.

⁸³ National Archives and Records Administration, “Census 2000 Comprehensive Record Schedule,” SF-115 for Job No. N1-29-00-2, June 14, 2000. See also “Microfilming of Census 2000 Image Files, SOL #52-SOBC-1-0001,” *Commerce Business Daily*, May 18, 2001.

⁸⁴ National Archives and Records Administration, “National Archives to Preserve Digital Images of Census 2000 Questionnaires,” press release, June 8, 2000, <<http://www.archives.gov/press/press-releases/2000/nr00-82.html>>, accessed June 20, 2006.

⁸⁵ For more information on modifications to the DCS2000 contract, see the “Data Capture Outsourcing” section of this chapter. See also National Archives and Records Administration, “Census 2000 Comprehensive Record Schedule,” SF-115 for Job No. N1-29-00-2, June 14, 2000, and “Extension to Contract No. 50-YABC-7-66010 for the Transition of the Production DCS2000 Systems to a Post-Decennial Environment,” *Commerce Business Daily*, PSA No. 2737, November 30, 2000.

HEADQUARTERS PROCESSING

For Census 2000 the Census Bureau consolidated all processing functions at headquarters with an integrated and interdependent network of headquarters data processing systems.⁸⁶ Once received at headquarters, census data continued through a series of processing steps that organized and integrated the information to produce a “normalized” data file for the creation of Census 2000 data products. This process began with the compilation of the decennial response file (DRF) and ended with the final edited detail files—the 100 percent detail file (HDF) and the sample edited detail file (SEDF) containing sample data from the long forms.

Non-ID Processing

Every address in the census had a unique identifier, the master address file (MAF) identification (ID) number. This number linked each address to its census response. Most census addresses were assigned a unique ID number prior to census enumeration operations, and most census questionnaires had a preprinted and bar-coded MAF ID. However, some operations used questionnaires without preassigned MAF IDs. These response records were captured using a temporary processing ID for control and tracking purposes. The non-ID operation attempted to assign an MAF ID to those responses.

Headquarters processing identified the non-ID records and forwarded them to the Geography Division (GEO) for processing. GEO provided a census ID number (MAF ID) for each address it could either match or geocode and it updated the MAF with new housing unit addresses found among non-ID responses. GEO forwarded the results of the non-ID process to the Decennial Systems and Contracts Management Office (DSCMO) which added the new addresses to the decennial master address file (DMAF). Response records without an initial MAF ID were divided into three groups, designated Types A, B, and C:

Type A records consisted of housing unit addresses of responses from the Be Counted program, the Telephone Questionnaire Assistance (TQA) operation, and the service-based enumeration (SBE) operation. Type A also included usual home elsewhere (UHE)⁸⁷ addresses provided on group quarters (GQ) questionnaires (GQ/UHE addresses) and UHE addresses provided on enumerator questionnaire responses from the in-mover and whole household UHE coverage improvement probes. For these records, GEO conducted an automated match of city-style (i.e., house number and street name) and non-city-style addresses to the MAF. GEO also carried out an automated process to geocode city-style addresses that could not be matched to the MAF in the automated process.

GEO clerks carried out interactive telephone and computer-assisted operations at the NPC to match and geocode records that could not be matched or geocoded in the automated processes. If the initial attempt to clerically match or geocode an address failed, the address was compared to a commercially available database of addresses in order to obtain a telephone number and correct any deficiencies in the address. If appropriate, a second attempt was made to clerically match or geocode the address based on the updated information. If still unsuccessful, the clerical staff used the telephone number to contact the respondent and correct any errors in the address information. If corrections were made, another attempt was then made to match or geocode the address.

New addresses (i.e., those not matched to addresses already on the MAF) that could be geocoded were added to the DMAF. Census plans specified that existence of new Type A addresses added to the DMAF through the non-ID process must be confirmed by the field verification (FV) operation. Enumerators visited the location of the new addresses in the FV operation to determine whether the address existed as a census housing unit on April 1, 2000.

Type B records included a subset of responses from the Be Counted program that indicated the respondent had no usual home on April 1, 2000. These responses were included in the GQ universe if GEO identified the local census office (LCO) geography that contained the address. Type B

⁸⁶ See “Automation Infrastructure” section in this chapter for information on individual systems.

⁸⁷ A usual home elsewhere address is a Census Day address reported by a respondent that is different from the address at which the respondent is interviewed.

addresses were geocoded only to the geographic area of the LCO since the only geographic information collected was the place and county where the person without a usual residence stayed on Census Day. New Type B address locations geocoded to the LCO geography were added to the DMAF.

Type C records included housing unit addresses that were added to the census through the update/leave (U/L), urban update/leave (UU/L), nonresponse follow-up (NRFU), coverage improvement follow-up (CIFU), transient-night, or GQ enumeration programs. GEO assigned an MAF ID to all Type C addresses. GEO attempted first to match the address to an existing address on the MAF. If no match was found, and the address could be geocoded, the address was added to the DMAF.⁸⁸

Overall, the geocoding and matching operations made effective use of the interactive mapping and geocoding system technology. This system enabled clerical staff assigned to matching and geocoding operations to simultaneously view both the MAF and TIGER® databases while calling respondents to verify addresses. This use of automation contributed to an increase in production rates, but the workload for Type A and Type B records for non-ID processing was larger than anticipated, causing a considerable number of difficulties in identifying and processing all cases. Almost 2.3 million of the 4.2 million Type A and Type B non-ID cases were included in error. Headquarters processing did not apply the filter to exclude ineligible GQ/UHE returns from the non-ID process prior to sending them to GEO for identifying returns requiring the assignment of an MAF ID through the non-ID process. As a result, 2,281,712 GQ returns were erroneously included in the non-ID process, while 659,566 GQ returns were legitimately included. Additionally, GEO received over a million records too late to be processed in subsequent collection and processing operations.⁸⁹

Decennial Response Files (DRF)

The DRF was a set of files containing all person records and housing unit records obtained from census enumerations that could be assigned a census ID. The DRF provided a consistent data format across various modes of input, and several critical processes were run on the DRF records. Discrepancies between the reported number of occupants and the number of people in households for which there was not room on the main questionnaire were linked to the main household record; and household and person records to be included in the census, and therefore placed on the census unedited file (CUF), were identified.

Processing of the DRF occurred in two stages. The compilation of response files for DRF1 began on March 7 and continued until September 17, 2000. Inputs to DRF1 included daily transmissions from DCS2000, TQA, and Internet Data Collection. Also included were key from paper, low-volume GQ (i.e., Puerto Rico, stateside service-based enumeration, and Shipboard Census Reports), and the research and experimentation forms keyed at the National Processing Center (NPC) outside the DCS2000 system. On a flow basis, the DSCMO converted or “normalized” into one file format, response data from 82 different questionnaire types transmitted in one of 15 different formats. Once normalization was complete, the DSCMO validated every data field by checking for illegal characters and comparing values against specific capture ranges. DRF1 processing also incorporated edits or deletes transmitted from the coverage edit follow-up (CEFU) operation for households with more than six members or with count discrepancies.⁹⁰ During the identification step, the DSCMO identified and processed valid person records by applying a data definition to every DRF1 person record associated with a census ID. The definition was based on the 100 percent population items and name fields on the person records. For a person record to remain in the DRF, two or more of the six fields had to be completed.⁹¹ Once all field data collection and Pass 1 data

⁸⁸ Karen Medina, U.S. Census Bureau, “Assessment Report for Non-ID Questionnaire Processing (Including BCF/TQA Field Verification),” Census 2000 Informational Memorandum No. 141, September 2003.

⁸⁹ For greater detail on the distribution of non-ID processing errors, see Nicholas S. Alberti, *Data Processing in Census 2000*, Census 2000 Testing Experimentation, and Evaluation Program Topic Report No. 7, TR-7, (U.S. Census Bureau: Washington, D.C., 2004), pp. 18–19; Karen Medina, U.S. Census Bureau, “Assessment Report for Non-ID Questionnaire Processing (Including BCF/TQA Field Verification),” Census 2000 Informational Memorandum No. 141, September 2003.

⁹⁰ See Chapter 5, “Data Collection,” for information on the CEFU operation.

⁹¹ 100 percent population data included relationship, sex, age, date of birth, Hispanic origin, and race.

capture activities concluded, final MAF extracts and all CEFU data were delivered to the DSCMO, and a final DMAF was created for each LCO. This marked the completion of the first stage of DRF processing.

Processing of DRF2 began on August 17 and concluded on September 18, 2000. This process consisted of three steps: reformatting DRF1 data, linking continuation forms with their parent enumerator forms, and implementing the primary selection algorithm (PSA) to resolve the multiple responses received for some units. DRF2 processing began by sorting DRF1 data into LCO files by block and ID and then grouping response records with the same ID together. Person records determined to be data defined remained on the DRF2 and were eligible to be selected by PSA. Those that were not data defined remained on the DRF2 for evaluation purposes.

The next step in DRF2 processing involved resolving multiple returns for the same ID. Given the variety of response options available for Census 2000, a single household may have been enumerated on more than one questionnaire—for example, through mail returns, TQA or IDC, or follow-up operations such as CEFU, NRFU, or CIFU. DRF2 processing compared response records with the same census ID and determined which responses would be combined to form the census household. At three stages of the DRF2 process, a status and an expected household population count were set for each housing unit record that had the potential to become a “parent” form.⁹² When the multiple returns were merged during the linking step, the return-level record for the parent form was retained and a variable set to identify that the form was merged. Once form linkage was complete, the DSCMO determined the expected population count for every return on the DRF2 that was to be used in the application of the PSA.⁹³

Primary Selection Algorithm (PSA)

The application of the PSA resolved the issue of more than one census record being received for a housing unit. It did this by comparing the responses, eliminating the redundant ones, and determining the status and the number of person records to include for each housing unit. The PSA software performed four functions. It matched persons between returns; constructed PSA households; selected the primary PSA household; and selected additional persons for the census households that were not in the primary PSA household. In the summer of 1999, a team of Census Bureau staff from the DMD, DSSD, DSCMO, Population Division, and Housing and Household Economic Statistics Division partnered with a private sector firm to develop and test the PSA software. Preproduction testing continued from January through August 2000.⁹⁴

The PSA defined 2,656,951 returns as ineligible for the PSA process. Approximately 8 percent of census IDs on the DRF, or nearly 9 million returns, had more than one eligible return. For these eligible returns, the PSA process identified sets of associated persons at each census ID, designating these sets as PSA households. Over 73 percent of census IDs with more than one eligible return had only one PSA household. However, approximately 2 percent of the census IDs had two or more PSA households. For these census IDs, the PSA determined the primary PSA household to be used in further processing by sequentially applying detailed selection criteria to the PSA households until one was selected.⁹⁵ A final housing unit status and population count for each census

⁹² A “parent” form was the initial form of multiple forms used for a single enumerator interview. The parent form contained the original label, record of contact, introduction, housing questions, and interview summary. All questionnaires with additional person data that were supplemental to a parent form were called “child” forms.

⁹³ U.S. Census Bureau, “Program Master Plan: Census 2000 Decennial Response Files Program,” Census 2000 Informational Memorandum No. 85, November 25, 2000, p.10.

⁹⁴ Teresa Angueira, “Decennial Response File 2 (DRF2)/Primary Selection Algorithm (PSA) Software Quality Assurance Development Plan,” Census 2000 Informational Memorandum No. 118, January 31, 2002; Stephanie Baumgardner, “Analysis of the Primary Selection Algorithm,” Census 2000 Evaluation No. L.3.a., November 26, 2002, pp. i–iii.

⁹⁵ Stephanie Baumgardner, “Analysis of the Primary Selection Algorithm,” Census 2000 Evaluation No. L.3.a., November 26, 2002, pp. ii–iii.

housing unit was then set. The completed PSA process provided an updated version of the DRF2.⁹⁶ Headquarters processing then created the 100 percent census unedited file (HCUF) using the results of the updated DRF2 and the address-level information from the DMAF.

Creation of the 100 Percent Census Unedited File (HCUF)

For the 1990 Census, the final 1990 census data capture file, the address control file, and the capture control file combined to create the equivalent of the Census 2000 100 percent census unedited file (HCUF). This 1990 file reflected the results of the census response records selected by the primary selection algorithm applied to the data capture file and the final address control file. The Census 2000 HCUF contained all the household and person records included in Census 2000. The HCUF consisted of the data records only for the addresses that were to be included in the final census count, and to determine the count of persons at each address. HCUF construction proceeded in three stages. First, data from the final DRF2 and the DMAF were used to determine which housing units were to be included in the census. Each unique DMAF address was determined to be either a potential census housing unit or an address that did not identify a unique housing unit.⁹⁷

Housing Unit Status

Addresses determined not to be housing units fell into two groups: kills and resolved deletes. Addresses on the DMAF found not to identify a housing unit as of April 1, 2000 were described as kills. These were identified primarily on the basis of address list development data. Resolved deletes were identified primarily on the basis of housing unit response data. A DMAF address became a kill if the census could find no recent evidence of its existence.⁹⁸ The primary means by which a DMAF address would be classified as a kill were if no mail return was received from the address, and it met one of the following criteria:

- Double delete: Both the Block Canvassing and Local Update of Census Addresses Field Verification operations classified the address as a “delete.”
- Old delivery sequence file address: Though placed on the DMAF by virtue of being a residential address on one of the USPS delivery sequence files from 1997 or 1998, the address was no longer a residential address on any of the USPS delivery sequence files in 1999 and 2000.
- The address was identified as a delete by an enumerator in a Census 2000 operation and no evidence was received indicating that the address was an existing residential address. Also in the first stage of HCUF creation, response data from both the DMAF and the DRF were used to assign status and population count to the remaining potential housing units. Possible statuses included occupied, vacant, resolved as occupied (unknown pop), occupancy status unknown, and housing unit status unknown. Resolved as occupied (unknown pop) indicated that the housing unit was occupied but the population count was unknown. Occupancy status unknown indicated that the housing unit existed but could have been either occupied or vacant. When the address might have been an occupied housing unit, a vacant housing unit, or not a census housing unit at all, its status was designated as unknown.⁹⁹

⁹⁶ These findings were confirmed by the Accuracy and Coverage Evaluation as well as studies about personal file duplication following the census. See National Research Council, *The 2000 Census: Counting Under Adversity*, pp. 240–43, (The National Academies Press, Washington, D.C.: 2004).

⁹⁷ Kim Jonas, “Census Unedited File Creation, Final Report,” Census 2000 Evaluation L.4, July 31, 2003, pp. 1–3.

⁹⁸ James B. Treat, “Specification of the Kill Universe on the Decennial Master Address File for Census 2000,” DSSD Census 2000 Procedures and Operations Memorandum Series #D-13, December 21, 2000.

⁹⁹ See Nick Alberti, “Specifications for Assigning the Housing Unit Status and Population Count of the Hundred-Percent Unedited File Prior to the Imputation of Unclassified Units,” DSSD Census 2000 Procedures and Operations Memorandum Series #D-14, January 19, 2001.

Imputation

Imputation is a term for the creation of data when required information is missing from a survey or census. Approximately 5.8 million people (2.1 percent of the total population) had all their 100 percent characteristics imputed in Census 2000. Designed to correct for nonresponse, imputation takes several forms. The Census Bureau divided these imputations into two categories—count imputation and characteristics imputation.

Count imputation. At the end of follow-up activities and data capture processing, some census housing unit records did not contain information on the number of persons or did not contain information on whether the census housing unit was occupied or vacant or whether the record should be deleted from the final list of housing units. These omissions may have been from respondents not providing correct information or from an unanticipated operational obstacle. In such cases the Census Bureau imputed the housing unit status and the number of persons for any occupied census housing unit without household size.

Since missing housing unit status and population count data affected the population total, only count imputation was required for the official population counts due December 31, 2000. Other missing data such as missing demographic data were handled during the characteristic imputation procedure which occurred after count imputation was completed. For Census 2000, production for count imputation started in mid-September 2000 and was completed by early October 2000.

Under the assumption that housing unit status and number of persons living in a housing unit are more similar in a nearby neighborhood than a far away community, the Census Bureau used a nearest-neighbor hot deck imputation method.¹⁰⁰ Using this method, data from the closest available neighbor were used to fill in the missing data. Geographical closeness of housing units was determined by sorting all housing units and group quarters within a tract by block number, street name, and house number. Based on this sort sequence, searches were conducted to find a donor for a unit with missing data. The unit with missing data was known as a donee. The nearest available unit meeting specified requirements (see Table 6-9) was used as a donor to fill in the data for the donee. The donee took the donor's housing unit status and population size as its own.

Count imputation consisted of three distinct processes defined as:

- **Household Size (Count) Imputation**—The Census Bureau imputed a population count for a housing unit when Census Bureau records indicated that the housing unit was occupied, but did not show the number of individuals residing in the unit.
- **Occupancy Status Imputation**—When Census Bureau records indicated that a housing unit existed but not whether it was occupied or vacant, the agency imputed occupancy status (occupied or vacant), and, if the unit were imputed to be occupied, the household size of the donor record was used.
- **Housing Unit Status Imputation**—When the Census Bureau's records had conflicting or insufficient information about whether an address represented a valid, unique housing unit, the process first imputed for the status of the unit (occupied, vacant, delete), then, if occupied, the household size of the donor record was used.

¹⁰⁰ Hot deck imputation involves the assignment of values from a set of stored values collected from other households. The phrase "hot deck" is used to describe the source because the deck is constantly refreshed by newly processed cases.

Table 6-9.
Summary of Count Imputation Categories

Type of imputation	Estimation category	Donees	Donors
Household size	1a. Single units 1b. Multiunits	Occupied units with undetermined population count.	Occupied units with a population count from enumerator-completed forms.
Occupancy status	2a. Single units 2b. Multiunits	Units known to exist (but occupancy status not determined).	Occupied or vacant units from enumerator-completed forms.
Housing unit status	3a. Single units 3b. Multiunits	Addresses not determined to be housing units.	Occupied, vacant, or deleted units from enumerator-completed forms.

The Census Bureau subdivided the three types of imputation categories into single housing units and multiunits to form six estimation categories. It conducted nearest-neighbor hot deck imputation separately for single units and multi-units within each of these three imputation categories. Household size imputation was done first, followed by occupancy status imputation and housing unit status imputation.¹⁰¹ During Census 2000 a total of 1,172,144 persons, or 0.42 percent of the total population was added to the apportionment count through count imputation. While this rate was in line with censuses before 1990, it was higher than the rate of count imputation in the 1990 Census.¹⁰²

Characteristics imputation. Characteristics imputation supplies all the data for people for whom one or more question items were not reported. The Census Bureau used whole-person characteristics imputation to impute all person characteristics for those whose census records did not contain two or more of the 100 percent population data items or name (those who were not data-defined persons.) During Census 2000, 4,602,122 person records representing 1.64 percent of the total population were imputed through the whole person characteristics imputation process.¹⁰³ The Census Bureau imputed whole person characteristics for two categories of cases in Census 2000—whole household imputation, and within household imputation.

Whole household imputation is performed for households containing no data-defined persons. Such households require all characteristics data to be imputed for each of the household members. This process uses substitution to replicate all of the 100 percent person data items (sex, age, date of birth, relationship, Hispanic origin, and race) from a hot deck nearest neighbor household donor pool record of the same household size.¹⁰⁴ A household may contain no data-defined persons because it was either enumerated with only a count provided, or was determined through count imputation to be occupied and supplied with a population count. During Census 2000, a total of 1,464,793 households were substituted nationwide in Census 2000. These represent 1.39 percent of the 105.5 million occupied housing units. Within these substituted households, there were 3,441,154 substituted persons. These persons account for 1.26 percent of the 273.6 million housing unit persons in the nation.¹⁰⁵

Within household imputation is performed for households containing at least one data-defined person and other persons with missing data. The imputation process allocates missing values for

¹⁰¹ Inez Chen and Andrew Kilmer, "Census 2000: Overview of Count Imputation—Reissue of Q2," DSSD Census 2000 Procedures and Operations Memorandum Series Q-78, March 18, 2002; Further details can be found in Memorandum Q-34 of the DSSD Census 2000 Procedures and Operations Memorandum Series, Subject: Census 2000 Specifications for Imputing Housing Unit Status and Population Counts.

¹⁰² Fay F. Nash, *ESCAP II: Analysis of Census Imputations, Report No. 21*, September 24, 2001, pp. 1–4.

¹⁰³ Those persons whose records contained two or more of the 100 percent population data items or name—known as data-defined persons—did not undergo whole person characteristics imputation. For such persons, missing data items were imputed through the edit process of assignment during which the responses for missing data items can be determined based on information provided on the same record by that same person.

¹⁰⁴ Substitution is the replication of a full set of data when records without sufficient information are found in the edit process. For more information on substitution in the edit and imputation process, see Susan Love and Don Dalzell to Daniel Weinberg, memorandum "Definitions of Substitution," U.S. Census Bureau, May 9, 2001.

¹⁰⁵ Kevin J. Zajac, "Analysis of Imputation Rates for the 100 Percent Person and Housing Unit Data Items from Census 2000, Final Report," Census 2000 Evaluation B.1.a, September 25, 2003, p. vii.

individual person characteristics data items on the basis of other reported information for the person or household, or from other persons or households with similar characteristics. Census 2000's 1,255,553 within household imputations resulted in 2,333,112 persons with all person characteristics imputed, marking a considerable increase over the 1990 census.¹⁰⁶

The Census Bureau's use of automated hot deck imputation began in 1960 and subject-matter specialists in population and housing have continued to refine specifications for edit procedures.¹⁰⁷ Census 2000, however, placed an unprecedented amount of reliance on automated imputation. Unlike earlier censuses which emphasized the use of clerical edits and repeated telephone and field follow-up to correct for missing values Census 2000 made more extensive use of hot deck matrices. This emphasis on automation rather than clerical edits and follow-up was due primarily to concerns over managing operation costs and schedule constraints. Given that the definition of imputation is sometimes interpreted in various ways across the Census Bureau, it is difficult to compare rates from previous censuses. Census 2000 imputation rates marked an increase over past censuses, which relied less on automated imputation and more on telephone and field follow-up operations to fill in missing data.¹⁰⁸ This increase may also be attributed to data processing problems. In one instance, an error in processing enumerator forms resulted in the unnecessary occupancy imputation of roughly 145,000 housing units. In addition, delays in the verification process for GQs resulted in the unnecessary imputation of housing unit status for 207,000 housing units.¹⁰⁹

Duplicate Delete Operation

Identification of duplicate addresses marked the final step in the HCUF process for housing units. In addition to the availability of multiple response modes during Census 2000, the Census Bureau's use of multiple sources for addresses combined with conservative rules for eliminating potential duplicates to increase the number of potential duplicates. Although the census design incorporated the use of the PSA to resolve multiple responses for the same MAF ID, the PSA was not designed to detect or eliminate duplicate addresses on the MAF.¹¹⁰ After site visits in June 2000 revealed evidence of significant housing unit duplication, Census Bureau staff developed the duplicate delete operation to correct a potential overcount of housing units. Designed and conducted in the summer and fall of 2000, this operation employed two primary methods to identify potential duplicate addresses: address matching based on characteristics of the address derived from MAF data, and person matching based on name and date of birth.

Scheduling deadlines required the Census Bureau to conduct the identification of duplicate addresses in two phases. During phase one a provisional list of duplicate addresses was identified and address and person matching were carried out independently. This process yielded 2,645,387 matched pairs of addresses. Addresses with one or more exact person matches and similar households were paired. After identifying kills and addresses given a status of delete, one address was

¹⁰⁶ Fay F. Nash, *ESCAP II: Analysis of Census Imputations, Report No. 21*, September 24, 2001, pp. 1–4; Signe I. Wetrogan and Arthur R. Cresce, *ESCAP II: Characteristics of Census Imputations, Report No. 22*, October 12, 2001, pp. ii–3. See also Kevin J. Zajac, "Analysis of Imputation Rates for the 100 Percent Person and Housing Unit Data Items from Census 2000, Final Report," Census 2000 Evaluation B.1.a, September 25, 2003.

¹⁰⁷ Although hot decks were used in 1960, the Census Bureau's first use of cold deck imputation—so called for the sets of computer punch cards containing numeric values from a previous survey or census—dates back to 1940 when the process was used to impute age.

¹⁰⁸ National Research Council, *The 2000 Census: Counting Under Adversity*, (The National Academies Press: Washington, D.C., 2004), pp. 133, 271–96, 406, 457–67.

¹⁰⁹ Nicholas S. Alberti, *Data Processing in Census 2000*, Census 2000 Topic Report No. 7, TR-7, (Washington, D.C.: U.S. Census Bureau, 2003) pp. 26–35. See also, Robert Fay, "The 2000 Housing Unit Duplication Operations and their Effect on the Accuracy of the Population Count," Proceedings of the Annual Meeting of the American Statistical Association, August 5–9, 2001; Teresa Angueira to Preston Jay Waite, U.S. Census Bureau, Census 2000 Informational Memorandum No. 110, "Initial Research on Count Imputation in Census 2000," August 10, 2001.

¹¹⁰ For more information on the development of the master address file (MAF) see Chapter 8, "Addresses and Questionnaire Printing and Mailing."

selected from each remaining pair. Those addresses not selected—including 2,411,743 MAF IDs—were flagged as provisional deletions.¹¹¹

Phase one identified, but did not eliminate addresses from the HCUF. After the HCUF was complete, the duplicate delete operation proceeded to phase two during which the results of phase one were used to identify which of the provisional deletions from phase one would be retained on HCEF. In phase two additional information on address matching and person matching combined to decide which of the provisional deletions to reinstate. Additional person matching used a modified version of the Census Bureau's probabilistic matching methods. At the completion of phase two, a total of 1,392,686 HCUF addresses were identified as duplicate addresses and not retained on the HCEF.¹¹²

Group Quarters Processing

GQ response data were processed separately from the housing unit data until the final step of the HCUF processing when the response records from both universes were placed on the same file. The Census Bureau relied heavily on the number of GQ questionnaires completed and captured by the DCS2000 to determine the population of each GQ. Individual GQ questionnaires were not tracked during the enumeration processes. Clerical counts of the number of questionnaires at several points of field processing and a count of records by the DCS2000 were recorded. The count of the number of questionnaires was recorded at five points in the post-enumeration processing:

- By the enumerator immediately following the enumeration of a GQ.
- By the LCO staff when the questionnaires were received.
- By the LCO staff when the questionnaires were shipped to the NPC.
- By the NPC staff when the questionnaires were received.
- By the DCS2000 during the data capture of questionnaires.

The counts listed above formed the basis for determining the final population count for each GQ. Other processes that contributed data were:

- The results of telephone follow-up interviews with GQ establishments that initially refused to be enumerated. No questionnaires were returned for these GQs. The Census Day population of each GQ was ascertained by the follow-up interview.
- Identification of BCF questionnaires with a GQ address.
- Identification of housing unit questionnaires with a reported UHE address for a GQ.
- Unduplication of persons at SBE Facilities.
- Identification of GQ questionnaires with a reported UHE address for a housing unit.

Although residents of all types of GQs were allowed to report UHE (i.e., a Census Day residence other than the GQ at which they were enumerated) only questionnaire data for eligible UHE responses were to be sent to the non-ID processes. Only persons with eligible UHE responses could be removed from the GQ universe and included in the housing unit universe. Eligibility was determined by the type of GQ from which the questionnaire was received and response to a screening question which identified a person's primary residence.

¹¹¹ Susan M. Miskura to Preston Jay Waite, U.S. Census Bureau, "Results of Reinstatement Rules for the Housing Unit Duplication Operations," Memo, November 21, 2000.

¹¹² See Robert Fay, "The 2000 Housing Unit Duplication Operations and Their Effect on the Accuracy of the Population Count," Proceedings of the Annual Meeting of the American Statistical Association, August 5–9, 2001, for more information on the two-phase operation of identifying deletes and reinstating provisional deletes. For information on reinstatement rules, see Howard Hogan, "Specification for Reinstating Addresses Flagged as Deletes on the Hundred Percent Census Unedited File," DSSD Census 2000 Procedures and Operations Memorandum Series #D-11, November 7, 2000.

Resolution of Missing Data

GQ processing dealt with difficulties surrounding a potentially large amount of missing data. In May 2000, the NPC reported that a large number of GQ questionnaires did not have GQ Identification (ID) numbers on them and/or had no associated control sheet. Census Bureau headquarters staff quickly designed and implemented procedures to clerically review these questionnaires and, if possible, identify them with the correct GQ. The staff reviewed an estimated 700,000 questionnaires during this operation.

Each GQ questionnaire received a unique barcode and number, however the barcode was not used to track GQ questionnaires from enumeration through data capture. This oversight required enumerators to transcribe the 14 digit GQ identification number on each GQ questionnaire. When this was not done or was done incorrectly it was difficult and sometimes impossible to identify the GQ at which the respondent was enumerated.

An interdivisional team of staff knowledgeable about GQ enumeration examined the counts of questionnaires after data capture by the DCS2000. This review was not originally part of the design for GQ processing. The team found that the data capture was incomplete in several ways:¹¹³

- No questionnaires were received for a number of GQs which were believed to have refused Census Bureau attempts to enumerate them.
- The count of questionnaires for a number of GQs was far less than projected by pre-enumeration operations.
- A number of GQs had a higher count of questionnaires sent to NPC by the LCOs than were captured by the DCS2000.

An unscheduled telephone follow-up operation was implemented to address the first two of the count deficiencies described above. This follow-up ascertained the Census Day population count for GQs but did not collect the demographic data of residents. A total count of 101,598 persons (representing 1.3 percent of the total GQ population) was added to the GQ population as result of this follow-up. About 4.4 percent of GQ residents at hospitals were enumerated by this follow-up.

DSSD designed a procedure to derive a count of the expected number of persons enumerated at GQs to mitigate the problems posed by the last of the three count discrepancies. When the aggregate count of forms shipped to the NPC for a Special Place was higher than the aggregate count of forms captured, the difference in these two counts was allocated to the GQs within the Special Place proportional to the differences in the two counts for each GQ. Collectively, all these operations added about 200,000 persons to the Census 2000 GQ population of 7,825,407. As a result, it was necessary to impute all the required demographic data for 2.6 percent of the Census 2000 GQ population.

Processing of Responses With a Usual Home Elsewhere Address

The GQ processing recovered from the erroneous routing of returns for GQ residents reporting UHE addresses to the non-ID process. If a UHE address was confirmed to be a housing unit, GQ responses sent to the non-ID process could be removed from the GQ universe and placed in the housing unit universe. Hence, it was important to identify ineligible GQ UHE responses in order to prevent them from being erroneously removed from the GQ universe. During GQ processing, 659,566 responses with a UHE housing-unit address were correctly removed from the GQ universe. Additionally, 150,315 responses were incorrectly removed from the GQ universe because they were incorrectly identified as having a UHE address. GQ processing erroneously sent nearly 2.3 million GQ responses to the non-ID process.¹¹⁴

¹¹³ A portion of the missing questionnaires can be attributed to the missing GQ ID numbers on some forms and inability of the Census Bureau to associate them with the appropriate GQ.

¹¹⁴ There were 1,892,742 responses with a UHE address collected from those types of GQs that made them ineligible to be sent to the non-ID process. There were 388,970 responses that were incorrectly identified as having a UHE address. See Kimball Jonas, "Group Quarters Enumeration, Revision 1," Census 2000 Evaluation E.5, August 6, 2003.

Sample Census Unedited File (SCUF)

During Census 2000 the shift from an adjusted census design to a traditional census not only required a change in data capture operations with the adoption of a two-pass procedure, it also prompted a change in the processing of the census unedited file (CUF).¹¹⁵ In March 2000, the Census Bureau decided to divide the planned CUF into two separate files—the hundred percent census unedited file (HCUF) and the sample census unedited file (SCUF). The HCUF contained the unedited 100 percent items (and any sample items needed for the 100 percent edit) for all forms. It also contained write-in fields and was organized in collection geography. The SCUF contained the unedited 100 percent items and sample items for all sample housing units and their residents and all sample persons in the GQs.¹¹⁶ At the conclusion of the second data capture pass, DSCMO linked sample data to the DRF, after being matched to the HCUF, to produce the SCUF which was processed in the same fashion as the HCUF with additional weighted counts defined for the sample data to produce the sample census edited file (SCEF). Additional recodes and disclosure avoidance processes are applied to the SCEF to produce the SEDF for data tabulation.

Detail File Creation

Once the HCEF and SCEF were complete, the files proceeded through additional processing steps in the PRPS preparing them for tabulation. To produce the hundred percent detail file (HDF), the Census Bureau assigned the records to tabulation geography and applied standard disclosure avoidance techniques to the base edited files. As it had during the 1990 census, the Census Bureau employed a disclosure avoidance technique called data swapping. Designed to protect confidentiality, this technique added a small amount of uncertainty to the data summaries for small areas, such as census blocks, including those used for legislative redistricting.¹¹⁷ After the application of disclosure avoidance, the HDF was ready for tabulation and the development of census data products.

¹¹⁵ See Chapter 11, “Legal Issues,” for further information on sampling and adjustment.

¹¹⁶ Michael Longini to Susan Miskura, U.S. Census Bureau, “Census 2000 Unedited Data Files,” 2000 Census DSCMO to DMD Memorandum Series No. 00-02, March 3, 2000; Susan Miskura, “Census 2000 Written Responses Within Unedited Data Files,” Census 2000 Informational Memorandum No. 57, May 24, 2000.

¹¹⁷ Howard Hogan to John Thompson, U.S. Census Bureau, “Disclosure Avoidance Techniques for Census 2000,” Census 2000 Decision Memorandum No. 102, April 21, 2000; Phil Steel and Laura Zayatz, “The Effects of the Disclosure Limitation Procedure on Census 2000 Tabular Data Products (Abridged),” Census 2000 Evaluation C.1, April 15, 2003.

Appendix A: Major Events in the Planning and Conduct of Census 2000

October 24, 1991	Decennial Census Improvement Act of 1991 directed the U.S. Secretary of Commerce to hire the National Academy of Sciences to report on ways to conduct the most accurate census possible in 2000 and beyond.
April 1992	Field testing for Census 2000 began with the Simplified Questionnaire Test.
June 9, 1992	U.S. General Accounting Office released its report, “Decennial Census: 1990 Results Show Need for Fundamental Reform.”
February 1994	Census Bureau released the “1995 Census Test Design Plan.”
October 31, 1994	Census Address List Improvement Act of 1994 modified the Census Bureau’s authorizing statute (Title 13, U.S. Code) to allow the agency to share its address list with state, local, and tribal governments and required the U.S. Postal Service to provide address and related information to the Census Bureau for use in constructing and updating its address list.
February 1995	1995 Census Test began.
April 1995	Task Force for Planning the Year 2000 Census released its final report, “Reinventing the Decennial Census.”
May 1995	Census Bureau released the preliminary version of its plan for Census 2000, “The Reengineered 2000 Census.”
February 28, 1996	Census Bureau formally unveiled “The Plan for Census 2000” at a public ceremony at the U.S. Commerce Department.
March–May 1996	National Content Survey conducted.
June 1996	Race and Ethnic Targeted Test began.
March 21, 1997	Census Bureau awarded the data-capture contract to Lockheed Martin Mission Systems.
March 31, 1997	Census Bureau submitted to Congress the list of subjects proposed for inclusion in Census 2000.
April 25, 1997	Census Bureau awarded the data access and dissemination system contract to IBM.
July 1997	Census Bureau delivered to Congress its comprehensive and detailed plans for Census 2000, “Report to Congress—The Plan for Census 2000” and “Census 2000 Operational Plan.”
October 10, 1997	Census Bureau awarded the advertising contract for Census 2000 to Young & Rubicam and a consortium of four partners.
November 26, 1997	The Department of Commerce and Related Agencies Appropriations Act of 1998 established dual-track planning, contained language providing for judicial review of the use of sampling techniques to produce apportionment population counts, and established the Census Monitoring Board.
January 28, 1998	Census Bureau awarded the data capture services contract to TRW.
February 1998	Two lawsuits were filed challenging the use of sampling in completion of nonresponse follow-up and in the Integrated Coverage Measurement program to produce the congressional apportionment counts.
February 1998	Local Update of Census Addresses (LUCA) began.
March 1998	Census 2000 Dress Rehearsal began.

March 30, 1998	Census Bureau submitted to Congress the proposed questions for Census 2000 (7 on the short form and 53 on the long form).
December 1998– May 1999	Contracts for printing Census 2000 questionnaires awarded.
January 25, 1999	Supreme Court ruled, in <i>Department of Commerce v. U.S. House of Representatives</i> (119 S.Ct. 765 (1999)), that the Census Bureau's authorizing statute (Title 13, U.S. Code) prohibited the use of sampling to produce congressional apportionment population counts.
February 23, 1999	Revised plan for Census 2000 released; this plan eliminated sampling for nonresponse follow-up and Integrated Coverage Measurement and incorporated the Accuracy and Coverage Evaluation (A.C.E.) program.
April 1999	First of four data capture centers opened in Baltimore, MD.
January 2000	Census 2000 data collection began in rural Alaska.
April 1, 2000	Census Day.
April–July 2000	Nonresponse follow-up conducted.
May–August 2000	Accuracy and Coverage Evaluation in-person interviews conducted.
December 28, 2000	Secretary of Commerce delivered apportionment counts to the President.
January 6, 2001	President delivered apportionment statement to the Clerk of the U.S. House of Representatives.
March 6, 2001	Secretary of Commerce decided against statistical adjustment of the Census 2000 redistricting data.
March 7–30, 2001	Census Bureau delivered redistricting data to the states.
June 2001	Last of the data capture centers (Baltimore) closed.
June 2001– September 2003	Count question resolution program.
September 1, 2001	Census Monitoring Board sent final reports to Congress.
October 16, 2001	Census Bureau Acting Director decided against adjustment of the Census 2000 data for nonredistricting purposes.
June 2003–April 2004	Release of last printed report series, <i>Summary Population and Housing Unit Counts</i> (PHC-3).

Appendix B: Census 2000 Regional Census Centers and Local Census Offices by Regional Census Center Code Number

Name	City	State	Code number	Type of office ¹	Opening date	Closing date
Boston	Boston	MA	2199	RCC	2/15/1998	3/15/2001
New Britain	New Britain	CT	2112	C	8/2/1999	9/30/2000
Hartford	Hartford	CT	2113	A	10/1/1998	9/30/2000
New Haven	New Haven	CT	2114	A	8/12/1999	9/30/2000
Norwich	Norwich	CT	2115	C	8/6/1999	9/30/2000
Stamford	Stamford	CT	2116	A	11/1/1998	9/30/2000
Waterbury	Waterbury	CT	2117	C	7/1/1999	9/30/2000
Boston	Boston	MA	2118	A	10/1/1998	9/30/2000
Boston South	Allston	MA	2119	A	9/7/1999	9/30/2000
Yarmouth	S. Yarmouth	MA	2121	C	8/20/1999	8/31/2000
Lowell	Lowell	MA	2122	B	10/1/1998	9/30/2000
Cambridge	Cambridge	MA	2123	A	9/1/1999	9/30/2000
New Bedford	New Bedford	MA	2124	B	10/1/1998	9/30/2000
Beverly	Beverly	MA	2125	B	8/4/1999	9/30/2000
Pittsfield	Pittsfield	MA	2126	C	9/1/1999	9/30/2000
Randolph	Randolph	MA	2127	B	9/1/1999	9/30/2000
Springfield	Springfield	MA	2128	C	7/1/1999	9/30/2000
Worcester	Worcester	MA	2130	C	10/1/1998	9/30/2000
Bangor	Bangor	ME	2131	D	8/1/1999	9/30/2000
Portland	South Portland	ME	2132	D	7/1/1999	9/30/2000
Concord	Concord	NH	2133	D	10/1/1998	9/30/2000
Dover	Dover	NH	2134	D	8/1/1999	9/30/2000
Albany	Albany	NY	2135	C	10/1/1998	9/30/2000
Amherst	Amherst	NY	2136	C	8/1/1999	9/30/2000
Buffalo	Buffalo	NY	2137	A	10/1/1998	8/31/2000
Elmira	Elmira	NY	2138	C	7/1/1999	9/30/2000
Glens Falls	Glens Falls	NY	2139	D	7/1/1999	9/30/2000
Kingston	Kingston	NY	2140	C	8/1/1999	8/31/2000
Niagara Falls	Niagara Falls	NY	2142	C	8/1/1999	8/31/2000
Rochester	Rochester	NY	2143	B	7/1/1999	9/30/2000
Syracuse	Syracuse	NY	2144	C	10/1/1998	9/30/2000
Utica	Utica	NY	2145	D	7/1/1999	9/30/2000
Watertown	Watertown	NY	2146	D	7/1/1999	8/31/2000
Providence	Providence	RI	2147	A	8/4/1999	9/30/2000
Warwick	Warwick	RI	2148	C	7/1/1999	9/30/2000
Burlington	Williston	VT	2149	D	8/1/1999	9/30/2000
San Juan North	Hato Rey	PR	2150	E	7/1/1999	9/15/2000
Guaynabo	Guaynabo	PR	2151	E	8/1/1999	9/15/2000
Bayamon	Bayamon	PR	2152	E	7/1/1999	9/15/2000
Arecibo	Arecibo	PR	2153	E	9/1/1999	9/15/2000
Aguadilla	Aguadilla	PR	2154	E	9/1/1999	9/15/2000
Mayaguez	Mayaguez	PR	2155	E	9/1/1999	9/15/2000
Ponce	Ponce	PR	2156	E	8/1/1999	9/15/2000
Caguas	Caguas	PR	2157	E	7/1/1999	9/15/2000
Carolina	Carolina	PR	2158	E	8/1/1999	9/15/2000
Bridgeport	Bridgeport	CT	2159	A	9/1/1999	9/30/2000
Chelsea	Chelsea	MA	2160	A	9/1/1999	9/30/2000
Natick	Natick	MA	2161	B	9/13/1999	9/30/2000
Middletown	Middletown	NY	2162	C	9/1/1999	9/30/2000

See footnote at end of table.

Name	City	State	Code number	Type of office ¹	Opening date	Closing date
New York	New York	NY	2299	RCC	12/9/1997	10/31/2000
Bergen Co. North	Glen Rock	NJ	2211	C	7/1/1999	9/8/2000
Bergen Co. South	Hasbrouck Heights	NJ	2212	A	7/1/1999	9/12/2000
Newark	Newark	NJ	2213	A	10/1/1998	9/25/2000
Essex Co. West	Verona	NJ	2214	A	9/1/1999	8/29/2000
Hudson Co. North	Union City	NJ	2215	A	9/1/1999	9/15/2000
Jersey City	Jersey City	NJ	2216	A	10/1/1998	9/12/2000
Middlesex Co.	New Brunswick	NJ	2217	B	8/1/1999	9/28/2000
Sussex Co./Warren Co.	Hackettstown	NJ	2218	C	8/1/1999	8/31/2000
Paterson	Paterson	NJ	2219	A	10/1/1998	9/27/2000
Somerset Co./Union Co.	Plainfield	NJ	2220	C	8/1/1999	9/28/2000
Bronx Northeast	Bronx	NY	2221	A	9/1/1999	9/22/2000
Bronx Northwest	Bronx	NY	2222	A	9/1/1999	8/28/2000
New York—Bronx	New York—Bronx	NY	2223	A	10/1/1998	9/21/2000
Bronx Southwest	Bronx	NY	2224	A	7/1/1999	9/26/2000
Brooklyn Central	Brooklyn Central	NY	2225	A	8/1/1999	9/11/2000
Brooklyn East	Brooklyn	NY	2226	A	7/1/1999	9/15/2000
Brooklyn Northeast	Brooklyn	NY	2227	A	7/1/1999	9/7/2000
Brooklyn	Brooklyn	NY	2228	A	12/1/1998	9/11/2000
Brooklyn	Brooklyn	NY	2229	A	10/1/1998	9/28/2000
Brooklyn Southwest	Brooklyn	NY	2230	A	7/7/1999	9/7/2000
Nassau Co. Northeast	Bethpage	NY	2231	B	8/1/1999	8/28/2000
Garden City	Garden City	NY	2232	B	12/1/1998	9/26/2000
New York East	New York	NY	2233	A	9/15/1999	9/25/2000
New York North	New York	NY	2234	A	9/15/1999	9/14/2000
New York Northeast	New York	NY	2235	A	9/15/1999	9/26/2000
New York Northwest	New York	NY	2236	A	9/1/1999	8/30/2000
New York	New York	NY	2237	A	10/1/1998	9/28/2000
New York West	New York	NY	2238	A	9/1/1999	9/13/2000
Queens Central	Woodhaven	NY	2239	A	9/1/1999	9/29/2000
Queens Northeast	Flushing	NY	2240	A	9/1/1999	9/12/2000
Queens Northwest	Long Island City	NY	2241	A	8/1/1999	9/29/2000
Jamaica	Jamaica	NY	2242	A	10/1/1998	9/14/2000
Queens Southwest	Long Island City	NY	2243	A	9/1/1999	9/29/2000
Richmond Co.	Saint George/Staten	NY	2244	A	8/1/1999	9/13/2000
Rockland Co./Westchester Co. North	Orangeburg	NY	2245	B	8/1/1999	9/14/2000
Suffolk Co. East	Medford, LI	NY	2246	C	8/11/1999	9/28/2000
Suffolk Co. West	Hauppauge	NY	2247	C	8/1/1999	9/13/2000
White Plains	White Plains	NY	2248	B	10/1/1998	9/28/2000
Morris County	Dover	NJ	2249	C	9/1/1999	9/11/2000
Philadelphia	Philadelphia	PA	2399	RCC	2/15/1998	2/19/2001
Washington	Washington	DC	2311	A	9/15/1998	9/14/2000
DC West	Washington	DC	2312	A	11/1/1999	9/15/2000
New Castle	New Castle	DE	2313	C	10/1/1998	9/30/2000
Annapolis	Annapolis	MD	2314	C	7/1/1999	9/26/2000
Baltimore East	Baltimore	MD	2315	A	9/1/1999	9/15/2000
Baltimore	Baltimore	MD	2316	A	11/4/1998	9/30/2000
Hagerstown	Hagerstown	MD	2317	C	7/1/1999	9/30/2000
Rockville	Rockville	MD	2318	C	10/1/1998	9/30/2000
Forestville	Forestville	MD	2319	C	9/20/1999	9/15/2000
Waldorf	Waldorf	MD	2320	C	7/1/1999	9/15/2000
Towson	Towson	MD	2321	C	7/1/1999	9/15/2000
Camden	Camden	NJ	2322	A	10/1/1998	9/29/2000
Freehold	Freehold	NJ	2324	C	7/1/1999	9/30/2000
Trenton	Trenton	NJ	2325	C	10/1/1998	9/30/2000
Vineland	Vineland	NJ	2326	C	7/1/1999	9/30/2000
Allentown	Allentown	PA	2327	C	8/1/1999	9/30/2000
Altoona	Altoona	PA	2328	C	7/1/1999	9/30/2000
Rochester	Rochester	PA	2329	C	8/1/1999	9/30/2000

See footnote at end of table.

Name	City	State	Code number	Type of office ¹	Opening date	Closing date
Philadelphia—Con.						
Coatesville	Coatesville	PA	2330	C	8/1/1999	9/30/2000
Erie	Erie	PA	2331	C	7/1/1999	9/30/2000
Harrisburg	Harrisburg	PA	2332	C	10/1/1998	9/30/2000
Johnstown	Johnstown	PA	2333	C	7/12/1999	9/30/2000
Langhorne	Langhorne	PA	2334	C	8/1/1999	9/30/2000
McKeesport	McKeesport	PA	2335	C	8/1/1999	9/30/2000
Concordville	Concordville	PA	2336	B	8/3/1999	9/15/2000
Norristown	Norristown	PA	2337	C	10/1/1998	9/30/2000
Philadelphia	Philadelphia	PA	2338	A	10/1/1998	9/15/2000
Philadelphia Frankford	Philadelphia	PA	2339	A	9/10/1999	9/30/2000
Philadelphia West	Philadelphia	PA	2340	A	9/1/1999	9/30/2000
Pittsburgh	Pittsburgh	PA	2341	A	10/1/1998	9/15/2000
Reading	Reading	PA	2342	C	7/1/1999	9/27/2000
Scranton	Scranton	PA	2343	C	9/1/1999	9/28/2000
State College	State College	PA	2344	C	10/1/1998	9/15/2000
Wilkes-Barre	Wilkes-Barre	PA	2346	C	10/1/1998	9/28/2000
York	York	PA	2347	C	7/1/1999	9/25/2000
College Park	Riverdale	MD	2348	B	9/1/1999	9/28/2000
Woodlawn	Woodlawn	MD	2349	C	9/1/1999	9/26/2000
Cherry Hill	Cherry Hill	NJ	2350	C	9/1/1999	9/30/2000
Lakehurst	Lakehurst (Ocean City)	NJ	2351	C	9/1/1999	9/15/2000
Greensburg	Greensburg	PA	2352	C	8/1/1999	9/28/2000
Philadelphia North	Philadelphia	PA	2353	A	9/1/1999	9/27/2000
Washington	Washington	PA	2354	C	9/1/1999	9/29/2000
Detroit	Detroit	MI	2499	RCC	2/15/1998	3/25/2001
Ann Arbor	Ann Arbor	MI	2411	C	8/4/1999	9/26/2000
Battle Creek	Battle Creek	MI	2412	C	7/1/1999	9/28/2000
Dearborn	Dearborn	MI	2413	B	6/28/1999	9/28/2000
Detroit	Detroit	MI	2414	A	10/1/1998	9/27/2000
Detroit West	Detroit	MI	2415	A	8/3/1999	9/19/2000
Flint	Flint	MI	2416	C	8/6/1999	9/22/2000
Grand Rapids	Grand Rapids	MI	2417	C	10/1/1998	9/29/2000
Kalamazoo	Kalamazoo	MI	2418	C	7/7/1999	9/27/2000
Lansing	Lansing	MI	2419	C	9/24/1998	9/26/2000
Livonia	Livonia	MI	2420	B	7/1/1999	9/28/2000
Macomb Co.	Sterling Heights	MI	2421	C	8/17/1999	9/20/2000
Marquette	Ishpeming	MI	2422	C	7/13/1999	9/27/2000
Midland	Midland	MI	2423	C	8/2/1999	9/25/2000
Muskegon	Muskegon	MI	2424	C	9/14/1999	9/29/2000
Saginaw	Saginaw	MI	2425	C	8/2/1999	9/25/2000
Clawson	Clawson	MI	2426	C	9/28/1998	9/26/2000
Akron	Akron	OH	2427	C	9/9/1999	9/26/2000
Bowling Green	Bowling Green	OH	2428	C	9/1/1999	9/29/2000
Canton	Canton	OH	2429	C	9/29/1998	9/27/2000
Chillicothe	Chillicothe	OH	2430	C	7/1/1999	9/22/2000
Cincinnati	Cincinnati	OH	2431	A	10/5/1998	9/29/2000
Blue Ash	Blue Ash	OH	2432	C	9/15/1999	9/29/2000
Cleveland	Cleveland	OH	2433	A	7/1/1999	9/28/2000
Richmond Heights	Richmond Heights	OH	2434	A	10/1/1998	9/26/2000
Cleveland Southeast	North Randall	OH	2435	C	9/1/1999	9/25/2000
Columbus	Columbus	OH	2436	C	11/1/1998	9/28/2000
Columbus West	Columbus	OH	2437	C	10/1/1999	9/28/2000
Dayton	Dayton	OH	2438	C	8/1/1999	9/21/2000
Hamilton	Cincinnati	OH	2439	C	9/1/1999	9/19/2000
Lorain	Lorain	OH	2440	C	7/14/1999	9/27/2000
Mansfield	Mansfield	OH	2441	C	7/1/1999	9/28/2000
Newark	Newark	OH	2442	C	8/1/1999	9/27/2000
Springfield	Springfield	OH	2443	C	6/30/1999	9/22/2000
Toledo	Toledo	OH	2444	C	9/29/1998	9/29/2000

See footnote at end of table.

Name	City	State	Code number	Type of office ¹	Opening date	Closing date
Detroit—Con.						
Youngstown	Youngstown	OH	2445	C	7/1/2000	9/26/2000
Beaver	Beaver	WV	2446	C	9/1/1999	9/22/2000
Charleston	Charleston	WV	2447	C	10/1/1998	9/21/2000
Westover	Westover	WV	2448	C	9/1/1999	9/26/2000
Detroit North	Highland Park	MI	2449	A	9/17/1999	9/29/2000
Traverse City	Traverse City	MI	2450	C	9/1/1999	9/22/2000
Steubenville	Steubenville	OH	2451	C	8/25/1999	9/29/2000
Parkersburg	Parkersburg	WV	2452	C	8/5/1999	9/25/2000
Chicago	Chicago	IL	2599	RCC	1/20/1998	12/14/2000
Belleville	Belleville	IL	2511	C	10/1/1998	9/13/2000
Chicago Far North	Chicago	IL	2512	A	9/23/1999	9/27/2000
Chicago Far South	Chicago	IL	2513	A	9/17/1999	9/26/1999
Chicago Far Southwest	Chicago	IL	2514	A	10/27/1999	10/12/2000
Chicago Near North	Chicago	IL	2515	A	10/5/1999	10/13/2000
Cook Co. West	Lemont	IL	2516	B	8/18/1999	9/29/2000
Chicago	Chicago	IL	2517	A	10/2/1998	10/13/2000
Chicago Near Southwest	Chicago	IL	2518	A	9/15/1999	9/26/2000
Chicago Northwest	Chicago	IL	2519	A	9/2/1999	9/27/2000
Chicago	Chicago	IL	2520	A	10/1/1998	10/11/2000
Des Plaines	Des Plaines	IL	2521	B	9/28/1998	9/11/2000
Cook Co. Southwest	Hazelcrest	IL	2522	B	8/16/1999	9/15/2000
Glen Ellyn	Glen Ellyn	IL	2523	C	10/1/1998	9/12/2000
Elgin	Elgin	IL	2524	C	8/1/1999	9/26/2000
Tinley Park	Tinley Park	IL	2525	C	7/1/1999	9/27/2000
Lake Co.	Vernon Hills	IL	2526	B	10/8/1999	9/29/2000
Marion	Marion	IL	2527	C	7/1/1999	9/27/2000
Quincy	Quincy	IL	2528	C	9/15/1999	9/28/2000
Peoria	Peoria	IL	2529	C	7/9/1999	9/11/2000
Rockford	Rockford	IL	2530	C	7/7/1999	9/28/2000
Springfield	Springfield	IL	2531	C	10/1/1998	9/13/2000
Champaign	Champaign	IL	2532	C	7/1/1999	9/25/2000
Evansville	Evansville	IN	2533	C	8/2/1999	9/11/2000
Fort Wayne	Fort Wayne	IN	2534	C	7/6/1999	9/29/2000
Gary	Gary	IN	2535	C	10/1/1998	9/14/2000
Indianapolis	Indianapolis	IN	2536	A	10/1/1998	9/25/2000
Kokomo	Kokomo	IN	2537	C	8/27/1999	9/27/2000
Marion Co.	Indianapolis	IN	2538	B	9/1/1999	9/26/2000
Muncie	Muncie	IN	2539	C	10/1/1998	9/25/2000
Clarksville	Clarksville	IN	2540	C	9/1/1999	9/26/2000
South Bend	South Bend	IN	2541	C	9/1/1999	9/28/2000
Terre Haute	Terre Haute	IN	2542	C	8/2/1999	9/26/2000
Germantown	Germantown	WI	2543	C	7/1/1999	9/13/2000
Fond Du Lac	Fond Du Lac	WI	2544	C	7/1/1999	9/13/2000
Green Bay	Green Bay	WI	2545	C	8/1/1999	9/27/2000
Racine	Racine	WI	2546	C	9/18/1999	9/28/2000
La Crosse	La Crosse	WI	2547	C	11/5/1998	9/28/2000
Madison	Madison	WI	2548	C	10/1/1998	9/12/2000
Milwaukee	Milwaukee	WI	2549	A	10/1/1998	9/28/2000
Superior	Superior	WI	2550	C	7/1/1999	9/14/2000
West Allis	Muskego	WI	2551	B	9/1/1999	9/14/2000
Bloomington	Bloomington	IL	2552	C	9/1/1999	9/11/2000
Cook County Northwest	Palatine	IL	2553	B	9/1/1999	9/13/2000
Stevens Point	Stevens Point	WI	2554	C	8/2/1999	9/13/2000
Chicago Central	Chicago	IL	2555	A	8/2/1999	9/27/2000
Kansas City	Kansas City	KS	2699	RCC	12/22/1997	12/14/2000
Ft. Smith	Ft. Smith	AR	2611	C	8/1/1999	9/30/2000
Jonesboro	Jonesboro	AR	2612	C	7/1/1999	9/30/2000

See footnote at end of table.

Name	City	State	Code number	Type of office ¹	Opening date	Closing date
Kansas City—Con.						
Little Rock	Little Rock	AR	2613	C	10/1/1998	9/30/2000
Pine Bluff	Pine Bluff	AR	2614	C	7/1/1999	9/30/2000
Ames	Ames	IA	2615	C	7/1/1999	9/15/2000
Cedar Rapids	Cedar Rapids	IA	2616	C	7/1/1999	9/15/2000
Des Moines	Des Moines	IA	2617	C	10/1/1998	9/30/2000
Sioux City	Sioux City	IA	2618	C	9/1/1999	9/15/2000
Waterloo	Waterloo	IA	2619	C	8/1/1999	9/15/2000
Hays	Hays	KS	2620	C	8/1/1999	9/30/2000
Kansas City	Kansas City	KS	2621	C	10/1/1998	9/30/2000
Topeka	Topeka	KS	2622	C	8/1/1999	9/30/2000
Wichita	Wichita	KS	2623	C	8/1/1999	9/30/2000
Coon Rapids	Maple Grove	MN	2624	C	8/1/1999	9/30/2000
Duluth	Duluth	MN	2625	C	9/1/1999	9/15/2000
Minneapolis	Minneapolis	MN	2626	A	10/1/1998	9/30/2000
Minneapolis West	Edina	MN	2627	B	8/1/1999	9/30/2000
Moorhead	Moorhead	MN	2628	C	7/1/1999	9/30/2000
Rochester	Rochester	MN	2629	C	9/1/1999	9/15/2000
Shakopee	Shakopee	MN	2630	C	7/1/1999	9/15/2000
St. Paul	St. Paul	MN	2631	B	10/1/1998	9/30/2000
Blue Springs	Blue Springs	MO	2632	C	9/1/1999	9/30/2000
Cape Girardeau	Cape Girardeau	MO	2633	C	7/1/1999	9/15/2000
Columbia	Columbia	MO	2634	C	7/1/1999	9/30/2000
Kansas City	Kansas City	MO	2635	A	10/1/1998	9/15/2000
Springfield	Springfield	MO	2636	C	7/1/1999	9/30/2000
St. Joseph	St. Joseph	MO	2637	C	8/1/1999	9/30/2000
St. Louis	St. Louis	MO	2638	A	10/1/1998	9/30/2000
St. Louis County North	St. Louis County North	MO	2639	C	9/1/1999	9/30/2000
St. Louis County South	St. Louis County South	MO	2640	C	9/1/1999	9/30/2000
Duncan	Duncan	OK	2641	C	9/1/1999	9/15/2000
Enid	Enid	OK	2642	C	7/1/1999	9/15/2000
Tahlequah	Tahlequah	OK	2643	C	7/1/1999	9/15/2000
Oklahoma City	Oklahoma City	OK	2644	C	10/1/1998	9/30/2000
Shawnee	Shawnee	OK	2645	C	7/1/1999	9/15/2000
Tulsa	Tulsa	OK	2646	C	10/1/1998	9/30/2000
Seattle	Seattle	WA	2799	RCC	12/15/1997	12/31/2001
Anchorage	Anchorage	AK	2711	D	10/1/1998	10/15/2000
Castro Valley	Pleasanton	CA	2712	C	10/1/1999	9/30/2000
Concord	Concord	CA	2713	C	7/1/1999	9/30/2000
Davis	Davis	CA	2714	C	7/1/1999	9/15/2000
Eureka	Eureka	CA	2715	D	7/1/1999	9/15/2000
Los Gatos	Sunnyvale	CA	2716	C	9/1/1999	10/15/2000
Modesto	Modesto	CA	2717	C	10/1/1998	9/30/2000
Oakland	Oakland	CA	2718	A	10/1/1998	10/15/2000
Placerville	Placerville	CA	2719	D	8/1/1999	9/30/2000
Redding	Redding	CA	2720	D	7/1/1999	9/30/2000
Sacramento	Sacramento	CA	2721	B	10/1/1998	10/15/2000
Sacramento South	Sacramento	CA	2722	C	8/1/1999	9/30/2000
San Bruno	So. San Francisco	CA	2723	C	8/24/1999	9/30/2000
San Francisco	San Francisco	CA	2724	A	10/1/1998	10/15/2000
San Francisco West	San Francisco West	CA	2725	A	10/1/1999	9/15/2000
San Jose	San Jose	CA	2726	A	10/1/1998	9/30/2000
San Leandro	Oakland	CA	2727	A	9/1/1999	9/30/2000
Santa Rosa	Santa Rosa	CA	2728	C	10/1/1998	9/30/2000
Sunnyvale	Sunnyvale	CA	2729	C	7/1/1999	9/15/2000
Lewiston	Lewiston	ID	2730	D	9/28/1999	9/30/2000
Boise	Boise	ID	2731	D	7/6/1999	9/30/2000
Beaverton	Beaverton	OR	2732	C	8/1/1999	9/15/2000
Bend	Redmond	OR	2733	D	7/1/1999	9/30/2000

See footnote at end of table.

Name	City	State	Code number	Type of office ¹	Opening date	Closing date
Seattle—Con.						
Eugene	Eugene	OR	2734	C	8/1/1999	10/15/2000
Portland	Portland	OR	2735	C	10/1/1998	9/30/2000
Salem	Salem	OR	2736	C	8/1/1999	9/15/2000
Bellevue	Bellevue	WA	2737	C	9/1/1999	9/30/1999
Everett	Everett	WA	2738	C	8/1/1999	9/15/2000
Tukwila	Tukwila	WA	2739	B	8/1/1999	9/30/2000
Olympia	Olympia	WA	2740	C	8/27/1999	9/30/2000
Richland	Richland	WA	2741	D	7/1/1999	9/15/2000
Seattle	Seattle	WA	2742	B	10/1/1998	9/30/2000
Silverdale	Silverdale	WA	2743	C	7/1/1999	9/30/2000
Spokane	Spokane	WA	2744	C	10/1/1998	10/15/2000
Tacoma	Tacoma	WA	2745	C	10/1/1998	10/15/2000
San Francisco NE	San Francisco Northeast	CA	2746	A	9/1/1999	10/15/2000
Idaho Falls	Idaho Falls	ID	2749	D	9/1/1999	9/30/2000
Mt. Vernon	Mount Vernon	WA	2750	C	8/1/1999	9/30/2000
Charlotte	Charlotte	NC	2899	RCC	1/26/1998	1/12/2002
Corbin	Corbin	KY	2811	C	7/1/1999	9/15/2000
Covington	Covington	KY	2812	C	9/22/2000	9/30/2000
Hopkinsville	Hopkinsville	KY	2814	C	7/6/1999	9/30/2000
Lexington	Lexington	KY	2815	C	9/8/1999	9/15/2000
Louisville	Louisville	KY	2816	B	10/1/1998	9/15/2000
Asheville	Asheville	NC	2817	C	8/9/1999	9/30/2000
Charlotte	Charlotte	NC	2818	C	12/1/1998	9/30/2000
Durham	Durham	NC	2819	C	12/1/1998	9/30/2000
Hickory	Hickory	NC	2820	C	9/7/1999	9/30/2000
Greensboro	Greensboro	NC	2821	C	10/6/1998	9/15/2000
Greenville East	Greenville	NC	2822	C	7/7/1999	9/30/2000
Monroe	Monroe	NC	2823	C	7/8/1999	9/30/2000
Raleigh	Raleigh	NC	2824	C	9/1/1999	9/30/2000
Greenville West	Greenville	NC	2825	C	9/1/1999	9/30/2000
Wilmington	Wilmington	NC	2827	C	7/27/1999	9/15/2000
Winston-Salem	Winston-Salem	NC	2828	C	7/15/1999	9/30/2000
Anderson	Anderson	SC	2829	C	9/13/1999	9/15/2000
Beaufort	Beaufort	SC	2830	C	11/2/1999	9/30/2000
Charleston	Charleston	SC	2831	C	9/13/1999	9/30/2000
Columbia	Columbia	SC	2832	C	10/1/1998	9/30/2000
Rock Hill	Rock Hill	SC	2833	C	10/1/1999	9/20/2000
Chattanooga	Chattanooga	TN	2835	C	7/1/1999	9/15/2000
Clarksville	Clarksville	TN	2836	C	9/9/1999	9/30/2000
Jackson	Jackson	TN	2837	C	8/16/1999	9/30/2000
Johnson City	Johnson City	TN	2838	C	7/1/1999	9/30/2000
Knoxville	Knoxville	TN	2839	C	7/1/1999	9/30/2000
Memphis	Memphis	TN	2840	A	10/2/1998	9/30/2000
Murfreesboro	Murfreesboro	TN	2841	C	10/1/1999	9/30/2000
Nashville	Nashville	TN	2842	C	10/1/1998	9/15/2000
Tullahoma	Tullahoma	TN	2843	C	7/1/1999	9/15/2000
Alexandria	Alexandria	VA	2844	B	10/1/1998	9/15/2000
Ashland	Ashland	VA	2845	C	8/16/1999	9/15/2000
Charlottesville	Charlottesville	VA	2846	C	8/1/1999	9/30/2000
Chesapeake	Chesapeake	VA	2847	C	9/1/1999	9/15/2000
Fairfax	Alexandria	VA	2848	B	8/2/1999	9/15/2000
Manassas	Manassas	VA	2849	C	8/6/1999	9/30/2000
Newport News	Newport News	VA	2850	C	9/1/1999	9/15/2000
Radford	Radford	VA	2851	C	9/1/1999	9/30/2000
Richmond	Richmond	VA	2852	A	10/1/1998	9/15/2000
Roanoke	Roanoke	VA	2853	C	8/1/1999	9/15/2000
Virginia Beach	Virginia Beach	VA	2854	C	10/1/1998	9/15/2000
Ashland	Ashland	KY	2855	C	9/10/1999	9/15/2000

See footnote at end of table.

Name	City	State	Code number	Type of office ¹	Opening date	Closing date
Charolette—Con.						
Bowling Green	Bowling Green	KY	2856	C	9/1/1999	9/30/2000
Gastonia	Gastonia	NC	2858	C	9/2/1999	9/30/2000
Salisbury	Salisbury	NC	2859	C	9/1/1999	9/30/2000
Conway	Conway	SC	2860	C	9/21/1999	9/30/2000
Florence	Florence	SC	2861	C	9/3/1999	9/30/2000
Greenville	Greenville	SC	2862	C	9/1/1999	9/15/2000
Crossville	Crossville	TN	2864	C	9/8/1999	9/15/2000
Fredericksburg	Fredericksburg	VA	2865	C	9/2/1999	9/15/2000
Atlanta	Atlanta	GA	2999	RCC	1/22/1998	1/21/2001
Birmingham	Birmingham	AL	2911	A	10/1/1998	9/15/2000
Gadsden	Gadsden	AL	2912	C	7/1/1999	9/30/2000
Huntsville	Huntsville	AL	2913	C	7/1/1999	9/30/2000
Mobile	Mobile	AL	2914	C	7/14/1999	9/30/2000
Montgomery	Montgomery	AL	2915	C	10/1/1998	9/15/2000
Opelika	Opelika	AL	2916	C	7/1/1999	10/15/2000
Tuscaloosa	Tuscaloosa	AL	2917	C	7/1/1999	10/15/2000
Delray Beach	Delray Beach	FL	2918	B	8/1/1999	10/15/2000
Bradenton	Bradenton	FL	2919	C	7/1/1999	9/30/2000
Broward Co. South	Pembroke Pines	FL	2920	C	10/1/1999	9/15/2000
Miami-Dade NE	Miami Beach	FL	2921	A	9/1/1999	10/31/2000
Homestead	Homestead	FL	2922	C	9/1/1999	9/15/2000
Daytona Beach	Daytona Beach	FL	2923	C	8/1/1999	10/15/2000
Ft. Lauderdale	Ft. Lauderdale	FL	2924	A	10/8/1998	10/15/2000
Ft. Myers	Ft. Myers	FL	2925	C	10/1/1998	9/30/2000
Ft. Pierce	Ft. Pierce	FL	2926	C	7/1/1999	10/15/2000
Gainesville	Gainesville	FL	2927	C	7/7/1999	10/15/2000
Hialeah	Hialeah	FL	2928	B	7/1/1999	10/31/2000
Hillsborough Co.	Tampa	FL	2929	B	7/1/1999	10/15/2000
Jacksonville North	Jacksonville	FL	2930	C	9/1/1999	10/15/2000
Jacksonville	Jacksonville	FL	2931	C	10/1/1998	10/15/2000
Lakeland	Lakeland	FL	2932	C	8/1/1999	9/30/2000
West-Melbourne	West-Melbourne	FL	2933	C	10/1/1998	9/30/2000
Miami	Miami	FL	2934	A	10/1/1998	10/31/2000
Miami Springs	Miami Springs	FL	2935	A	10/1/1998	10/31/2000
Ocala	Ocala	FL	2936	C	8/1/1999	10/31/2000
Orlando	Orlando	FL	2937	C	10/1/1998	10/15/2000
Lake Worth	Lake Worth	FL	2938	C	8/1/1999	9/30/2000
Pensacola	Pensacola	FL	2939	C	10/1/1998	9/30/2000
Palm Harbor	Palm Harbor	FL	2940	C	8/1/1999	10/15/2000
Clearwater	Clearwater	FL	2941	B	7/1/1999	10/15/2000
Sanford	Sanford	FL	2942	C	7/1/1999	9/30/2000
Port Charlotte	Port Charlotte	FL	2943	C	9/1/1999	10/15/2000
Tallahassee	Tallahassee	FL	2944	C	10/1/1998	10/15/2000
Tampa	Tampa	FL	2945	A	10/1/1998	10/15/2000
Albany	Albany	GA	2946	C	9/7/1999	9/30/2000
Atlanta East	Atlanta	GA	2947	A	10/1/1998	9/30/2000
Atlanta West	Atlanta	GA	2948	A	9/15/1999	10/31/2000
Augusta	Augusta	GA	2949	C	9/1/1999	9/30/2000
Decatur	Decatur	GA	2950	B	9/2/1999	9/30/2000
Newnan	Newnan	GA	2951	C	9/1/1999	9/30/2000
Gainesville	Gainesville	GA	2952	C	9/1/1999	9/30/2000
Forest Park	Forest Park	GA	2953	A	9/1/1999	9/30/2000
Duluth	Duluth	GA	2954	B	9/1/1999	9/30/2000
Macon	Macon	GA	2955	C	10/1/1998	9/30/2000
Marietta	Marietta	GA	2956	B	10/1/1998	10/15/2000
Dalton	Dalton	GA	2957	C	8/3/1999	10/15/2000
Savannah	Savannah	GA	2958	C	10/1/1999	9/15/2000
Bessemer	Bessemer	AL	2959	C	8/6/1999	10/15/2000
Florence	Florence	AL	2960	C	8/1/1999	10/15/2000

See footnote at end of table.

Name	City	State	Code number	Type of office ¹	Opening date	Closing date
Atlanta—Con.						
Brooksville	Brooksville	FL	2961	C	9/7/1999	10/15/2000
Broward County North	Sunrise	FL	2962	B	7/20/1999	10/15/2000
Athens	Bogart	GA	2963	C	8/1/1999	10/15/2000
Columbus	Columbus	GA	2964	C	10/1/1999	9/30/2000
Waycross	Waycross	GA	2965	C	9/1/1999	10/31/2000
Dallas	Dallas	TX	3099	RCC	3/15/1998	4/5/2001
Baton Rouge	Baton Rouge	LA	3011	C	9/3/1999	9/29/2000
Hammond	Hammond	LA	3012	C	10/19/1999	9/28/2000
Houma	Houma	LA	3013	C	9/1/1999	9/26/2000
Opelousas	Opelousas	LA	3014	C	10/1/1998	9/29/2000
Harahan	Harahan	LA	3015	A	8/1/1999	9/28/2000
Monroe	Monroe	LA	3016	C	7/7/1999	9/6/2000
New Orleans	New Orleans	LA	3017	A	10/1/1998	9/25/2000
Harris Co. NW	New Orleans	LA	3018	C	9/1/2000	9/30/2000
Shreveport	Shreveport	LA	3019	C	7/1/1999	9/13/2000
Biloxi/Gulfport	Gulfport	MS	3020	C	8/17/1999	9/27/2000
Greenville	Greenville	MS	3021	C	8/6/1999	9/25/2000
Jackson	Jackson	MS	3022	C	10/1/1998	9/21/2000
Meridian	Meridian	MS	3023	C	9/1/1999	9/26/2000
Tupelo	Tupelo	MS	3024	C	7/6/1999	9/21/2000
Abilene	Abilene	TX	3025	C	7/6/1999	9/28/2000
Amarillo	Amarillo	TX	3026	C	7/7/1999	9/30/2000
Austin	Austin	TX	3027	C	7/1/1999	9/29/2000
Beaumont	Beaumont	TX	3028	C	7/1/1999	9/13/2000
Bedford	Bedford/Euleess	TX	3029	B	9/1/1999	9/11/2000
College Station	College Station	TX	3030	C	7/8/1999	9/28/2000
Corpus Christi	Corpus Christi	TX	3031	C	10/1/1998	9/15/2000
Dallas	Dallas	TX	3032	A	10/1/1998	9/14/2000
Dallas County NE	Dallas	TX	3033	C	7/1/1999	9/13/2000
Dallas Co. NW	Farmers Branch	TX	3034	B	9/15/1999	9/13/2000
Dallas Co. South	Duncanville	TX	3035	C	9/7/1999	9/15/2000
El Paso	El Paso	TX	3036	D	7/23/1999	9/7/2000
Fort Worth	Fort Worth	TX	3037	C	10/1/1998	9/19/2000
Houston	Houston	TX	3038	C	10/1/1998	9/26/2000
Harris Co. NW	Houston	TX	3039	C	9/8/1999	9/29/2000
Harris Co. South	Harris Co. South	TX	3040	B	7/1/1999	9/28/2000
Houston	Houston	TX	3041	A	10/1/1998	9/25/2000
Huntsville	Huntsville	TX	3042	C	8/3/1999	9/28/2000
Laredo	Laredo	TX	3043	C	7/16/1999	9/7/2000
Longview	Longview	TX	3044	C	8/24/1999	9/29/2000
Lubbock	Lubbock	TX	3045	C	10/1/1998	9/22/2000
McAllen	McAllen	TX	3046	C	7/9/1999	9/14/2000
Stafford	Stafford	TX	3047	C	8/2/1999	9/29/2000
Plano	Plano	TX	3048	C	11/2/1998	9/21/2000
San Antonio	San Antonio	TX	3049	B	10/1/1998	9/15/2000
San Antonio East	San Antonio East	TX	3050	C	8/2/1999	9/15/2000
San Antonio North	San Antonio	TX	3051	C	8/1/1999	9/15/2000
Sherman	Sherman	TX	3052	C	9/1/1999	9/27/2000
Texas City	Texas City	TX	3053	C	7/1/1999	9/14/2000
Tyler	Tyler	TX	3054	C	10/1/1999	9/29/2000
Victoria	Victoria	TX	3055	C	10/4/1999	9/14/2000
Waco	Waco	TX	3056	C	11/1/1998	9/26/2000
Denver	Denver	CO	3199	RCC	1/28/1998	1/27/2001
Flagstaff	Flagstaff	AZ	3111	D	11/1/1999	9/30/2000
Phoenix	Phoenix	AZ	3112	D	10/19/1998	9/30/2000
Mesa	Chandler	AZ	3113	C	7/1/1999	9/30/2000

See footnote at end of table.

Name	City	State	Code number	Type of office ¹	Opening date	Closing date
Denver—Con.						
Phoenix	Phoenix	AZ	3114	A	10/1/1998	8/31/2000
Scottsdale	Phoenix	AZ	3115	D	7/1/1999	9/30/2000
Tucson (rural)	Tucson	AZ	3116	D	8/1/1999	9/30/2000
Tucson (urban)	Tucson	AZ	3117	C	8/4/1999	9/30/2000
Window Rock	Window Rock	AZ	3118	D	9/7/1999	9/30/2000
Aurora	Aurora	CO	3119	C	7/1/1999	9/30/2000
Colorado Springs	Colorado Springs	CO	3120	C	7/1/1999	9/30/2000
Denver	Denver	CO	3121	C	10/1/1998	9/30/2000
Grand Junction	Grand Junction	CO	3122	C	9/1/1999	9/30/2000
Greeley	Greeley	CO	3123	C	10/1/1998	9/30/2000
Pueblo	Pueblo	CO	3124	C	9/1/1999	9/30/2000
Westminster	Arvada	CO	3125	C	8/3/1999	9/30/2000
Billings	Billings	MT	3126	D	7/16/1999	9/30/2000
Missoula	Missoula	MT	3127	C	8/5/1999	9/30/2000
Lincoln	Lincoln	NE	3128	C	9/1/1999	9/30/2000
North Platte	North Platte	NE	3129	D	7/28/1999	9/30/2000
Omaha	Omaha	NE	3130	C	10/1/1998	9/30/2000
Henderson	Henderson	NV	3131	C	8/3/1999	9/30/2000
Las Vegas	Las Vegas	NV	3132	A	10/1/1998	9/30/2000
Reno	Reno	NV	3133	D	7/29/1999	9/30/2000
Albuquerque	Albuquerque	NM	3134	C	10/1/1998	9/30/2000
Las Cruces	Las Cruces	NM	3135	D	8/1/1999	9/30/2000
Santa Fe	Santa Fe	NM	3136	D	8/3/1999	9/30/2000
Bismarck	Bismarck	ND	3137	D	8/2/1999	9/30/2000
Fargo	Fargo	ND	3138	C	8/1/1999	9/30/2000
Rapid City	Rapid City	SD	3139	D	7/2/1999	9/30/2000
Sioux Falls	Sioux Falls	SD	3140	C	8/1/1999	9/30/2000
Ogden	Ogden	UT	3141	D	8/23/1999	9/30/2000
Provo	American Fork	UT	3142	D	7/1/1999	9/30/2000
Salt Lake City	Salt Lake City	UT	3143	C	10/1/1998	9/30/2000
Cheyenne	Cheyenne	WY	3144	D	7/8/1999	9/30/2000
Yuma	Yuma	AZ	3145	D	9/9/1999	9/30/2000
Great Falls	Great Falls	MT	3146	D	9/3/1999	9/30/2000
North Las Vegas	North Las Vegas	NV	3147	D	9/1/1999	9/30/2000
Casper	Casper	WY	3148	D	9/1/1999	9/30/2000
Los Angeles	Los Angeles	CA	3299	RCC	3/1/1998	3/17/2001
Fullerton	Fullerton	CA	3211	B	7/21/1999	9/12/2000
Bakersfield	Bakersfield	CA	3212	D	8/16/1999	9/5/2000
Commerce	Commerce	CA	3213	A	8/1/1999	9/12/2000
Glendale	Glendale	CA	3214	B	12/20/1999	9/14/2000
Compton	Compton	CA	3215	A	10/1/1998	9/14/2000
West Covina	West Covina	CA	3216	C	9/1/2000	9/13/2000
East LA/Monterey Park	Monterey Park	CA	3217	A	7/1/2000	9/12/2000
Spring Valley	Spring Valley	CA	3218	C	8/16/1999	9/13/2000
Escondido	Escondido	CA	3219	C	7/1/1999	9/13/2000
Fresno	Fresno	CA	3220	C	10/1/1998	9/1/2000
Hollywood/Mid-Wilshire	Los Angeles	CA	3221	A	7/1/1999	9/13/2000
Garden Grove	Garden Grove	CA	3222	B	7/1/1999	9/15/2000
Inglewood	Inglewood	CA	3223	A	8/2/1999	9/6/2000
Irvine	Irvine	CA	3224	C	7/1/1999	9/15/2000
Long Beach	Long Beach	CA	3225	B	10/1/1998	9/7/2000
Los Angeles	Los Angeles	CA	3226	A	10/1/1998	9/11/2000
Culver City East	Culver City	CA	3227	A	9/1/1999	9/15/2000
Salinas	Salinas	CA	3228	C	8/1/1999	9/7/2000
Vista	Vista	CA	3229	C	9/1/1999	9/14/2000
Chino	Chino	CA	3230	C	8/1/1999	9/8/2000
Palm Springs	Palm Springs	CA	3231	D	7/1/1999	9/13/2000
Victorville	Victorville	CA	3232	D	8/1/1999	9/14/2000

See footnote at end of table.

Name	City	State	Code number	Type of office ¹	Opening date	Closing date
Los Angeles—Con.						
Riverside	Riverside	CA	3233	C	10/1/1998	9/6/2000
San Bernardino	San Bernardino	CA	3234	A	10/1/1998	9/12/2000
San Diego	San Diego	CA	3235	B	10/1/1998	9/12/2000
Chula Vista	Chula Vista	CA	3236	A	10/1/1999	9/6/2000
Santa Ana	Santa Ana	CA	3237	A	10/1/1998	9/15/2000
Santa Clarita	Santa Clarita	CA	3238	C	8/1/1999	9/12/2000
Santa Maria	Santa Maria	CA	3239	C	10/1/1998	9/15/2000
Santa Monica	Los Angeles	CA	3240	B	9/16/1999	9/11/2000
Torrance	Torrance	CA	3241	C	9/1/1999	9/14/2000
Van Nuys	Van Nuys	CA	3242	A	10/1/1998	9/14/2000
Ventura	Ventura	CA	3243	C	7/1/1999	9/11/2000
Hanford	Hanford	CA	3244	C	9/1/1999	9/8/2000
Woodland Hills	Woodland Hills	CA	3245	B	9/1/1999	9/15/2000
Norwalk	Norwalk	CA	3246	B	8/1/1999	9/14/2000
Honolulu	Honolulu	HI	3247	C	10/1/1998	9/22/2000
Kailua	Kailua	HI	3248	D	7/1/1999	9/8/2000
Culver City	Culver City	CA	3249	B	9/1/1999	9/15/2000
Merced	Merced	CA	3250	D	10/4/1999	9/6/2000
Monrovia	Monrovia	CA	3251	C	9/1/1999	9/12/2000

¹For Census 2000, there were six different types of Local Census Offices (LCOs):

Type A: Located in inner-city urban areas that were among the most difficult to enumerate, these LCOs were responsible for enumerating between 121,000 and 285,000 housing units (HUs), and took the census mainly by mailout/mailback (though small areas were enumerated using urban update/leave).

Type B: Type B LCOs were situated in urban metropolitan areas, included some hard to enumerate areas, were responsible for enumerating between 300,000 and 335,000 HUs, and were generally enumerated by mailout/mailback, though some portions relied on the urban update/leave method.

Type C: Found in small cities, towns, and rural areas, these LCOs were less hard to enumerate than Types A and B above, contained between 316,000 and 325,000 HUs, and were enumerated largely by mailout/mailback and update/leave, with some areas using the update/enumerate method.

Type D: Type D LCOs were located in more remote, rural areas; update/leave and list/enumerate were the main methods of data collection, though some areas used update/enumerate.

Type E: These LCOs were assigned to Puerto Rico only; the update/leave method of enumeration was the only one used; each LCO was responsible for between 152,000 and 160,000 HUs; and the LCOs were part of the Boston Regional Census Center.

Type F: The Anchorage, AK, LCO had its own designation due to the use of a modified list/enumerate method in remote Alaska.

Appendix C: Census 2000 Full Cycle Obligations, Budget Authority, and Appropriations

(Direct obligations in thousands of current dollars)

Budget framework	1991 actual	1992 actual	1993 actual	1994 actual	1995 actual	Through 1995 total	Budget framework	1996 actual	1997 actual	1998 actual	1999 actual	2000 actual	2001 actual ²	2002 actual ²	2003 actual	2004 actual	1996 through 2003 total	1991 through 2003 total
Program development and management information	\$ 1,445	\$ 890	\$ 529	\$ 1,063	\$ 2,390	\$ 6,317	Program development and management	\$ 8,239	\$ 5,378	\$ 33,000	\$ 24,608	\$ 21,270	\$ 25,734	\$ 8,180	\$ 3,878	\$ -	\$ -	\$ -
Content requirements and public use forms	-	800	1,791	725	1,545	4,861	Data, content, and products	9,628	12,260	24,278	120,505	218,286	61,277	72,237	41,725	-	560,196	-
Test census and dress rehearsal	-	-	-	5,524	29,707	35,231	Field data collection and support systems	13,289	20,814	93,500	324,761	3,059,614	141,307	15,286	17,086	9,779	3,695,436	-
Decennial geographic support	-	520	419	-	1,267	2,206	Address list development	2,316	2,484	70,554	294,122	44,833	4,107	32	7	-	418,455	-
Evaluation and development	-	4,186	6,031	7,135	5,035	22,387	Automated data processing and telecommunications support	6,771	20,251	97,937	151,730	493,476	135,941	25,220	12,117	-	943,443	-
Address list compilation	-	1,080	992	119	-	2,191	Testing, evaluations and dress rehearsal	9,430	19,808	42,813	30,738	13,288	56,313	22,106	14,225	-	208,721	-
Stakeholder education and consultation	-	395	255	149	368	1,167	Puerto Rico, Virgin Islands, and Pacific Areas	256	861	2,436	10,792	57,417	9,663	2,667	2,519	-	86,611	-
Tabulation, publication, and data user services	-	170	-	-	-	170	Marketing, communications and partnerships	1,426	4,551	21,748	126,694	197,907	7,199	2,208	859	-	362,592	-
Automation/telecommunication support	-	1,400	3,735	4,002	621	9,758		-	-	-	-	10,453	-	-	-	-	10,453	-
Audit adjustment	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
Gross obligations	\$ 1,445	\$ 9,441	\$ 13,752	\$ 18,717	\$ 40,933	\$ 84,288		\$ 51,355	\$ 86,407	\$ 386,266	\$ 1,083,950	\$ 4,116,544	\$ 441,541	\$ 147,936	\$ 92,416	\$ 9,779	\$ 6,416,194	\$ 6,500,482
Recovery of prior year obligations	(7)	(3)	(36)	(10,747)	-	(10,793)		(908)	(769)	(380)	(2,968)	(4,897)	(69,957)	(28,306)	(7,131)	-	(115,316)	(126,109)
Unobligated balance start of year	-	(99)	(716)	-	(152)	(967)		(1,193)	(1,273)	-	(3,798)	(4,558)	(321,264)	(72,355)	(44,778)	(9,779)	(458,998)	(459,965)
Unobligated balance end of year	99	716	-	152	1,170	2,137		(429)	(255)	-	1,428	359,891	74,254	34,969	9,193	-	479,051	481,188
Refund	-	-	-	-	-	-		-	-	-	-	-	(1,144)	(8,528)	-	-	(8,078)	(8,078)
Offsetting collection	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	(9,672)	(9,672)
Budget authority available	\$ 1,537	\$ 10,055	\$ 13,000	\$ 8,122	\$ 41,951	\$ 74,665		\$ 48,625	\$ 84,110	\$ 385,886	\$ 1,078,612	\$ 4,466,980	\$ 123,430	\$ 73,716	\$ 41,622	\$ -	\$ 6,303,181	\$ 6,377,846
Transfer from other accounts (PL 105-277) Y2K	-	-	-	-	-	-		-	-	-	(10,900)	-	-	-	-	-	(10,900)	(10,900)
Transfer to other accounts (CMB and DoC IG)	-	-	-	-	-	-		-	-	4,000	4,000	3,935	3,500	-	-	-	15,435	15,435
Reprogramming (DSSR)	-	-	-	-	-	-		-	-	-	-	-	3,687	-	-	-	3,687	3,687
Appropriation	\$ 1,537	\$ 10,055	\$ 13,000	\$ 8,122	\$ 41,951	\$ 74,665		\$ 48,625	\$ 84,110	\$ 389,886	\$ 1,071,712	\$ 4,470,915	\$ 130,617	\$ 73,716	\$ 41,622	\$ -	\$ 6,311,403	\$ 6,386,068

¹ FY 2000 Reported Costs are \$4,116,544. A \$10.5 million audit adjustment for printing reveals actual costs of \$4,106,091.

² Of the \$359.9 million in FY 2000 unobligated balances, Congress allocated \$300 million to offset FY 2001 direct appropriations—\$260 million to the decennial census and \$40 million to the Suitland Federal Center. As directed in Public Law 106-553, the remaining \$59.9 million in unobligated balances not allocated by Congress required notification of Congress for allocation.

³ Of the \$74.3 million in unobligated balance at the end of FY 01, Congress allocated \$54 million to offset direct appropriations. Allocation of the remaining balance required congressional notification.

Note: Total full cycle obligations overstate the cost of Census 2000 due to: reobligation of recoveries. The following frameworks were removed from the table because they had no expenditures in this time period: precensus day operations and support systems; postcensus day operations; Puerto Rico and outlying areas; Year 2001 and beyond; cooperation with the U.S. Postal Service; follow-on surveys.

Source: U.S. Census Bureau, Budget Division

Appendix D: Census 2000 Short (100 Percent) Form

United States
**Census
2000**

U.S. Department of Commerce • Bureau of the Census



This is the official form for all the people at this address. It is quick and easy, and your answers are protected by law. Complete the Census and help your community get what it needs — today and in the future!

Start Here

Please use a black or blue pen.

1. How many people were living or staying in this house, apartment, or mobile home on April 1, 2000?

Number of people

INCLUDE in this number:

- foster children, roomers, or housemates
- people staying here on April 1, 2000 who have no other permanent place to stay
- people living here most of the time while working, even if they have another place to live

DO NOT INCLUDE in this number:

- college students living away while attending college
- people in a correctional facility, nursing home, or mental hospital on April 1, 2000
- Armed Forces personnel living somewhere else
- people who live or stay at another place most of the time

2. Is this house, apartment, or mobile home — Mark ONE box.

- Owned by you or someone in this household with a mortgage or loan?
- Owned by you or someone in this household free and clear (without a mortgage or loan)?
- Rented for cash rent?
- Occupied without payment of cash rent?

3. Please answer the following questions for each person living in this house, apartment, or mobile home. Start with the name of one of the people living here who owns, is buying, or rents this house, apartment, or mobile home. If there is no such person, start with any adult living or staying here. We will refer to this person as Person 1.

What is this person's name? Print name below.

Last Name

First Name

MI

OMB No. 0607-0856: Approval Expires 12/31/2000

Form **D-61A**

4. What is Person 1's telephone number? We may call this person if we don't understand an answer.

Area Code + Number

 - -

5. What is Person 1's sex? Mark ONE box.

Male Female

6. What is Person 1's age and what is Person 1's date of birth?

Age on April 1, 2000

Print numbers in boxes.

Month Day Year of birth

→ **NOTE: Please answer BOTH Questions 7 and 8.**

7. Is Person 1 Spanish/Hispanic/Latino? Mark the "No" box if **not** Spanish/Hispanic/Latino.

- No, not Spanish/Hispanic/Latino Yes, Puerto Rican
- Yes, Mexican, Mexican Am., Chicano Yes, Cuban
- Yes, other Spanish/Hispanic/Latino — Print group. ↗

8. What is Person 1's race? Mark one or more races to indicate what this person considers himself/herself to be.

- White
- Black, African Am., or Negro
- American Indian or Alaska Native — Print name of enrolled or principal tribe. ↗

- Asian Indian Japanese Native Hawaiian
- Chinese Korean Guamanian or Chamorro
- Filipino Vietnamese Samoan
- Other Asian — Print race. ↗ Other Pacific Islander — Print race. ↗

- Some other race — Print race. ↗

→ If more people live here, continue with Person 2.

Person 2

Your answers are important!
Every person in the Census counts.

1. What is Person 2's name? *Print name below.*

Last Name

First Name

MI

2. How is this person related to Person 1? *Mark ONE box.*

- | | |
|--|--|
| <input type="checkbox"/> Husband/wife | If NOT RELATED to Person 1: |
| <input type="checkbox"/> Natural-born son/daughter | <input type="checkbox"/> Roomer, boarder |
| <input type="checkbox"/> Adopted son/daughter | <input type="checkbox"/> Housemate, roommate |
| <input type="checkbox"/> Stepson/stepdaughter | <input type="checkbox"/> Unmarried partner |
| <input type="checkbox"/> Brother/sister | <input type="checkbox"/> Foster child |
| <input type="checkbox"/> Father/mother | <input type="checkbox"/> Other nonrelative |
| <input type="checkbox"/> Grandchild | |
| <input type="checkbox"/> Parent-in-law | |
| <input type="checkbox"/> Son-in-law/daughter-in-law | |
| <input type="checkbox"/> Other relative — <i>Print exact relationship.</i> | <input type="text"/> |

3. What is this person's sex? *Mark ONE box.*

- Male Female

4. What is this person's age and what is this person's date of birth? *Print numbers in boxes.*

Age on April 1, 2000 Month Day Year of birth

→ NOTE: Please answer BOTH Questions 5 and 6.

5. Is this person Spanish/Hispanic/Latino? *Mark the "No" box if not Spanish/Hispanic/Latino.*

- | | |
|---|--|
| <input type="checkbox"/> No, not Spanish/Hispanic/Latino | <input type="checkbox"/> Yes, Puerto Rican |
| <input type="checkbox"/> Yes, Mexican, Mexican Am., Chicano | <input type="checkbox"/> Yes, Cuban |
| <input type="checkbox"/> Yes, other Spanish/Hispanic/Latino — <i>Print group.</i> | |

6. What is this person's race? *Mark one or more races to indicate what this person considers himself/herself to be.*

- White
 Black, African Am., or Negro
 American Indian or Alaska Native — *Print name of enrolled or principal tribe.*

- | | | |
|---|-------------------------------------|--|
| <input type="checkbox"/> Asian Indian | <input type="checkbox"/> Japanese | <input type="checkbox"/> Native Hawaiian |
| <input type="checkbox"/> Chinese | <input type="checkbox"/> Korean | <input type="checkbox"/> Guamanian or Chamorro |
| <input type="checkbox"/> Filipino | <input type="checkbox"/> Vietnamese | <input type="checkbox"/> Samoan |
| <input type="checkbox"/> Other Asian — <i>Print race.</i> | | <input type="checkbox"/> Other Pacific Islander — <i>Print race.</i> |

- Some other race — *Print race.*

→ If more people live here, continue with Person 3.

Person 3

Census information helps your
community get financial
assistance for roads, hospitals,
schools, and more.

1. What is Person 3's name? *Print name below.*

Last Name

First Name

MI

2. How is this person related to Person 1? *Mark ONE box.*

- | | |
|--|--|
| <input type="checkbox"/> Husband/wife | If NOT RELATED to Person 1: |
| <input type="checkbox"/> Natural-born son/daughter | <input type="checkbox"/> Roomer, boarder |
| <input type="checkbox"/> Adopted son/daughter | <input type="checkbox"/> Housemate, roommate |
| <input type="checkbox"/> Stepson/stepdaughter | <input type="checkbox"/> Unmarried partner |
| <input type="checkbox"/> Brother/sister | <input type="checkbox"/> Foster child |
| <input type="checkbox"/> Father/mother | <input type="checkbox"/> Other nonrelative |
| <input type="checkbox"/> Grandchild | |
| <input type="checkbox"/> Parent-in-law | |
| <input type="checkbox"/> Son-in-law/daughter-in-law | |
| <input type="checkbox"/> Other relative — <i>Print exact relationship.</i> | <input type="text"/> |

3. What is this person's sex? *Mark ONE box.*

- Male Female

4. What is this person's age and what is this person's date of birth? *Print numbers in boxes.*

Age on April 1, 2000 Month Day Year of birth

→ NOTE: Please answer BOTH Questions 5 and 6.

5. Is this person Spanish/Hispanic/Latino? *Mark the "No" box if not Spanish/Hispanic/Latino.*

- | | |
|---|--|
| <input type="checkbox"/> No, not Spanish/Hispanic/Latino | <input type="checkbox"/> Yes, Puerto Rican |
| <input type="checkbox"/> Yes, Mexican, Mexican Am., Chicano | <input type="checkbox"/> Yes, Cuban |
| <input type="checkbox"/> Yes, other Spanish/Hispanic/Latino — <i>Print group.</i> | |

6. What is this person's race? *Mark one or more races to indicate what this person considers himself/herself to be.*

- White
 Black, African Am., or Negro
 American Indian or Alaska Native — *Print name of enrolled or principal tribe.*

- | | | |
|---|-------------------------------------|--|
| <input type="checkbox"/> Asian Indian | <input type="checkbox"/> Japanese | <input type="checkbox"/> Native Hawaiian |
| <input type="checkbox"/> Chinese | <input type="checkbox"/> Korean | <input type="checkbox"/> Guamanian or Chamorro |
| <input type="checkbox"/> Filipino | <input type="checkbox"/> Vietnamese | <input type="checkbox"/> Samoan |
| <input type="checkbox"/> Other Asian — <i>Print race.</i> | | <input type="checkbox"/> Other Pacific Islander — <i>Print race.</i> |

- Some other race — *Print race.*

→ If more people live here, continue with Person 4.

Person 4

Information about children helps your community plan for child care, education, and recreation.



1. What is Person 4's name? Print name below.

Last Name

First Name

MI

2. How is this person related to Person 1? Mark ONE box.

- | | |
|---|--|
| <input type="checkbox"/> Husband/wife | If NOT RELATED to Person 1: |
| <input type="checkbox"/> Natural-born son/daughter | <input type="checkbox"/> Roomer, boarder |
| <input type="checkbox"/> Adopted son/daughter | <input type="checkbox"/> Housemate, roommate |
| <input type="checkbox"/> Stepson/stepdaughter | <input type="checkbox"/> Unmarried partner |
| <input type="checkbox"/> Brother/sister | <input type="checkbox"/> Foster child |
| <input type="checkbox"/> Father/mother | <input type="checkbox"/> Other nonrelative |
| <input type="checkbox"/> Grandchild | |
| <input type="checkbox"/> Parent-in-law | |
| <input type="checkbox"/> Son-in-law/daughter-in-law | |
| <input type="checkbox"/> Other relative — Print exact relationship. → | <input type="text"/> |

3. What is this person's sex? Mark ONE box.

- Male Female

4. What is this person's age and what is this person's date of birth? Print numbers in boxes.

Age on April 1, 2000 Month Day Year of birth

→ NOTE: Please answer BOTH Questions 5 and 6.

5. Is this person Spanish/Hispanic/Latino? Mark the "No" box if not Spanish/Hispanic/Latino.

- No, not Spanish/Hispanic/Latino Yes, Puerto Rican
 Yes, Mexican, Mexican Am., Chicano Yes, Cuban
 Yes, other Spanish/Hispanic/Latino — Print group. ↘

6. What is this person's race? Mark one or more races to indicate what this person considers himself/herself to be.

- White
 Black, African Am., or Negro
 American Indian or Alaska Native — Print name of enrolled or principal tribe. ↘

- | | | |
|--|---|--|
| <input type="checkbox"/> Asian Indian | <input type="checkbox"/> Japanese | <input type="checkbox"/> Native Hawaiian |
| <input type="checkbox"/> Chinese | <input type="checkbox"/> Korean | <input type="checkbox"/> Guamanian or Chamorro |
| <input type="checkbox"/> Filipino | <input type="checkbox"/> Vietnamese | <input type="checkbox"/> Samoan |
| <input type="checkbox"/> Other Asian — Print race. ↘ | <input type="checkbox"/> Other Pacific Islander — Print race. ↘ | |

- Some other race — Print race. ↘

→ If more people live here, continue with Person 5.

Person 5

Knowing about age, race, and sex helps your community better meet the needs of everyone.



1. What is Person 5's name? Print name below.

Last Name

First Name

MI

2. How is this person related to Person 1? Mark ONE box.

- | | |
|---|--|
| <input type="checkbox"/> Husband/wife | If NOT RELATED to Person 1: |
| <input type="checkbox"/> Natural-born son/daughter | <input type="checkbox"/> Roomer, boarder |
| <input type="checkbox"/> Adopted son/daughter | <input type="checkbox"/> Housemate, roommate |
| <input type="checkbox"/> Stepson/stepdaughter | <input type="checkbox"/> Unmarried partner |
| <input type="checkbox"/> Brother/sister | <input type="checkbox"/> Foster child |
| <input type="checkbox"/> Father/mother | <input type="checkbox"/> Other nonrelative |
| <input type="checkbox"/> Grandchild | |
| <input type="checkbox"/> Parent-in-law | |
| <input type="checkbox"/> Son-in-law/daughter-in-law | |
| <input type="checkbox"/> Other relative — Print exact relationship. → | <input type="text"/> |

3. What is this person's sex? Mark ONE box.

- Male Female

4. What is this person's age and what is this person's date of birth? Print numbers in boxes.

Age on April 1, 2000 Month Day Year of birth

→ NOTE: Please answer BOTH Questions 5 and 6.

5. Is this person Spanish/Hispanic/Latino? Mark the "No" box if not Spanish/Hispanic/Latino.

- No, not Spanish/Hispanic/Latino Yes, Puerto Rican
 Yes, Mexican, Mexican Am., Chicano Yes, Cuban
 Yes, other Spanish/Hispanic/Latino — Print group. ↘

6. What is this person's race? Mark one or more races to indicate what this person considers himself/herself to be.

- White
 Black, African Am., or Negro
 American Indian or Alaska Native — Print name of enrolled or principal tribe. ↘

- | | | |
|--|---|--|
| <input type="checkbox"/> Asian Indian | <input type="checkbox"/> Japanese | <input type="checkbox"/> Native Hawaiian |
| <input type="checkbox"/> Chinese | <input type="checkbox"/> Korean | <input type="checkbox"/> Guamanian or Chamorro |
| <input type="checkbox"/> Filipino | <input type="checkbox"/> Vietnamese | <input type="checkbox"/> Samoan |
| <input type="checkbox"/> Other Asian — Print race. ↘ | <input type="checkbox"/> Other Pacific Islander — Print race. ↘ | |

- Some other race — Print race. ↘

→ If more people live here, continue with Person 6.



Person 6

Your answers help
your community plan
for the future.



1. What is Person 6's name? Print name below.

Last Name

First Name

MI

2. How is this person related to Person 1? Mark ONE box.

- | | |
|---|--|
| <input type="checkbox"/> Husband/wife | If NOT RELATED to Person 1: |
| <input type="checkbox"/> Natural-born son/daughter | <input type="checkbox"/> Roomer, boarder |
| <input type="checkbox"/> Adopted son/daughter | <input type="checkbox"/> Housemate, roommate |
| <input type="checkbox"/> Stepson/stepdaughter | <input type="checkbox"/> Unmarried partner |
| <input type="checkbox"/> Brother/sister | <input type="checkbox"/> Foster child |
| <input type="checkbox"/> Father/mother | <input type="checkbox"/> Other nonrelative |
| <input type="checkbox"/> Grandchild | |
| <input type="checkbox"/> Parent-in-law | |
| <input type="checkbox"/> Son-in-law/daughter-in-law | |
| <input type="checkbox"/> Other relative — Print exact relationship. → | <input type="text"/> |

3. What is this person's sex? Mark ONE box.

- Male Female

4. What is this person's age and what is this person's date of birth? Print numbers in boxes.

Age on April 1, 2000 Month Day Year of birth

→ **NOTE: Please answer BOTH Questions 5 and 6.**

5. Is this person Spanish/Hispanic/Latino? Mark the "No" box if not Spanish/Hispanic/Latino.

- No, not Spanish/Hispanic/Latino Yes, Puerto Rican
 Yes, Mexican, Mexican Am., Chicano Yes, Cuban
 Yes, other Spanish/Hispanic/Latino — Print group. ↗

6. What is this person's race? Mark one or more races to indicate what this person considers himself/herself to be.

- White
 Black, African Am., or Negro
 American Indian or Alaska Native — Print name of enrolled or principal tribe. ↗

- Asian Indian Japanese Native Hawaiian
 Chinese Korean Guamanian or Chamorro
 Filipino Vietnamese Samoan
 Other Asian — Print race. ↗ Other Pacific Islander — Print race. ↗

- Some other race — Print race. ↗

→ **If more people live here, list their names on the back of this page in the spaces provided.**

**Please turn
to go to last
page.**

Form D-61A

Persons 7 – 12

If you didn't have room to list everyone who lives in this house or apartment, please list the others below. You may be contacted by the Census Bureau for the same information about these people.

Person 7 — Last Name

First Name MI

Person 8 — Last Name

First Name MI

Person 9 — Last Name

First Name MI

Person 10 — Last Name

First Name MI

Person 11 — Last Name

First Name MI

Person 12 — Last Name

First Name MI

The Census Bureau estimates that, for the average household, this form will take about 10 minutes to complete, including the time for reviewing the instructions and answers. Comments about the estimate should be directed to the Associate Director for Finance and Administration, Attn: Paperwork Reduction Project 0607-0856, Room 3104, Federal Building 3, Bureau of the Census, Washington, DC 20233.

Respondents are not required to respond to any information collection unless it displays a valid approval number from the Office of Management and Budget.

**Thank you for
completing your official
U.S. Census 2000 form.**

The "Informational Copy" shows the content of the United States Census 2000 "short" form questionnaire. Each household will receive either a short form (100-percent questions) or a long form (100-percent and sample questions). The short form questionnaire contains 6 population questions and 1 housing question. On average, about 5 in every 6 households will receive the short form. The content of the forms resulted from reviewing the 1990 census data, consulting with federal and non-federal data users, and conducting tests.

For additional information about Census 2000, visit our website at **www.census.gov** or write to the Director, Bureau of the Census, Washington, DC 20233.

FOR OFFICE USE ONLY

A. JIC1 **B. JIC2** **C. JIC3** **D. JIC4**

--	--	--	--

Appendix E: Census 2000 Long (Sample) Form

United States
**Census
2000**

U.S. Department of Commerce
Bureau of the Census



This is the official form for all the people at this address. It is quick and easy, and your answers are protected by law. Complete the Census and help your community get what it needs — today and in the future!

Start Here Please use a black or blue pen.

- 1** How many people were living or staying in this house, apartment, or mobile home on April 1, 2000?

Number of people

INCLUDE in this number:

- foster children, roomers, or housemates
- people staying here on April 1, 2000 who have no other permanent place to stay
- people living here most of the time while working, even if they have another place to live

DO NOT INCLUDE in this number:

- college students living away while attending college
- people in a correctional facility, nursing home, or mental hospital on April 1, 2000
- Armed Forces personnel living somewhere else
- people who live or stay at another place most of the time

- ➔** Please turn the page and print the names of all the people living or staying here on April 1, 2000.



If you need help completing this form, call 1-800-471-9424 between 8:00 a.m. and 9:00 p.m., 7 days a week. The telephone call is free.

TDD – Telephone display device for the hearing impaired. Call 1-800-582-8330 between 8:00 a.m. and 9:00 p.m., 7 days a week. The telephone call is free.

¿NECESITA AYUDA? Si usted necesita ayuda para completar este cuestionario llame al 1-800-471-8642 entre las 8:00 a.m. y las 9:00 p.m., 7 días a la semana. La llamada telefónica es gratis.

The Census Bureau estimates that, for the average household, this form will take about 38 minutes to complete, including the time for reviewing the instructions and answers. Comments about the estimate should be directed to the Associate Director for Finance and Administration, Attn: Paperwork Reduction Project 0607-0856, Room 3104, Federal Building 3, Bureau of the Census, Washington, DC 20233.

Respondents are not required to respond to any information collection unless it displays a valid approval number from the Office of Management and Budget.

OMB No. 0607-0856: Approval Expires 12/31/2000

Form **D-2**

List of Persons

➔ Please be sure you answered question 1 on the front page before continuing.

2 Please print the names of all the people who you indicated in question 1 were living or staying here on April 1, 2000.

Example — Last Name

J O H N S O N

First Name MI

R O B I N J

Start with the person, or one of the people living here who owns, is buying, or rents this house, apartment, or mobile home. If there is no such person, start with any adult living or staying here.

Person 1 — Last Name

First Name MI

Person 2 — Last Name

First Name MI

Person 3 — Last Name

First Name MI

Person 4 — Last Name

First Name MI

Person 5 — Last Name

First Name MI

Person 6 — Last Name

First Name MI

Person 7 — Last Name

First Name MI

Person 8 — Last Name

First Name MI

Person 9 — Last Name

First Name MI

Person 10 — Last Name

First Name MI

Person 11 — Last Name

First Name MI

Person 12 — Last Name

First Name MI

➔ Next, answer questions about Person 1.

FOR OFFICE USE ONLY

A. JIC1

□ □

B. JIC2

□ □

C. JIC3

□ □

D. JIC4

□ □

Person 1 (continued)

8 b. What grade or level was this person attending?

Mark ONE box.

- Nursery school, preschool
- Kindergarten
- Grade 1 to grade 4
- Grade 5 to grade 8
- Grade 9 to grade 12
- College undergraduate years (freshman to senior)
- Graduate or professional school (for example: medical, dental, or law school)

9 What is the highest degree or level of school this person has COMPLETED? Mark ONE box.
If currently enrolled, mark the previous grade or highest degree received.

- No schooling completed
- Nursery school to 4th grade
- 5th grade or 6th grade
- 7th grade or 8th grade
- 9th grade
- 10th grade
- 11th grade
- 12th grade, **NO DIPLOMA**
- HIGH SCHOOL GRADUATE** — high school DIPLOMA or the equivalent (for example: GED)
- Some college credit, but less than 1 year
- 1 or more years of college, no degree
- Associate degree (for example: AA, AS)
- Bachelor's degree (for example: BA, AB, BS)
- Master's degree (for example: MA, MS, MEng, MEd, MSW, MBA)
- Professional degree (for example: MD, DDS, DVM, LLB, JD)
- Doctorate degree (for example: PhD, EdD)

10 What is this person's ancestry or ethnic origin?

(For example: Italian, Jamaican, African Am., Cambodian, Cape Verdean, Norwegian, Dominican, French Canadian, Haitian, Korean, Lebanese, Polish, Nigerian, Mexican, Taiwanese, Ukrainian, and so on.)

11 a. Does this person speak a language other than English at home?

- Yes
- No → Skip to 12

b. What is this language?

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

(For example: Korean, Italian, Spanish, Vietnamese)

c. How well does this person speak English?

- Very well
- Well
- Not well
- Not at all

12 Where was this person born?

- In the United States — Print name of state.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

- Outside the United States — Print name of foreign country, or Puerto Rico, Guam, etc.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

13 Is this person a CITIZEN of the United States?

- Yes, born in the United States → Skip to 15a
- Yes, born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas
- Yes, born abroad of American parent or parents
- Yes, a U.S. citizen by naturalization
- No, not a citizen of the United States

14 When did this person come to live in the United States? Print numbers in boxes.

Year

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

15 a. Did this person live in this house or apartment 5 years ago (on April 1, 1995)?

- Person is under 5 years old → Skip to 33
- Yes, this house → Skip to 16
- No, outside the United States — Print name of foreign country, or Puerto Rico, Guam, etc., below; then skip to 16.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

- No, different house in the United States

Person 1 (continued)

15 b. Where did this person live 5 years ago?

Name of city, town, or post office

Did this person live inside the limits of the city or town?

- Yes
 No, outside the city/town limits

Name of county

Name of state

ZIP Code

16 Does this person have any of the following long-lasting conditions:

- | | Yes | No |
|--|--------------------------|--------------------------|
| a. Blindness, deafness, or a severe vision or hearing impairment? | <input type="checkbox"/> | <input type="checkbox"/> |
| b. A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying? | <input type="checkbox"/> | <input type="checkbox"/> |

17 Because of a physical, mental, or emotional condition lasting 6 months or more, does this person have any difficulty in doing any of the following activities:

- | | Yes | No |
|--|--------------------------|--------------------------|
| a. Learning, remembering, or concentrating? | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Dressing, bathing, or getting around inside the home? | <input type="checkbox"/> | <input type="checkbox"/> |
| c. (Answer if this person is 16 YEARS OLD OR OVER.) Going outside the home alone to shop or visit a doctor's office? | <input type="checkbox"/> | <input type="checkbox"/> |
| d. (Answer if this person is 16 YEARS OLD OR OVER.) Working at a job or business? | <input type="checkbox"/> | <input type="checkbox"/> |

18 Was this person under 15 years of age on April 1, 2000?

- Yes → Skip to 33
 No

19 a. Does this person have any of his/her own grandchildren under the age of 18 living in this house or apartment?

- Yes
 No → Skip to 20a

b. Is this grandparent currently responsible for most of the basic needs of any grandchild(ren) under the age of 18 who live(s) in this house or apartment?

- Yes
 No → Skip to 20a

c. How long has this grandparent been responsible for the(se) grandchild(ren)? If the grandparent is financially responsible for more than one grandchild, answer the question for the grandchild for whom the grandparent has been responsible for the longest period of time.

- Less than 6 months
 6 to 11 months
 1 or 2 years
 3 or 4 years
 5 years or more

20 a. Has this person ever served on active duty in the U.S. Armed Forces, military Reserves, or National Guard? Active duty does not include training for the Reserves or National Guard, but DOES include activation, for example, for the Persian Gulf War.

- Yes, now on active duty
 Yes, on active duty in past, but not now
 No, training for Reserves or National Guard only → Skip to 21
 No, never served in the military → Skip to 21

b. When did this person serve on active duty in the U.S. Armed Forces? Mark (X) a box for EACH period in which this person served.

- April 1995 or later
 August 1990 to March 1995 (including Persian Gulf War)
 September 1980 to July 1990
 May 1975 to August 1980
 Vietnam era (August 1964—April 1975)
 February 1955 to July 1964
 Korean conflict (June 1950—January 1955)
 World War II (September 1940—July 1947)
 Some other time

c. In total, how many years of active-duty military service has this person had?

- Less than 2 years
 2 years or more



Person 1 (continued)

31 c. **Interest, dividends, net rental income, royalty income, or income from estates and trusts** — Report even small amounts credited to an account.

Yes Annual amount — Dollars
\$ | | | , | | | .00 Loss

No

d. Social Security or Railroad Retirement

Yes Annual amount — Dollars
\$ | | | , | | | .00

No

e. Supplemental Security Income (SSI)

Yes Annual amount — Dollars
\$ | | | , | | | .00

No

f. Any public assistance or welfare payments from the state or local welfare office

Yes Annual amount — Dollars
\$ | | | , | | | .00

No

g. Retirement, survivor, or disability pensions — Do NOT include Social Security.

Yes Annual amount — Dollars
\$ | | | , | | | .00

No

h. Any other sources of income received regularly such as Veterans' (VA) payments, unemployment compensation, child support, or alimony — Do NOT include lump-sum payments such as money from an inheritance or sale of a home.

Yes Annual amount — Dollars
\$ | | | , | | | .00

No

32 **What was this person's total income in 1999?** Add entries in questions 31a—31h; subtract any losses. If net income was a loss, enter the amount and mark (X) the "Loss" box next to the dollar amount.

Annual amount — Dollars
 None OR \$ | | | , | | | .00 Loss

→ **Now, please answer questions 33—53 about your household.**

33 **Is this house, apartment, or mobile home** —

- Owned by you or someone in this household with a mortgage or loan?
- Owned by you or someone in this household free and clear (without a mortgage or loan)?
- Rented for cash rent?
- Occupied without payment of cash rent?

34 **Which best describes this building?** Include all apartments, flats, etc., even if vacant.

- A mobile home
- A one-family house detached from any other house
- A one-family house attached to one or more houses
- A building with 2 apartments
- A building with 3 or 4 apartments
- A building with 5 to 9 apartments
- A building with 10 to 19 apartments
- A building with 20 to 49 apartments
- A building with 50 or more apartments
- Boat, RV, van, etc.

35 **About when was this building first built?**

- 1999 or 2000
- 1995 to 1998
- 1990 to 1994
- 1980 to 1989
- 1970 to 1979
- 1960 to 1969
- 1950 to 1959
- 1940 to 1949
- 1939 or earlier

36 **When did this person move into this house, apartment, or mobile home?**

- 1999 or 2000
- 1995 to 1998
- 1990 to 1994
- 1980 to 1989
- 1970 to 1979
- 1969 or earlier

37 **How many rooms do you have in this house, apartment, or mobile home?** Do NOT count bathrooms, porches, balconies, foyers, halls, or half-rooms.

- | | |
|----------------------------------|--|
| <input type="checkbox"/> 1 room | <input type="checkbox"/> 6 rooms |
| <input type="checkbox"/> 2 rooms | <input type="checkbox"/> 7 rooms |
| <input type="checkbox"/> 3 rooms | <input type="checkbox"/> 8 rooms |
| <input type="checkbox"/> 4 rooms | <input type="checkbox"/> 9 or more rooms |
| <input type="checkbox"/> 5 rooms | |

Person 1 (continued)

38 How many bedrooms do you have; that is, how many bedrooms would you list if this house, apartment, or mobile home were on the market for sale or rent?

- No bedroom
- 1 bedroom
- 2 bedrooms
- 3 bedrooms
- 4 bedrooms
- 5 or more bedrooms

39 Do you have COMPLETE plumbing facilities in this house, apartment, or mobile home; that is, 1) hot and cold piped water, 2) a flush toilet, and 3) a bathtub or shower?

- Yes, have all three facilities
- No

40 Do you have COMPLETE kitchen facilities in this house, apartment, or mobile home; that is, 1) a sink with piped water, 2) a range or stove, and 3) a refrigerator?

- Yes, have all three facilities
- No

41 Is there telephone service available in this house, apartment, or mobile home from which you can both make and receive calls?

- Yes
- No

42 Which FUEL is used MOST for heating this house, apartment, or mobile home?

- Gas: from underground pipes serving the neighborhood
- Gas: bottled, tank, or LP
- Electricity
- Fuel oil, kerosene, etc.
- Coal or coke
- Wood
- Solar energy
- Other fuel
- No fuel used

43 How many automobiles, vans, and trucks of one-ton capacity or less are kept at home for use by members of your household?

- None
- 1
- 2
- 3
- 4
- 5
- 6 or more

44 Answer ONLY if this is a ONE-FAMILY HOUSE OR MOBILE HOME — All others skip to 45.

a. Is there a business (such as a store or barber shop) or a medical office on this property?

- Yes
- No

b. How many acres is this house or mobile home on?

- Less than 1 acre → Skip to 45
- 1 to 9.9 acres
- 10 or more acres

c. In 1999, what were the actual sales of all agricultural products from this property?

- None
- \$1 to \$999
- \$1,000 to \$2,499
- \$2,500 to \$4,999
- \$5,000 to \$9,999
- \$10,000 or more

45 What are the annual costs of utilities and fuels for this house, apartment, or mobile home? If you have lived here less than 1 year, estimate the annual cost.

a. Electricity

Annual cost — Dollars

\$ | , | | .00

OR

- Included in rent or in condominium fee
- No charge or electricity not used

b. Gas

Annual cost — Dollars

\$ | , | | .00

OR

- Included in rent or in condominium fee
- No charge or gas not used

c. Water and sewer

Annual cost — Dollars

\$ | , | | .00

OR

- Included in rent or in condominium fee
- No charge

d. Oil, coal, kerosene, wood, etc.

Annual cost — Dollars

\$ | , | | .00

OR

- Included in rent or in condominium fee
- No charge or these fuels not used



Person 1 (continued)

46 Answer **ONLY** if you **PAY RENT** for this house, apartment, or mobile home — All others skip to 47.

a. What is the monthly rent?

Monthly amount — *Dollars*

\$ | | , | | .00

b. Does the monthly rent include any meals?

- Yes
- No

47 Answer questions 47a—53 if you or someone in this household owns or is buying this house, apartment, or mobile home; otherwise, skip to questions for Person 2.

a. Do you have a mortgage, deed of trust, contract to purchase, or similar debt on THIS property?

- Yes, mortgage, deed of trust, or similar debt
- Yes, contract to purchase
- No → *Skip to 48a*

b. How much is your regular monthly mortgage payment on THIS property? Include payment only on first mortgage or contract to purchase.

Monthly amount — *Dollars*

\$ | | , | | .00

OR

No regular payment required → *Skip to 48a*

c. Does your regular monthly mortgage payment include payments for real estate taxes on THIS property?

- Yes, taxes included in mortgage payment
- No, taxes paid separately or taxes not required

d. Does your regular monthly mortgage payment include payments for fire, hazard, or flood insurance on THIS property?

- Yes, insurance included in mortgage payment
- No, insurance paid separately or no insurance

48 **a. Do you have a second mortgage or a home equity loan on THIS property? Mark all boxes that apply.**

- Yes, a second mortgage
- Yes, a home equity loan
- No → *Skip to 49*

b. How much is your regular monthly payment on all second or junior mortgages and all home equity loans on THIS property?

Monthly amount — *Dollars*

\$ | | , | | .00

OR

No regular payment required

49 What were the real estate taxes on THIS property last year?

Yearly amount — *Dollars*

\$ | | , | | .00

OR

None

50 What was the annual payment for fire, hazard, and flood insurance on THIS property?

Annual amount — *Dollars*

\$ | | , | | .00

OR

None

51 What is the value of this property; that is, how much do you think this house and lot, apartment, or mobile home and lot would sell for if it were for sale?

- | | |
|---|---|
| <input type="checkbox"/> Less than \$10,000 | <input type="checkbox"/> \$90,000 to \$99,999 |
| <input type="checkbox"/> \$10,000 to \$14,999 | <input type="checkbox"/> \$100,000 to \$124,999 |
| <input type="checkbox"/> \$15,000 to \$19,999 | <input type="checkbox"/> \$125,000 to \$149,999 |
| <input type="checkbox"/> \$20,000 to \$24,999 | <input type="checkbox"/> \$150,000 to \$174,999 |
| <input type="checkbox"/> \$25,000 to \$29,999 | <input type="checkbox"/> \$175,000 to \$199,999 |
| <input type="checkbox"/> \$30,000 to \$34,999 | <input type="checkbox"/> \$200,000 to \$249,999 |
| <input type="checkbox"/> \$35,000 to \$39,999 | <input type="checkbox"/> \$250,000 to \$299,999 |
| <input type="checkbox"/> \$40,000 to \$49,999 | <input type="checkbox"/> \$300,000 to \$399,999 |
| <input type="checkbox"/> \$50,000 to \$59,999 | <input type="checkbox"/> \$400,000 to \$499,999 |
| <input type="checkbox"/> \$60,000 to \$69,999 | <input type="checkbox"/> \$500,000 to \$749,999 |
| <input type="checkbox"/> \$70,000 to \$79,999 | <input type="checkbox"/> \$750,000 to \$999,999 |
| <input type="checkbox"/> \$80,000 to \$89,999 | <input type="checkbox"/> \$1,000,000 or more |

52 Answer **ONLY** if this is a **CONDOMINIUM** — What is the monthly condominium fee?

Monthly amount — *Dollars*

\$ | | , | | .00

53 Answer **ONLY** if this is a **MOBILE HOME** —

a. Do you have an installment loan or contract on THIS mobile home?

- Yes
- No

b. What was the total cost for installment loan payments, personal property taxes, site rent, registration fees, and license fees on THIS mobile home and its site last year? Exclude real estate taxes.

Yearly amount — *Dollars*

\$ | | , | | .00

→ Are there more people living here? If yes, continue with Person 2.

Person

2



Census information helps your community get financial assistance for roads, hospitals, schools and more.

1 What is this person's name? Print the name of Person 2 from page 2.

Last Name

First Name

MI

2 How is this person related to Person 1? Mark ONE box.

- Husband/wife
- Natural-born son/daughter
- Adopted son/daughter
- Stepson/stepdaughter
- Brother/sister
- Father/mother
- Grandchild
- Parent-in-law
- Son-in-law/daughter-in-law
- Other relative — Print exact relationship.

If NOT RELATED to Person 1:

- Roomer, boarder
- Housemate, roommate
- Unmarried partner
- Foster child
- Other nonrelative

3 What is this person's sex? Mark ONE box.

- Male
- Female

4 What is this person's age and what is this person's date of birth?

Age on April 1, 2000

Print numbers in boxes.

Month Day Year of birth

NOTE: Please answer BOTH Questions 5 and 6.

5 Is this person Spanish/Hispanic/Latino? Mark the "No" box if **not** Spanish/Hispanic/Latino.

- No, not Spanish/Hispanic/Latino
- Yes, Mexican, Mexican Am., Chicano
- Yes, Puerto Rican
- Yes, Cuban
- Yes, other Spanish/Hispanic/Latino — Print group. ↘

6 What is this person's race? Mark one or more races to indicate what this person considers himself/herself to be.

- White
- Black, African Am., or Negro
- American Indian or Alaska Native — Print name of enrolled or principal tribe. ↘

- Asian Indian
- Chinese
- Filipino
- Japanese
- Korean
- Vietnamese
- Other Asian — Print race. ↘
- Native Hawaiian
- Guamanian or Chamorro
- Samoan
- Other Pacific Islander — Print race. ↘

- Some other race — Print race. ↘

7 What is this person's marital status?

- Now married
- Widowed
- Divorced
- Separated
- Never married



Person 2 (continued)

31 c. Interest, dividends, net rental income, royalty income, or income from estates and trusts — Report even small amounts credited to an account.

Yes Annual amount — Dollars
 \$ | | | , | | | .00 Loss

No

d. Social Security or Railroad Retirement

Yes Annual amount — Dollars
 \$ | | | , | | | .00

No

e. Supplemental Security Income (SSI)

Yes Annual amount — Dollars
 \$ | | | , | | | .00

No

f. Any public assistance or welfare payments from the state or local welfare office

Yes Annual amount — Dollars
 \$ | | | , | | | .00

No

g. Retirement, survivor, or disability pensions — Do NOT include Social Security.

Yes Annual amount — Dollars
 \$ | | | , | | | .00

No

h. Any other sources of income received regularly such as Veterans' (VA) payments, unemployment compensation, child support, or alimony — Do NOT include lump-sum payments such as money from an inheritance or sale of a home.

Yes Annual amount — Dollars
 \$ | | | , | | | .00

No

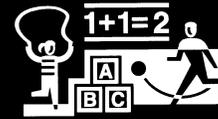
32 What was this person's total income in 1999? Add entries in questions 31a—31h; subtract any losses. If net income was a loss, enter the amount and mark the "Loss" box next to the dollar amount.

Annual amount — Dollars
 None OR \$ | | | , | | | .00 Loss

33 Are there more people living here? If yes, continue with Person 3.

Person

3



Information about children helps your community plan for child care, education, and recreation.

1 What is this person's name? Print the name of Person 3 from page 2.

Last Name

 First Name _____ MI _____

2 How is this person related to Person 1? Mark ONE box.

- Husband/wife
- Natural-born son/daughter
- Adopted son/daughter
- Stepson/stepdaughter
- Brother/sister
- Father/mother
- Grandchild
- Parent-in-law
- Son-in-law/daughter-in-law
- Other relative — Print exact relationship.

If NOT RELATED to Person 1:

- Roomer, boarder
- Housemate, roommate
- Unmarried partner
- Foster child
- Other nonrelative

3 What is this person's sex? Mark ONE box.

- Male
- Female

4 What is this person's age and what is this person's date of birth?

Age on April 1, 2000

 Print numbers in boxes.
 Month Day Year of birth

Person 3 (continued)

11 a. Does this person speak a language other than English at home?

- Yes
- No → *Skip to 12*

b. What is this language?

(For example: Korean, Italian, Spanish, Vietnamese)

c. How well does this person speak English?

- Very well
- Well
- Not well
- Not at all

12 Where was this person born?

- In the United States — *Print name of state.*

- Outside the United States — *Print name of foreign country, or Puerto Rico, Guam, etc.*

13 Is this person a CITIZEN of the United States?

- Yes, born in the United States → *Skip to 15a*
- Yes, born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas
- Yes, born abroad of American parent or parents
- Yes, a U.S. citizen by naturalization
- No, not a citizen of the United States

14 When did this person come to live in the United States? *Print numbers in boxes.*

Year

15 a. Did this person live in this house or apartment 5 years ago (on April 1, 1995)?

- Person is under 5 years old → *Skip to 33*
- Yes, this house → *Skip to 16*
- No, outside the United States — *Print name of foreign country, or Puerto Rico, Guam, etc., below; then skip to 16.*

- No, different house in the United States

15 b. Where did this person live 5 years ago?

Name of city, town, or post office

Did this person live inside the limits of the city or town?

- Yes
- No, outside the city/town limits

Name of county

Name of state

ZIP Code

16 Does this person have any of the following long-lasting conditions:

- | | Yes | No |
|--|--------------------------|--------------------------|
| a. Blindness, deafness, or a severe vision or hearing impairment? | <input type="checkbox"/> | <input type="checkbox"/> |
| b. A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying? | <input type="checkbox"/> | <input type="checkbox"/> |

17 Because of a physical, mental, or emotional condition lasting 6 months or more, does this person have any difficulty in doing any of the following activities:

- | | Yes | No |
|--|--------------------------|--------------------------|
| a. Learning, remembering, or concentrating? | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Dressing, bathing, or getting around inside the home? | <input type="checkbox"/> | <input type="checkbox"/> |
| c. (Answer if this person is 16 YEARS OLD OR OVER.) Going outside the home alone to shop or visit a doctor's office? | <input type="checkbox"/> | <input type="checkbox"/> |
| d. (Answer if this person is 16 YEARS OLD OR OVER.) Working at a job or business? | <input type="checkbox"/> | <input type="checkbox"/> |

18 Was this person under 15 years of age on April 1, 2000?

- Yes → *Skip to 33*
- No

Person 4 (continued)

8 a. At any time since February 1, 2000, has this person attended regular school or college? *Include only nursery school or preschool, kindergarten, elementary school, and schooling which leads to a high school diploma or a college degree.*

- No, has not attended since February 1 → *Skip to 9*
- Yes, public school, public college
- Yes, private school, private college

b. What grade or level was this person attending? *Mark ONE box.*

- Nursery school, preschool
- Kindergarten
- Grade 1 to grade 4
- Grade 5 to grade 8
- Grade 9 to grade 12
- College undergraduate years (freshman to senior)
- Graduate or professional school *(for example: medical, dental, or law school)*

9 What is the highest degree or level of school this person has COMPLETED? *Mark ONE box. If currently enrolled, mark the previous grade or highest degree received.*

- No schooling completed
- Nursery school to 4th grade
- 5th grade or 6th grade
- 7th grade or 8th grade
- 9th grade
- 10th grade
- 11th grade
- 12th grade, **NO DIPLOMA**
- HIGH SCHOOL GRADUATE** — high school DIPLOMA or the equivalent *(for example: GED)*
- Some college credit, but less than 1 year
- 1 or more years of college, no degree
- Associate degree *(for example: AA, AS)*
- Bachelor's degree *(for example: BA, AB, BS)*
- Master's degree *(for example: MA, MS, MEng, MEd, MSW, MBA)*
- Professional degree *(for example: MD, DDS, DVM, LLB, JD)*
- Doctorate degree *(for example: PhD, EdD)*

10 What is this person's ancestry or ethnic origin?

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

(For example: Italian, Jamaican, African Am., Cambodian, Cape Verdean, Norwegian, Dominican, French Canadian, Haitian, Korean, Lebanese, Polish, Nigerian, Mexican, Taiwanese, Ukrainian, and so on.)

11 a. Does this person speak a language other than English at home?

- Yes
- No → *Skip to 12*

b. What is this language?

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

(For example: Korean, Italian, Spanish, Vietnamese)

c. How well does this person speak English?

- Very well
- Well
- Not well
- Not at all

12 Where was this person born?

- In the United States — *Print name of state.*

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

- Outside the United States — *Print name of foreign country, or Puerto Rico, Guam, etc.*

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

13 Is this person a CITIZEN of the United States?

- Yes, born in the United States → *Skip to 15a*
- Yes, born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas
- Yes, born abroad of American parent or parents
- Yes, a U.S. citizen by naturalization
- No, not a citizen of the United States

14 When did this person come to live in the United States? *Print numbers in boxes.*

Year

--	--	--	--	--

15 a. Did this person live in this house or apartment 5 years ago (on April 1, 1995)?

- Person is under 5 years old → *Skip to 33*
- Yes, this house → *Skip to 16*
- No, outside the United States — *Print name of foreign country, or Puerto Rico, Guam, etc., below; then skip to 16.*

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

- No, different house in the United States



Person 4 (continued)

15 b. Where did this person live 5 years ago?
Name of city, town, or post office

Did this person live inside the limits of the city or town?
 Yes
 No, outside the city/town limits

Name of county

Name of state

ZIP Code

16 Does this person have any of the following long-lasting conditions:

	Yes	No
a. Blindness, deafness, or a severe vision or hearing impairment?	<input type="checkbox"/>	<input type="checkbox"/>
b. A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying?	<input type="checkbox"/>	<input type="checkbox"/>

17 Because of a physical, mental, or emotional condition lasting 6 months or more, does this person have any difficulty in doing any of the following activities:

	Yes	No
a. Learning, remembering, or concentrating?	<input type="checkbox"/>	<input type="checkbox"/>
b. Dressing, bathing, or getting around inside the home?	<input type="checkbox"/>	<input type="checkbox"/>
c. (Answer if this person is 16 YEARS OLD OR OVER.) Going outside the home alone to shop or visit a doctor's office?	<input type="checkbox"/>	<input type="checkbox"/>
d. (Answer if this person is 16 YEARS OLD OR OVER.) Working at a job or business?	<input type="checkbox"/>	<input type="checkbox"/>

18 Was this person under 15 years of age on April 1, 2000?
 Yes → Skip to 33
 No

19 a. Does this person have any of his/her own grandchildren under the age of 18 living in this house or apartment?
 Yes
 No → Skip to 20a

b. Is this grandparent currently responsible for most of the basic needs of any grandchild(ren) under the age of 18 who live(s) in this house or apartment?
 Yes
 No → Skip to 20a

c. How long has this grandparent been responsible for the(se) grandchild(ren)? *If the grandparent is financially responsible for more than one grandchild, answer the question for the grandchild for whom the grandparent has been responsible for the longest period of time.*
 Less than 6 months
 6 to 11 months
 1 or 2 years
 3 or 4 years
 5 years or more

20 a. Has this person ever served on active duty in the U.S. Armed Forces, military Reserves, or National Guard? *Active duty does not include training for the Reserves or National Guard, but DOES include activation, for example, for the Persian Gulf War.*
 Yes, now on active duty
 Yes, on active duty in past, but not now
 No, training for Reserves or National Guard only → Skip to 21
 No, never served in the military → Skip to 21

b. When did this person serve on active duty in the U.S. Armed Forces? *Mark (X) a box for EACH period in which this person served.*
 April 1995 or later
 August 1990 to March 1995 (including Persian Gulf War)
 September 1980 to July 1990
 May 1975 to August 1980
 Vietnam era (August 1964—April 1975)
 February 1955 to July 1964
 Korean conflict (June 1950—January 1955)
 World War II (September 1940—July 1947)
 Some other time

c. In total, how many years of active-duty military service has this person had?
 Less than 2 years
 2 years or more

Person 4 (continued)

31 c. Interest, dividends, net rental income, royalty income, or income from estates and trusts — Report even small amounts credited to an account.

Yes Annual amount — Dollars
 \$ | | | , | | | .00 Loss

No

d. Social Security or Railroad Retirement

Yes Annual amount — Dollars
 \$ | | | , | | | .00

No

e. Supplemental Security Income (SSI)

Yes Annual amount — Dollars
 \$ | | | , | | | .00

No

f. Any public assistance or welfare payments from the state or local welfare office

Yes Annual amount — Dollars
 \$ | | | , | | | .00

No

g. Retirement, survivor, or disability pensions — Do NOT include Social Security.

Yes Annual amount — Dollars
 \$ | | | , | | | .00

No

h. Any other sources of income received regularly such as Veterans' (VA) payments, unemployment compensation, child support, or alimony — Do NOT include lump-sum payments such as money from an inheritance or sale of a home.

Yes Annual amount — Dollars
 \$ | | | , | | | .00

No

32 What was this person's total income in 1999? Add entries in questions 31a—31h; subtract any losses. If net income was a loss, enter the amount and mark the "Loss" box next to the dollar amount.

Annual amount — Dollars
 None OR \$ | | | , | | | .00 Loss

33 Are there more people living here? If yes, continue with Person 5.

Person

5



Your answers help your community plan for the future.

1 What is this person's name? Print the name of Person 5 from page 2.

Last Name

 First Name
 _____ MI

2 How is this person related to Person 1? Mark ONE box.

- Husband/wife
- Natural-born son/daughter
- Adopted son/daughter
- Stepson/stepdaughter
- Brother/sister
- Father/mother
- Grandchild
- Parent-in-law
- Son-in-law/daughter-in-law
- Other relative — Print exact relationship.

If NOT RELATED to Person 1:

- Roomer, boarder
- Housemate, roommate
- Unmarried partner
- Foster child
- Other nonrelative

3 What is this person's sex? Mark ONE box.

- Male
- Female

4 What is this person's age and what is this person's date of birth?

Age on April 1, 2000

 Print numbers in boxes.
 Month Day Year of birth



Person 5 (continued)

11 a. Does this person speak a language other than English at home?

- Yes
- No → *Skip to 12*

b. What is this language?

(For example: Korean, Italian, Spanish, Vietnamese)

c. How well does this person speak English?

- Very well
- Well
- Not well
- Not at all

12 Where was this person born?

- In the United States — *Print name of state.*

- Outside the United States — *Print name of foreign country, or Puerto Rico, Guam, etc.*

13 Is this person a CITIZEN of the United States?

- Yes, born in the United States → *Skip to 15a*
- Yes, born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas
- Yes, born abroad of American parent or parents
- Yes, a U.S. citizen by naturalization
- No, not a citizen of the United States

14 When did this person come to live in the United States? *Print numbers in boxes.*

Year

15 a. Did this person live in this house or apartment 5 years ago (on April 1, 1995)?

- Person is under 5 years old → *Skip to 33*
- Yes, this house → *Skip to 16*
- No, outside the United States — *Print name of foreign country, or Puerto Rico, Guam, etc., below; then skip to 16.*

- No, different house in the United States

15 b. Where did this person live 5 years ago?

Name of city, town, or post office

Did this person live inside the limits of the city or town?

- Yes
- No, outside the city/town limits

Name of county

Name of state

ZIP Code

16 Does this person have any of the following long-lasting conditions:

- | | Yes | No |
|--|--------------------------|--------------------------|
| a. Blindness, deafness, or a severe vision or hearing impairment? | <input type="checkbox"/> | <input type="checkbox"/> |
| b. A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying? | <input type="checkbox"/> | <input type="checkbox"/> |

17 Because of a physical, mental, or emotional condition lasting 6 months or more, does this person have any difficulty in doing any of the following activities:

- | | Yes | No |
|--|--------------------------|--------------------------|
| a. Learning, remembering, or concentrating? | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Dressing, bathing, or getting around inside the home? | <input type="checkbox"/> | <input type="checkbox"/> |
| c. (Answer if this person is 16 YEARS OLD OR OVER.) Going outside the home alone to shop or visit a doctor's office? | <input type="checkbox"/> | <input type="checkbox"/> |
| d. (Answer if this person is 16 YEARS OLD OR OVER.) Working at a job or business? | <input type="checkbox"/> | <input type="checkbox"/> |

18 Was this person under 15 years of age on April 1, 2000?

- Yes → *Skip to 33*
- No



Person 5 (continued)

→ If "Car, truck, or van" is marked in 23a, go to 23b. Otherwise, skip to 24a.

23 b. How many people, including this person, usually rode to work in the car, truck, or van LAST WEEK?

- Drove alone
- 2 people
- 3 people
- 4 people
- 5 or 6 people
- 7 or more people

24 a. What time did this person usually leave home to go to work LAST WEEK?

: a.m. p.m.

b. How many minutes did it usually take this person to get from home to work LAST WEEK?

Minutes

→ Answer questions 25–26 for persons who did not work for pay or profit last week. Others skip to 27.

25 a. LAST WEEK, was this person on layoff from a job?

- Yes → Skip to 25c
- No

b. LAST WEEK, was this person TEMPORARILY absent from a job or business?

- Yes, on vacation, temporary illness, labor dispute, etc. → Skip to 26
- No → Skip to 25d

c. Has this person been informed that he or she will be recalled to work within the next 6 months OR been given a date to return to work?

- Yes → Skip to 25e
- No

d. Has this person been looking for work during the last 4 weeks?

- Yes
- No → Skip to 26

e. LAST WEEK, could this person have started a job if offered one, or returned to work if recalled?

- Yes, could have gone to work
- No, because of own temporary illness
- No, because of all other reasons (in school, etc.)

26 When did this person last work, even for a few days?

- 1995 to 2000
- 1994 or earlier, or never worked → Skip to 31

27 Industry or Employer — Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours. If this person had no job or business last week, give the information for his/her last job or business since 1995.

a. For whom did this person work? If now on active duty in the Armed Forces, mark (X) this box → and print the branch of the Armed Forces.

Name of company, business, or other employer

b. What kind of business or industry was this?

Describe the activity at location where employed. (For example: hospital, newspaper publishing, mail order house, auto repair shop, bank)

c. Is this mainly — Mark (X) ONE box.

- Manufacturing?
- Wholesale trade?
- Retail trade?
- Other (agriculture, construction, service, government, etc.)?

28 Occupation

a. What kind of work was this person doing?

(For example: registered nurse, personnel manager, supervisor of order department, auto mechanic, accountant)

b. What were this person's most important activities or duties? (For example: patient care, directing hiring policies, supervising order clerks, repairing automobiles, reconciling financial records)



Person 5 (continued)

- 29 Was this person** — Mark **ONE** box.
- Employee of a PRIVATE-FOR-PROFIT company or business or of an individual, for wages, salary, or commissions
 - Employee of a PRIVATE NOT-FOR-PROFIT, tax-exempt, or charitable organization
 - Local GOVERNMENT employee (*city, county, etc.*)
 - State GOVERNMENT employee
 - Federal GOVERNMENT employee
 - SELF-EMPLOYED in own NOT INCORPORATED business, professional practice, or farm
 - SELF-EMPLOYED in own INCORPORATED business, professional practice, or farm
 - Working WITHOUT PAY in family business or farm

- 30 a. LAST YEAR, 1999, did this person work at a job or business at any time?**
- Yes
- No → Skip to 31
- b. How many weeks did this person work in 1999?**
Count paid vacation, paid sick leave, and military service.
Weeks
- | |

- c. During the weeks WORKED in 1999, how many hours did this person usually work each WEEK?**
Usual hours worked each WEEK
- | |

- 31 INCOME IN 1999** — Mark the "Yes" box for each income source received during 1999 and enter the total amount received during 1999 to a maximum of \$999,999. Mark the "No" box if the income source was not received. If net income was a loss, enter the amount and mark the "Loss" box next to the dollar amount.

For income received jointly, report, if possible, the appropriate share for each person; otherwise, report the whole amount for only one person and mark the "No" box for the other person. If exact amount is not known, please give best estimate.

- a. Wages, salary, commissions, bonuses, or tips from all jobs** — Report amount before deductions for taxes, bonds, dues, or other items.

Yes Annual amount — Dollars

\$ | | | , | | | .00

No

- b. Self-employment income from own nonfarm businesses or farm businesses, including proprietorships and partnerships** — Report NET income after business expenses.

Yes Annual amount — Dollars

\$ | | | , | | | .00 Loss

No

- 31 c. Interest, dividends, net rental income, royalty income, or income from estates and trusts** — Report even small amounts credited to an account.

Yes Annual amount — Dollars

\$ | | | , | | | .00 Loss

No

- d. Social Security or Railroad Retirement**

Yes Annual amount — Dollars

\$ | | | , | | | .00

No

- e. Supplemental Security Income (SSI)**

Yes Annual amount — Dollars

\$ | | | , | | | .00

No

- f. Any public assistance or welfare payments from the state or local welfare office**

Yes Annual amount — Dollars

\$ | | | , | | | .00

No

- g. Retirement, survivor, or disability pensions** — Do NOT include Social Security.

Yes Annual amount — Dollars

\$ | | | , | | | .00

No

- h. Any other sources of income received regularly such as Veterans' (VA) payments, unemployment compensation, child support, or alimony** — Do NOT include lump-sum payments such as money from an inheritance or sale of a home.

Yes Annual amount — Dollars

\$ | | | , | | | .00

No

- 32 What was this person's total income in 1999?** Add entries in questions 31a—31h; subtract any losses. If net income was a loss, enter the amount and mark the "Loss" box next to the dollar amount.

Annual amount — Dollars

None OR \$ | | | , | | | .00 Loss

- 33 Are there more people living here? If yes, continue with Person 6.**

Person

6



Housing information helps your community plan for police and fire protection.

1 What is this person's name? Print the name of Person 6 from page 2.

Last Name

First Name MI

2 How is this person related to Person 1? Mark ONE box.

- Husband/wife
- Natural-born son/daughter
- Adopted son/daughter
- Stepson/stepdaughter
- Brother/sister
- Father/mother
- Grandchild
- Parent-in-law
- Son-in-law/daughter-in-law
- Other relative — Print exact relationship.

If NOT RELATED to Person 1:

- Roomer, boarder
- Housemate, roommate
- Unmarried partner
- Foster child
- Other nonrelative

3 What is this person's sex? Mark ONE box.

- Male
- Female

4 What is this person's age and what is this person's date of birth?

Age on April 1, 2000

Print numbers in boxes.

Month Day Year of birth

NOTE: Please answer BOTH Questions 5 and 6.

5 Is this person Spanish/Hispanic/Latino? Mark the "No" box if **not** Spanish/Hispanic/Latino.

- No, not Spanish/Hispanic/Latino
- Yes, Mexican, Mexican Am., Chicano
- Yes, Puerto Rican
- Yes, Cuban
- Yes, other Spanish/Hispanic/Latino — Print group. ↘

6 What is this person's race? Mark one or more races to indicate what this person considers himself/herself to be.

- White
- Black, African Am., or Negro
- American Indian or Alaska Native — Print name of enrolled or principal tribe. ↘

- Asian Indian
- Chinese
- Filipino
- Japanese
- Korean
- Vietnamese
- Other Asian — Print race. ↘
- Native Hawaiian
- Guamanian or Chamorro
- Samoan
- Other Pacific Islander — Print race. ↘

- Some other race — Print race. ↘

7 What is this person's marital status?

- Now married
- Widowed
- Divorced
- Separated
- Never married



Person 6 (continued)

8 a. At any time since February 1, 2000, has this person attended regular school or college? *Include only nursery school or preschool, kindergarten, elementary school, and schooling which leads to a high school diploma or a college degree.*

- No, has not attended since February 1 → *Skip to 9*
- Yes, public school, public college
- Yes, private school, private college

b. What grade or level was this person attending? Mark ONE box.

- Nursery school, preschool
- Kindergarten
- Grade 1 to grade 4
- Grade 5 to grade 8
- Grade 9 to grade 12
- College undergraduate years (freshman to senior)
- Graduate or professional school (for example: medical, dental, or law school)

9 What is the highest degree or level of school this person has COMPLETED? Mark ONE box. *If currently enrolled, mark the previous grade or highest degree received.*

- No schooling completed
- Nursery school to 4th grade
- 5th grade or 6th grade
- 7th grade or 8th grade
- 9th grade
- 10th grade
- 11th grade
- 12th grade, **NO DIPLOMA**
- HIGH SCHOOL GRADUATE** — high school DIPLOMA or the equivalent (for example: GED)
- Some college credit, but less than 1 year
- 1 or more years of college, no degree
- Associate degree (for example: AA, AS)
- Bachelor's degree (for example: BA, AB, BS)
- Master's degree (for example: MA, MS, MEng, MEd, MSW, MBA)
- Professional degree (for example: MD, DDS, DVM, LLB, JD)
- Doctorate degree (for example: PhD, EdD)

10 What is this person's ancestry or ethnic origin?

(For example: Italian, Jamaican, African Am., Cambodian, Cape Verdean, Norwegian, Dominican, French Canadian, Haitian, Korean, Lebanese, Polish, Nigerian, Mexican, Taiwanese, Ukrainian, and so on.)

11 a. Does this person speak a language other than English at home?

- Yes
- No → *Skip to 12*

b. What is this language?

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(For example: Korean, Italian, Spanish, Vietnamese)

c. How well does this person speak English?

- Very well
- Well
- Not well
- Not at all

12 Where was this person born?

In the United States — *Print name of state.*

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Outside the United States — *Print name of foreign country, or Puerto Rico, Guam, etc.*

--	--	--	--

13 Is this person a CITIZEN of the United States?

- Yes, born in the United States → *Skip to 15a*
- Yes, born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas
- Yes, born abroad of American parent or parents
- Yes, a U.S. citizen by naturalization
- No, not a citizen of the United States

14 When did this person come to live in the United States? *Print numbers in boxes.*

Year

--	--	--	--

15 a. Did this person live in this house or apartment 5 years ago (on April 1, 1995)?

- Person is under 5 years old → *Skip to 33*
- Yes, this house → *Skip to 16*
- No, outside the United States — *Print name of foreign country, or Puerto Rico, Guam, etc., below; then skip to 16.*

--	--	--	--

No, different house in the United States

Person 6 (continued)

31 **c. Interest, dividends, net rental income, royalty income, or income from estates and trusts** — Report even small amounts credited to an account.

Yes Annual amount — Dollars
\$ | | | , | | .00 Loss
 No

d. Social Security or Railroad Retirement

Yes Annual amount — Dollars
\$ | | , | | .00
 No

e. Supplemental Security Income (SSI)

Yes Annual amount — Dollars
\$ | | , | | .00
 No

f. Any public assistance or welfare payments from the state or local welfare office

Yes Annual amount — Dollars
\$ | | , | | .00
 No

g. Retirement, survivor, or disability pensions — Do NOT include Social Security.

Yes Annual amount — Dollars
\$ | | | , | | .00
 No

h. Any other sources of income received regularly such as Veterans' (VA) payments, unemployment compensation, child support, or alimony — Do NOT include lump-sum payments such as money from an inheritance or sale of a home.

Yes Annual amount — Dollars
\$ | | | , | | .00
 No

32 **What was this person's total income in 1999?** Add entries in questions 31a—31h; subtract any losses. If net income was a loss, enter the amount and mark the "Loss" box next to the dollar amount.

Annual amount — Dollars
 None OR \$ | | | , | | .00 Loss

33 **Thank you for completing your official U.S. Census form. If there are more than six people at this address, the Census Bureau may contact you for the same information about these people.**

Census 2000 Glossary

Term	Abbreviation	Description
100 percent census edited file	HCEF	A computer file that contains the edited characteristics and records for all households and people in Census 2000. The edits are performed on the 100 percent census unedited file. The edits include consistency edits and imputation for items or people where the data are insufficient for the 100 percent data items from both the short- and long-form questionnaires. The HCEF provided the census counts for apportionment purposes.
100 percent census unedited file	HCUF	The decennial response file was combined with the decennial master address file to create the HCUF and sample census unedited file. The HCUF contains the unedited individual responses to the 100 percent data items from both the Census 2000 short- and long-form questionnaires.
100 percent data		Population and housing information collected for all living quarters in the United States. See long form, sample data, short form.
100 percent detail file	HDF	A file resulting from the application of disclosure avoidance and tabulation geography to the 100 percent census edited file. This file was used to produce Census 2000 data products and other tabulations based on the 100 percent items.
A Streamlined Acquisition Process	ASAP	The Census Bureau process to acquire services. There are six phases: (1) bureau integrated strategic planning and budgeting, (2) project planning, (3) market research, (4) selection acquisition vehicle, (5) meet project objective and manage acquisition, and (6) closeout.
Accuracy and Coverage Evaluation	A.C.E.	A coverage measurement methodology used to determine the number of people and housing units missed or counted more than once in Census 2000.
active entity		A governmental unit that has elected or appointed officials who carry out legally prescribed functions, provide services, and/or raise revenues. The Census Bureau differentiates active entities by their fiscal independence and whether they provide general or limited special services. See functional status, functioning entity, governmental unit, inactive entity, nonfunctioning entity.
address		The house number and street name or other designation assigned to a housing unit, special place, business establishment, or other structure for purposes of mail delivery or to allow emergency services, delivery people, and visitors to find the structure. See basic street address, city-style address, E-911 address, fire number, house number and street name address, location description, mailing address, non-city-style address.
address break		The city-style address on each side of a legal boundary; for example, 1234 Main Street is inside an incorporated place and 1236 is outside the place.
address coding guide	ACG	A forerunner of the Geographic Base File/Dual Independent Map Encoding file and TIGER® file.

Term	Abbreviation	Description
address control file	ACF	The 1990 residential address list used to label questionnaires, control the mail response check-in operation, and determine the nonresponse follow-up workload. See master address file.
Address List Review Program and Address List Map Review Program	ALR ALMR	Also called Local Update of Census Addresses. Census 2000 programs, established in response to requirements of Public Law 103-430, that provided an opportunity for local and tribal governments to review and update individual address information in the master address file and associated geographic information in the TIGER® database to improve the completeness and accuracy of both computer files. The governments signed a confidentiality agreement to participate.
address listing	AL	A field operation to develop the Census 2000 address list in areas of predominantly non-city-style addresses. The lister enters, in an address register, all mailing addresses and/or physical locations for all places within a specified area. The lister marks the location of each residential structure on an assignment area block map by drawing a map spot and assigning a map spot number. The lister also updates and corrects the map if necessary.
address range		The lowest and highest house numbers along each side of a street segment that has city-style addresses. The U.S. Census Bureau usually expands the range to include all possible numbers, not just the existing ones (for example, the Census Bureau expands the actual addresses of 105–131 on the odd-numbered side of the 100 block of a street to 101–199). Usually an address range on one side of a street contains only even or only odd numbers, but sometimes one or both sides contain both.
address register	AR	A book used by field staff to record or verify addresses and related information for all living quarters in an assignment area. It also includes: (1) instructions on how to perform the job and (2) a set of maps for the assigned area.
address register area	ARA	Term used in 1990. Now called an assignment area.
addressable feature		A physical feature along which living quarters can be constructed and assigned an address. Usually, this is a road or street, but it could also be an alley, driveway, and occasionally an unusual feature such as a railroad track or navigable stream.
Advance Census Report	ACR	In previous censuses, an unaddressed, short-form questionnaire delivered by U.S. Postal Service letter carriers in advance of the actual enumeration in list/enumerate areas. Enumerators picked up any completed ACRs, checked them for completeness and consistency, transferred the responses to standard census questionnaires, and completed any missing information. Used only in the Island Areas for Census 2000.
advance notice letter/reminder card	ANL/RC	Part of the questionnaire mailing strategy. ANL: In every area except list/enumerate, the Census Bureau sends an advance notice letter to every mailout address to alert households that the census form will be sent soon. RC: A postcard sent to addresses on the decennial master address file to remind respondents to return their census questionnaires or to thank them if they already have. All addresses in mailout/mailback areas receive a postcard. The Census Bureau blanket-mails these postcards to postal patrons (no addresses) in update/leave areas.
Advance Post Office Check	APOC	Obsolete term. See postal validation check.

Term	Abbreviation	Description
Alaska Native Claims Settlement Act	ANCSA	Legislation (Public Law 92-203) enacted in 1972 establishing the Alaska Native Regional Corporations and Alaska Native Villages to conduct business and nonprofit activities by and for Alaska Natives.
Alaska Native Regional Corporation	ANRC	A corporate entity organized to conduct both business and nonprofit affairs of Alaska Natives pursuant to the Alaska Native Claims Settlement Act.
Alaska Native Village	ANV	A type of local governmental unit in Alaska that constitutes an association, band, clan, community, group, tribe, or village recognized pursuant to the Alaska Native Claims Settlement Act. ANVs do not have legally defined boundaries. See Alaska Native Village statistical area, governmental unit, legal entity.
Alaska Native Village statistical area	ANVSA	A decennial census statistical area that represents the geographic jurisdiction of an Alaska Native Village (ANV) as established for the Census Bureau by officials of the ANV and its Alaska Native Regional Corporation for the purpose of presenting census data.
American Community Survey	ACS	A monthly sample household survey similar to the long-form census questionnaire. It was first tested in 1996 and is expected to replace the long form for the 2010 Census. Beginning in 2003, the nationwide monthly sample survey provides annual data for social, economic, and housing characteristics. At first, the data will be available for states, cities, counties, and metropolitan areas with a minimum population of 250,000; then, in 2004, a minimum population of 65,000; and in 2008, small geographic entities.
American FactFinder	AFF	A generalized electronic system for access and dissemination of Census Bureau data. The system is available through the Internet and offers prepackaged data products and the ability to build custom products. The system serves as the vehicle for accessing and disseminating data from Census 2000 (as well as the 1997 Economic Censuses and the American Community Survey). The system was formerly known as the Data Access and Dissemination System (DADS).
American Indian and Alaska Native area	AIANA	A Census Bureau term referring to these entity types: American Indian reservation, American Indian subreservation area, American Indian trust lands, state designated American Indian statistical area, tribal jurisdictional statistical area, tribal designated statistical area, tribal subdivision, Alaska Native Regional Corporation, Alaska Native Village, or Alaska Native Village statistical area.
American Indian area	AIA	A generic Census Bureau grouping that includes reference to any or all of the following areas: American Indian reservation, American Indian trust lands, tribal jurisdiction statistical area, or tribal designated statistical area.
American Indian area/Alaska Native area/Hawaiian Home Lands	AIANHH	An all-encompassing Census Bureau term referring to American Indian entities, Alaska Native entities, and Hawaiian Home Lands. See American Indian and Alaska Native area, Hawaiian Home Lands.
American Indian reservation		An American Indian geographic entity with boundaries established by treaty, statute, or executive or court order. Federal and some state governments have established reservations as territory over which American Indians have governmental jurisdiction. These entities are designated as colonies, communities, pueblos, rancherias, reservations, and reserves. See American Indian and Alaska Native area, governmental unit, legal entity.

Term	Abbreviation	Description
American Indian tribal subdivision		An administrative subdivision of an American Indian reservation. Tribal subdivisions may extend beyond the boundary of their reservations. These entities are internal units of self-government or administration that serve social, cultural, or economic purposes for the American Indians living on and adjacent to the reservation.
American Indian trust land	TL	Land held in trust by the federal government for either a tribe (tribal trust land) or an individual member of a tribe (individual trust land). Such land always is associated with a specific federally recognized reservation or tribe but may be located on or off the reservation. The Census Bureau recognizes and tabulates data separately only for off-reservation trust lands. See American Indian reservation, Hawaiian Home Lands.
apportionment		The number of representatives that a state is entitled to in the U.S. House of Representatives based on the decennial census. See reapportionment, redistricting.
assignment area	AA	A geographic area established by the Census Bureau for a specific field operation for the census. An AA consists of one or more census blocks for most operations and is assigned to a single enumerator, lister, or other field staff to obtain information about the residents and living quarters within the boundaries of the AA. Formerly called an address register area and an enumeration district. See assignment area map, collection geography.
assignment area map	AA map	A map that shows the area assigned to a member of the field staff for a specific census operation. The map displays the individual roads, streets, and nonstreet features (and their names, if any) in and adjacent to the assignment area (AA), and, if appropriate, the city-style address ranges of the roads and streets or the census collection block numbers within the AA. See assignment area, block map, collection block, locator map.
assignment control		For all field operations, clerks check the accuracy and completeness of work returned from the field to the local census office. This procedure takes on critical importance for nonresponse follow-up and list/enumerate.
assignment preparation		The coordination, preparation, and assembly of all materials, including maps, registers, and questionnaires, by assignment area. This operation is performed at the regional census centers for address listing and block canvassing and at the local census offices for other field operations. Map pouch labels and maps are printed in the regional census centers.
Asynchronous Transfer Mode	ATM	A process that increases the amount of information that can be electronically transferred at one time between sites.
Automated Address Range Program	AARP	A program for achieving consistent address/block number relationships between field-verified residential addresses in the master address file and address ranges in the TIGER® database.
automated data processing	ADP	The data processing operations performed by a system of electronic or electrical machines.
Automated Master Address File Geocoding Office Resolution	AMAF-GOR	A computer match that attempts to geocode city-style addresses in the master address file after street features, names, address ranges, and ZIP Code information have been inserted into the TIGER® database from digital files from a local government or commercial source. See Boundary and Annexation Survey, census map preview, digital exchange file, geocode, TIGER®, TIGER® Improvement Program, and targeted map update.

Term	Abbreviation	Description
bar code		A code consisting of a group of printed and patterned bars designed to be scanned and read into computer memory.
barrio		A legal subdivision of a municipio in Puerto Rico, treated as a minor civil division by the Census Bureau. See barrio-pueblo, county subdivision, legal entity, minor civil division.
barrio-pueblo		A legal subdivision of a municipio in Puerto Rico, treated as a minor civil division by the Census Bureau. The barrio-pueblo is differentiated from other barrios because it is the historical center and seat of government of its municipio. See barrio, county subdivision, legal entity, minor civil division.
basic street address	BSA	The house number and street name portion of an address, such as 11 Main Street. The BSA does not include designations for apartments, units, lots, and the like. However, when the address for a specific structure is identified by a number followed by a fraction or letter, such as 11½, or 11A, the fraction or letter is part of the BSA. See address, city-style address, house number and street name address, mailing address.
Be Counted enumeration and Be Counted form	BC/BCF	Includes the Be Counted enumeration procedure and the Be Counted form. The enumeration procedure targets areas that are traditionally undercounted. Unaddressed census questionnaires (Be Counted forms) are placed at selected sites where people who believe they were not counted can pick them up, complete them, and mail them to the Census Bureau. The sites are in targeted areas that local governments and community groups, in conjunction with the Census Bureau, identified as traditionally undercounted.
Be Counted field verification		This operation verifies the existence and the residential status of addresses given to the Census Bureau through the Be Counted program. Any address that is verified is added to the master address file.
best and final offer	BAFO	The final and best technical and price solution a vendor provides for a request for proposal in response to a call from the government contracting officer.
beta site		Located at headquarters, the beta site is an independent operation to test and assure quality, completeness, and security of software systems, hardware systems, and network systems before release to a production environment.
beta testing		Ensures that the hardware, software, and communication components are functioning properly before release to the various decennial operating units.
blanket mailing		There are two definitions for this term: (1) The mailing to all postal patrons (no addresses) of reminder cards or other forms. (2) A strategy that was considered but not implemented for Census 2000: the mailing of replacement questionnaires to either all addresses or all addresses in areas with anticipated low response rates.
block		A geographic area bounded on all sides by visible or non-visible features shown on census maps. A block is the smallest geographic entity for which the Census Bureau collects and tabulates decennial census information. See block boundary, block number, collection block, statistical entity, or tabulation block.

Term	Abbreviation	Description
block boundary		A census map feature, visible (street, road, stream, shoreline, and so forth) or nonvisible (county line, city limit, property line, and so forth), that delimits a census block. Two or more features usually delimit a block, but a single feature may delimit a block in the case of an island or a circular street. A boundary generally must include at least one addressable feature, that is, a feature that can have an address assigned to it. The boundary of a state or county is always a block boundary.
Block Boundary Suggestion Project	BBSP	The first phase of the Census Bureau's Public Law 94-171 program that provides an opportunity for states to suggest visible features, such as block boundaries, that are or may be voting district boundaries for the decennial census.
block canvassing		A Census 2000 field operation that ensures the quality of the master address file within the mailout/mailback area (city-style addresses). The Census Bureau sends canvassers into the field to canvass their assignment areas and ensure that the master address file contains a mailing address for every living quarters. They especially seek hidden housing units, such as attics, basements, or garages converted into housing units, or houses that appear to be one unit but which actually contain multiple housing units. They also update and correct the census maps. Formerly called precanvass and targeted canvassing. See blue line and canvass.
block cluster		A single block or a group of blocks, varying in size.
Block Definition Project	BDP	A program similar to the Block Boundary Suggestion Project. It applies only to American Indian reservations and Puerto Rico.
block group	BG	A combination of census blocks that is a statistical subdivision of a census tract. Geographic block groups never cross census tracts but may cross the boundaries of county subdivisions, places, urbanized areas, voting districts, and so forth. Tabulation block groups may be split to present data for every unique combination of county subdivision, place, and the like.
block locator map		A Census Bureau map that displays a census block—usually a collection block—and a substantial amount of surrounding area, to help field staff identify where the block is located and determine an efficient route of travel to the block. See collection block, locator map.
block map		A large scale map of an individual census collection block showing the individual roads, streets, and other features, together with their names (if any) within and adjacent to the block. Field staff use block maps to guide them in their canvass of each block, to annotate map changes, and to mark (map spot) and number the location of each residential structure. See assignment area map, block number, collection block, and map spot.

Term	Abbreviation	Description
block number		<p>A number assigned to each census block.</p> <ul style="list-style-type: none"> ▪ For collecting information for Census 2000, each census block was identified uniquely within a county (or statistically equivalent entity) by a 4- or 5-digit number. All the collection blocks in a county used the same number of digits. As a result of changes to the TIGER® database after the Census Bureau had numbered the blocks in preparation for Census 2000 field operations, the number could have an alphabetic suffix, to represent one portion of a physical block that was split by an added street or road or by the addition or change of the boundary of a county, American Indian reservation, off-reservation trust land, or military installation; e.g., if an added street bisected Block 1005, the block was split into Blocks 1005A and 1005B to represent the portion of the original collection block on each side of that street. ▪ For tabulating data for Census 2000, each census block was identified uniquely within a census tract by a 4-digit number. A 1990 census block number had three digits and might include an alphabetic suffix. The first digit of a tabulation block number identified the block group in which the census block was located.
block numbering area	BNA	<p>Small statistical subdivisions of a county for grouping and numbering blocks in nonmetropolitan counties where local committees of census data users have not established census tracts. For Census 2000, the agency combined the census tract and block numbering area programs into a single program; the resulting geographic entity was called a census tract.</p>
blue line		<p>A boundary defining the area included in mailout/mailback. Essentially, these are areas that have city delivery of mail.</p>
boarded up		<p>A housing condition in which the doors or windows of a building have been covered to prevent destruction or entry.</p>
borough		<p>A county equivalent in Alaska, a minor civil division in New York, and an incorporated place in Connecticut, New Jersey, and Pennsylvania. See governmental unit.</p>
boundary		<p>A line identifying the extent of a geographic entity, such as a block, census tract, county, or place. The legal boundaries the Census Bureau recognizes for a census are those in place on the first day of the census year.</p>
Boundary and Annexation Survey	BAS	<p>An annual survey of all incorporated places and all counties conducted by the Census Bureau to determine the correct legal limits and related information as of January 1 of the survey year. See Automated Master Address File Geocoding Office Operation, census map preview, targeted map update, TIGER®, and TIGER® Improvement Program.</p>

Term	Abbreviation	Description
boundary change		The establishment, relocation, or deletion of a boundary. For legal entities, boundary changes are reported to the Census Bureau in a state, local, or tribal government's response to a Boundary and Annexation Survey; through a periodic survey to collect boundary information for a specific set of geographic entities; as an adjunct to obtaining other information about an area (such as updated street pattern or address information); or by some other reliable source. For statistical entities, boundary changes are provided in preparation for a specific census in response to the Census Bureau's Participant Statistical Areas Program or some other specific boundary collection program. The boundaries of legal entities are changed due to legal actions, whereas statistical entities may be changed by appropriate reviewers to reflect population growth or decline, or because of revisions either to visible or legal features used as boundaries or to Census Bureau procedures. A boundary change also can occur due to an error in recording a boundary for one census or survey and showing it correctly for the next one.
building		Usually a separate structure that has open space on all sides. Townhouses are separate buildings. Some buildings can be used both as a residence and a business, as in the case of an apartment located above a grocery store.
Bureau of Economic Analysis	BEA	Department of Commerce. The BEA's goal is to provide a clear picture of the U.S. economy by preparing, developing, and interpreting the national income and product accounts (summarized by the gross domestic product) as well as aggregate measures of international, regional, and state economic activity.
Bureau of Labor Statistics	BLS	Department of Labor. The BLS is the principal fact-finding agency for the federal government in the broad field of labor economics and statistics.
callback		Repeat telephone calls an enumerator makes to a living quarters to obtain information.
callback record page		A page in an address register used to record information about each callback an enumerator makes to a living quarters to obtain information.
canvass		To systematically travel, block by block, every street, road, path, and the like in an assignment area, identifying every place where people live or could live.
casing check		See postal validation check.
census		A complete enumeration of a population or the business and commercial establishments, farms, or governments in an area. See decennial census.
Census 2000 Committee on Statistical Policy	CCSP	Composed of policy makers and technicians who provided external review and advice. The group reviewed policy matters as they affected decisions about statistical methods to be used.
Census 2000 library		A depository of key Census 2000 documents using an electronic document tracking system. See Personal Computer Document Organization and Control System.
Census 2000 Publicity Office	C2PO	Census Bureau. Developed, implemented, and coordinated an integrated marketing program for Census 2000, including paid advertising, direct mail, public relations, partnerships, and local outreach.
Census Address List Improvement Act of 1994		See Public Law 103-430.

Term	Abbreviation	Description
Census Advisory Committee	CAC	Several advisory committees counseled the Census Bureau on matters relating to Census 2000. The Commerce Secretary's 2000 Census Advisory Committee was composed of representatives of organizations interested in and knowledgeable about the decennial census. The Census Advisory Committee of Professional Associations consisted of nine representatives from each of the following organizations: the American Economic Association, the American Marketing Association, the American Statistical Association, and the Population Association of America. Five race and ethnic advisory committees informed the Census Bureau on matters relating to their communities' participation in the decennial census and uses of census products. These committees represented the following race and ethnic groups: African Americans, American Indians and Alaska Natives, Asians, Hispanics, and Native Hawaiians and Other Pacific Islanders.
census area		The statistical equivalent of a county in Alaska. Census areas are delineated cooperatively with the State of Alaska for statistical purposes in the portions of Alaska not within an organized borough.
census block		See block.
census block map		A map showing the numbered census blocks and appropriate higher-level census geography within a geographic entity or area. A census block map usually consists of multiple map sheets. See block map, Census Bureau map.
Census Bureau	CB	Department of Commerce. The Census Bureau is the country's preeminent statistical collection and dissemination agency. It publishes a wide variety of statistical data about people and the economy of the nation. The Census Bureau conducts approximately 200 annual surveys and conducts the decennial census of the U.S. population and the quinquennial census of industry.
Census Bureau map		Any map, in electronic or paper form, produced by the Census Bureau. Such a map usually displays the boundaries and names and/or codes of the geographic entities that the Census Bureau uses to take a census or survey, or for which the Census Bureau tabulates data, and may include both visible and invisible features, feature names, and other information appropriate to the purpose for which the map was prepared. Some Census Bureau maps display statistical data in various thematic forms. Every Census Bureau map displays a credit note showing that it was produced by the U.S. Census Bureau. May be referred to as "census map" after first usage of the term.
census code		A code assigned by the Census Bureau to identify a specific geographic entity. The Census Bureau uses census codes for geographic entities for which a federal information processing standards code either does not exist or is inadequate to identify and/or sequence a type of entity. See federal information processing standards code, geographic code.
census county division	CCD	A subdivision of a county that is a relatively permanent statistical area established cooperatively by the Census Bureau and local government authorities. Used for presenting decennial census statistics in those states that do not have well-defined and stable minor civil divisions that serve as local governments.
Census Day		The reference date for collection of census information. For the decennial census, this has been April 1 of the decade year (year ending with zero) since the 1930 census.

Term	Abbreviation	Description
census designated place	CDP	A statistical entity comprising a dense concentration of population that is not within an incorporated place but is locally identified by a name. CDPs are delineated cooperatively with state, local, and tribal government officials based on Census Bureau guidelines. For the first time in Census 2000, CDPs did not have to meet a population threshold to qualify for tabulation of census data. See comunidad, place, statistical entity, zona urbana.
census division		See division (census geographic).
census edited file	CEF	This file contains the 100 percent edited characteristics/records for all households and persons in the census. The edits include consistency edits and imputation for items or persons where the data are insufficient. See 100 percent data, census unedited file.
census feature class code	CFCC	A 3- or 4-character alphanumeric code assigned to the various features (points, lines, polygons, and key geographic locations) in the TIGER® database to uniquely identify the basic characteristics of each feature. Only landmarks use 4-character CFCCs, which appear only in the Geography Division's internal files.
census field office	CFO	A temporary Census Bureau office established in Census 2000 to manage address listing field work, conduct local recruiting, and create a local presence.
census geography		A collective term referring to the geographic entities used by the Census Bureau for data collection and tabulation. There is collection geography and tabulation geography.
census identification number		A number associating a response with a specific address in the master address file.
census map		Any map produced by the Census Bureau. A census map displays geographic entities used in a Census Bureau census or survey for which the Census Bureau tabulates data.
census map preview		A Census 2000 program that asked local government officials to review census maps. See Automated Master Address File Geocoding Office Operation, Boundary and Annexation Survey, targeted map update, TIGER®, and TIGER® Improvement Program.
Census Monitoring Board		Established by public law, the function of the board was "to observe and monitor all aspects of the preparation and implementation of the 2000 decennial census (including all dress rehearsals and other simulations of a census in preparation therefore)." The board ceased to exist on September 30, 2001.
census region		See region (census geographic).
census statistical areas committee	CSAC	A committee established by local government officials and other interested individuals to identify, in cooperation with the Census Bureau, the census tracts, block groups, census designated places, and other statistical entities for the area it serves.
census statistical areas key person	CSAKP	A person designated by a census statistical areas committee to act as its contact person with the Census Bureau.
census subarea		Statistical subdivisions of boroughs and census areas (county equivalents) in Alaska.
census tract		See tract.
census tract number		See tract number.

Term	Abbreviation	Description
census unedited file	CUF	A file created by merging the control file for the decennial master address file with the decennial response file of unedited data after the primary selection algorithm has been applied. This file contains the final housing unit and person counts. It is used to generate apportionment data as well as related "raw" or unedited census data.
central city		In a metropolitan area (MA), the largest place and, in some areas, one or more additional places that meet official standards issued by the federal Office of Management and Budget. If a place extends beyond an MA, only the portion within the MA is a central city. A few primary metropolitan statistical areas do not have a central city.
central county		A core county (or statistically equivalent entity) of a metropolitan area (MA). Such a county includes at least half the population of a central city of the MA, provided the central city is located in an urbanized area related to the MA, or at least half the population of the related urbanized area(s) in the county. All other counties (or statistically equivalent entities) in an MA are "outlying counties." MAs in New England do not have a central county.
central place		In an urban area (urbanized area or urban cluster), the largest place and, in some areas, one or more additional places that meet specific Census Bureau criteria. If a place is identified as an extended place, only the portion within the urban area represents the central place. For an urban area that does not contain an incorporated or census designated place, there is no central place; the title of the urbanized area or urban cluster uses the name of a minor civil division, or a local place name recognized by the Board on Geographic Names and recorded by the U.S. Geological Survey, but the name does not represent a central place.
city		A type of incorporated place in all states and the District of Columbia. In agreement with the State of Hawaii, however, the Census Bureau does not recognize the city of Honolulu for presentation of decennial census data. In Virginia, all cities are not part of any county, and the Census Bureau treats them as county equivalents as well as places for purposes of data presentation; there also is one such independent city in each of three states: Maryland, Missouri, and Nevada. In 20 states, some or all cities are not part of any minor civil division, and the Census Bureau treats them as county subdivisions for purposes of data presentation. See county equivalent, county subdivision, governmental unit, incorporated place, and independent city.
city delivery area		An area (1) in which post offices deliver mail to addresses consisting of a house number and street name AND (2) which consists of city delivery routes as designated by the U.S. Postal Service. Some homes and establishments in a city delivery area may choose to use a post office/drawer or general delivery for their mail. See city-style address, nondelivery area, rural delivery area.
city-style address		An address that consists of a house number and street name; for example, 201 Main Street. The address may or may not be used for the delivery of mail and may include apartment numbers/designations or similar identifiers. See address, basic street address, house number and street name address, mailing address, noncity-style address.

Term	Abbreviation	Description
cluster		A range of house number and street name addresses that contains one or more addresses that were not geocoded to a census block. Lists of such address ranges ("cluster lists") were used for Master Address File Geocoding Office Resolution, the TIGER® Improvement Program, and targeted map update, to identify for resolution those address ranges for which the Census Bureau had received one or more addresses that it could not match to a specific location in the TIGER® database.
coefficient of variation	CV	The ratio of the standard error (square root of the variance) to the value being estimated, usually expressed in terms of a percentage (also known as the relative standard deviation). The lower the CV, the higher the relative reliability of the estimate.
collection block		A physical block enumerated as a single geographic area, regardless of any legal or statistical boundaries passing through it. (Except the state and county boundaries are always block boundaries.) See block, block number, tabulation block.
collection geography		The geographic entities used by the Census Bureau for taking a census. For Census 2000, a census field office or local census office/crew leader district/assignment area collection block identified a unique geographic area. See tabulation geography.
Commerce Administrative Management System	CAMS	A system integrating financial and related subsystems for management and administration.
<i>Commerce Business Daily</i>	CBD	A newspaper published by the Department of Commerce in which all procurement notices and awards in the federal government are listed.
commercially available off-the-shelf software/ commercial off-the-shelf software	COTS	Software that may be purchased and implemented for a particular application with minimal or no modification required.
Commonwealth		The legal designation for four states (Kentucky, Massachusetts, Pennsylvania, and Virginia) and two Island Areas (Puerto Rico and the Northern Mariana Islands). The Census Bureau does not use this term in presenting data.
comunidad		A census designated place in Puerto Rico. See census designated place, zona urbana.
compact disk-read only memory	CD-ROM	An optical disk that is created by a mastering process and used for storing large amounts of data. Unlike standard computer disks and diskettes, CD-ROMs can be used only to read stored data, not to update or change its content.
Complete Count Committee	CCC	A volunteer committee established by local, and sometimes state, governments and comprised of a cross-section of community leaders, including representatives from government, education, business, religious organizations, community agencies, minority organizations, and the media. These committees were charged with developing and implementing a Census 2000 outreach, promotion, recruiting, and enumeration assistance plan of action designed to target and address the needs of their community.
computer-assisted personal interview	CAPI	A method of data collection consisting of the interviewer asking questions displayed on a laptop computer screen and entering the answers directly into the computer.
Computer Assisted Survey Research Office	CASRO	Census Bureau. Provides automation and telecommunication technologies to improve the collection, processing, and dissemination of data.

Term	Abbreviation	Description
computer-assisted telephone interviewing	CATI	A method of data collection using telephone interviews in which the questions to be asked are displayed on a computer screen and responses are entered directly into the computer.
concept of operations	CONOPS	The Department of Commerce's reengineered acquisition process.
confidentiality		The guarantee made by law (Title 13, U.S. Code) to individuals who provide census information regarding nondisclosure of that information to others. See Privacy Act, special sworn status individual.
confidentiality edit		The name for the Census 2000 disclosure avoidance procedure.
Congressional Affairs Office	CAO	Census Bureau. Acts as a liaison between Congress and the Census Bureau.
congressional district	CD	An area established by law for the election of representatives to the U.S. Congress. Each CD is to be as equal in population to all other CDs in the state as practicable, based on the decennial census counts.
consolidated city		An incorporated place that has combined its governmental functions with a county or county subdivision but contains one or more other incorporated places that continue to function as local governments within the consolidated government. See consolidated government, incorporated place, legal entity.
consolidated government		A governmental unit that includes two or more legal entities that have joined together to form a common government; for example, a consolidated city-county government.
consolidated metropolitan statistical area	CMSA	A geographic entity designated by the federal Office of Management and Budget for use by federal statistical agencies. An area becomes a CMSA if it qualifies as a metropolitan statistical area (MSA), has a population of 1 million or more, and has component parts that qualify as primary metropolitan statistical areas, provided local opinion favors the designation. CMSAs consist of whole counties except for the New England states, where they consist of cities and towns.
content edit		An operation including a review of questionnaires for missed answers or multiple entries. The edits are designed to improve data quality and reduce item nonresponse.
continuous measurement	CM	Census data is collected once every 10 years. To provide a stream of data between decennial censuses, the Census Bureau has instituted the American Community Survey.
conventional census		See list/enumerate.
Cost and Progress System for Census 2000	C&P	Refers to both the system and the reports generated by the system. The C&P system was a component of the management information system that reported on the cost and progress of address list development and data collection, capture, processing, and dissemination for Census 2000. See Enterprise Information System.
count question resolution	CQR	A process whereby state, local, and tribal government officials could obtain answers to their concerns about the accuracy and completeness of the Census 2000 counts.

Term	Abbreviation	Description
county		A type of governmental unit that is the primary legal subdivision of every state except Alaska and Louisiana (boroughs and parishes, respectively). The Island Areas also do not have counties as their primary legal subdivision (county is a minor civil division in American Samoa). See county equivalent, governmental unit.
county equivalent		A geographic entity that is not legally referred to as a county but is recognized by the Census Bureau as equivalent to a county for purposes of data presentation. Because they contain no county-type subdivision, the Census Bureau treats the District of Columbia and Guam as county equivalents (as well as state equivalents). See also borough, census area, independent city, municipio, parish.
county subdivision		A legal or statistical division of a county recognized by the Census Bureau for data presentation. See barrio, barrio-pueblo, borough, census county division, county subarea, city, minor civil division, town, unorganized territory, village. Also see legal entity, statistical entity.
coverage edit/coverage edit follow-up	CEFU	An edit performed on the mailback census response universe. Staff make telephone calls to resolve forms that are incomplete or have other coverage discrepancies, such as a difference between the number of persons reported in that household and the number of persons for whom census information was provided on the form. This edit includes the large household follow-up.
coverage improvement follow-up	CIFU	A procedure for the traditional census in which housing units with conflicting status information are followed up.
crew leader	CL	The immediate supervisor of a team of listers, enumerators, or other field staff for a decennial census. See crew leader district, field operations supervisor.
crew leader district	CLD	The district area assigned to a crew leader, formed by grouping together a number of enumerator assignment areas.
crews of vessels		The shipboard populations of U.S. Navy, U.S. Coast Guard, and merchant marine vessels. For geographic purposes, they are assigned to the offshore area adjacent to their home port.
Customer Liaison Office	CLO	Census Bureau. The CLO is the point of contact between the Census Bureau and its external customers, both public and private. The external customers include government organizations, such as the state data centers, business and industry data centers, census information centers, governors' liaisons for Census 2000, and tribal governmental leaders, and nongovernment entities, such as the national labor unions and national nonprofit organizations.
dangerous settlements		Compounds where listers have encountered dangerous situations, such as militia groups. The listers are instructed to note the living quarters as a special place and to not interview. Though listed as a special place, special place operations are not conducted at these living quarters. Procedures for listing and enumerating these settlements include interviewing the local postmaster and public officials.
Data Access and Dissemination System	DADS	Now called the American FactFinder.
data capture audit resolution	DCAR	An edit and review on response records. An edit compares a derived count of persons to the questionnaire count. Edit failures may be resolved in-house or referred to coverage follow-up.

Term	Abbreviation	Description
data capture center	DCC	A decentralized facility that checks in questionnaires returned by mail, creates images of all questionnaire pages, and converts data to computer-readable format. The DCCs also perform other computer-processing activities, including automated questionnaire edits, work flow management, and data storage. There is one permanent DCC, the National Processing Center. For Census 2000, the Census Bureau set up three temporary DCCs. The temporary facilities were provided and operated by a private contractor through the data capture services contract.
Data Capture Management Information System	DMIS	A computerized management information system developed for use in the data capture centers. It provides automated tools to facilitate and support the management of the centers.
data capture services contract	DCSC	The contract that provides the facilities for data capture center operations and services.
Data Capture System 2000	DCS 2000	The data capture system that was used to capture information from census forms. This system incorporated the following activities: processing more than 120 million incoming forms; digitally capturing and processing billions of bits of information on the forms; converting automatically the image of the form to text-based data; and editing/repairing data that the system was unable to decipher automatically.
Data Preparation Division	DPD	Now called the National Processing Center.
Decennial Applicant Name Check	DANC	An automated system used to screen all applicants' backgrounds for criminal histories to facilitate the selection, hiring, promotion, and payrolling of qualified and suitable applicants for the conduct of Census 2000.
decennial census		The census of population and housing, taken in each year ending in zero. Article 1, Section 2 of the Constitution requires that a census be taken every 10 years for the purpose of apportioning the U.S. House of Representatives. The first census of population was taken in 1790. The Census Bureau first conducted the census of housing in 1940.
Decennial Cost Model	DCM	The primary tool for documenting and analyzing budgetary resources needed to support program requirements. It contains assumptions and parameters used to describe and analyze the budget components.
decennial field interface	DFI	The collection of systems used in the regional census centers, the census field offices, and the local census offices to control and manage the census data collection effort. It includes, among others, the operations control, payroll and personnel, map production, and management information systems.
Decennial Management Division	DMD	Census Bureau. The DMD directs and monitors the decennial census. It coordinates and provides project management for all census operations; maintains the master activity schedule, the Cost and Progress System, the Executive Information System, and the Decennial Cost Model; manages the decennial budget; manages decennial communications, issue resolution change control, and requirements documentation; and directs development of the census plan.

Term	Abbreviation	Description
decennial master address file	DMAF	Had features for controlling and tracking the long- and short-term operations and programs of Census 2000. Contained the processing status information to support document mailouts; data capture progress control, tracking, and reporting; and field enumeration processes (notably follow-ups). The base file for sampling housing units for programs, such as long-form implementation. Limited to addresses that the Census Bureau successfully linked to the TIGER® database. See master address file.
decennial response file	DRF	Contains every response to the census from all sources. The primary selection algorithm is applied to this file to unduplicate persons between multiple returns for a housing unit and to determine the housing unit record and the persons to include at the housing unit. The DRF is then combined with the decennial master address file to create the census unedited file.
Decennial Statistical Studies Division	DSSD	Census Bureau. Develops mathematical and statistical techniques for the design and conduct of the census.
Decennial Systems and Contracts Management Office	DSCMO	Census Bureau. Developed and managed major Census 2000 contracts to process Census 2000 data and disseminate data to the public.
delete		The status for an address in the master address file that no longer qualifies as a living quarters.
delivery sequence file	DSF	A computerized file containing all delivery point addresses serviced by the U.S. Postal Service (USPS). The USPS updates the DSF continuously as its letter carriers identify addresses for new delivery points or changes in the status of existing addresses.
demographic analysis	DA	An independent, macro-level approach to validate the census results. Estimates using demographic analysis are based on aggregate sets of administrative data, including birth and death records, immigration statistics, and Medicare data.
digital exchange file		An electronic file of roads and streets, their names, address ranges, and ZIP Codes obtained from a local government or commercial source and used to update TIGER®.
digital line graph		Digital information derived by the U.S. Geological Survey from its maps.
direct access		An entrance to a living quarters directly from the outside of the building or through a common or public hall (as in an apartment building).
direct sample follow-up		A methodology for nonresponse follow-up sampling whereby the initial response period stops at a specified date and a sample is selected from all remaining nonresponding units.
Director		Census Bureau. Determines policies and directs the programs of the Census Bureau, taking into account applicable legislative requirements and the needs of users of statistical information.
disclosure avoidance	DA	Statistical methods used in the tabulation of data prior to releasing data products to ensure the confidentiality of responses.
district office	DO	A pre-Census 2000 term for local offices established by the Census Bureau to conduct the decennial census. See census field office, local census office.

Term	Abbreviation	Description
division (census geographic)		A grouping of states within a census geographic region, established by the Census Bureau for the presentation of census data. The nine divisions (East North Central, East South Central, Middle Atlantic, Mountain, New England, Pacific, South Atlantic, West North Central, and West South Central) are intended to represent relatively homogeneous areas that are subdivisions of the four census geographic regions.
dress rehearsal	DR	A census of population and housing conducted in selected areas prior to a decennial census to determine the effectiveness of planned census operations. The Census 2000 Dress Rehearsal was conducted in 1998 in Sacramento, California; Menominee County, Wisconsin, including the Menominee American Indian reservation; and 11 counties in South Carolina, including the city of Columbia.
Dual Independent Map Encoding	DIME	Term used in the 1990 census. See Geographic Base File/Dual Independent Map Encoding.
dual system estimation	DSE	The estimation methodology used for the Accuracy and Coverage Evaluation (A.C.E.). This operation uses a geographic sample of block clusters to find persons missed by the census or A.C.E. and any errors from the census. The persons from the unedited census files are computer matched and then clerically matched to the data collected from the A.C.E. interviews. After the computer matching, the person matching continues through the following steps: clerical matching, field follow-up to resolve discrepancies, and a final clerical matching.
E-Sample		In the Census 2000 Accuracy and Coverage Evaluation (A.C.E.) program, the E-sample consisted of people enumerated in the census in the A.C.E. sample block clusters.
E-911 address		A number, usually unique within a county, posted on or near a structure, especially in rural areas, for use by emergency personnel to locate the structure. An E-911 address is a house number and street name address, which may or may not be used for mail delivery.
early opening local census offices	ELCO	Local census offices (LCOs) that open a year earlier than other LCOs to conduct operations required for a traditional (nonsampling) census.
economic census		The collective name for the censuses of construction, manufactures, minerals, minority- and women-owned businesses, retail trade, service industries, transportation, and wholesale trade, conducted by the Census Bureau every 5 years (in years ending in 2 and 7).
Economics and Statistics Administration	ESA	Much of the statistical, economic, and demographic information collected by the federal government is made available to the public through the ESA. The ESA has two principal agencies: the Census Bureau and the Bureau of Economic Analysis.
embedded housing unit	EHU	One of two kinds of housing units found at a special place. An EHU is a housing unit within a group quarters where the occupants live separately from others living in the group quarters. An example of an EHU is a house parent's room in a dormitory. Embedded means located within the building and not free-standing.

Term	Abbreviation	Description
emergency shelters		Includes shelters that operate on a first-come, first-served basis where people must leave in the morning and have no guaranteed beds for the next night or where people know they have a bed for a specified period of time even if they leave the building every day. Shelters also include facilities that provide temporary shelter during extremely cold weather (such as churches) and facilities that provide emergency shelter for runaway or neglected children or abused women. Emergency shelters are service locations. See hotels, motels, or other facilities; regularly scheduled mobile food vans; service locations; shelters for children who are runaways, neglected, or without housing; soup kitchens; transitional shelters.
enhanced list	E/L	Listing of addresses in blocks that were selected to be included in the Integrated Coverage Measurement survey. Conducted independently of the general address listing activities and enhanced using additional procedures to obtain the most complete address listing possible.
Enterprise Information System or Executive Information System	EIS	Used with the Cost and Progress System for Census 2000 to access reports and data from the warehouse and to report to the Department of Commerce on decennial issues, the schedule, and the cost framework.
enumeration		The process of interviewing persons and recording the information on census forms.
enumeration district		Obsolete term. Now called an assignment area.
enumerator		A Census Bureau employee who interviews people to obtain information for a census questionnaire. The term also applies to field personnel who perform activities associated with update/leave and urban update/leave.
Estimation Review System	ERS	A system used for a sampling census that provides the statistical results of the various types and phases of the estimation process to the analysts.
Executive Information System		See Enterprise Information System.
executive steering committee		The assistant to the associate director for the decennial census, associate director for the decennial census, principal associate director for programs, principal associate director/chief financial officer, associate director of field operations, and the deputy director.
extended city		See extended place.
extended place		A place that contains both urban and rural territory; i.e., an incorporated place or census designated place that is partially within and partially outside of an urbanized area or urban cluster. First used for Census 2000. Previously referred to as an "extended city," which applied only to incorporated places, subject to very specific criteria.
facility questionnaire		See Special Place Facility Questionnaire.

Term	Abbreviation	Description
false entity		A legal geographic entity of one type that is used to complete the coverage of another part of the Census Bureau's geographic hierarchy. The Census Bureau uses false entities to ensure complete coverage for certain levels of the hierarchy; for example, to ensure that all area in the nation is assigned to a geographic entity at the county level. The Census Bureau treats the District of Columbia as equivalent to both a state and a county for data presentation purposes; the county record is a false entity. The Census Bureau treats Alexandria, VA, as a place and as a statistical equivalent of both a county (see independent city) and county subdivision (see independent place); the county and county subdivision records are false entities.
feature		Any part of the landscape, whether natural (such as a stream or ridge) or artificial (such as a road or power line). In a geographic context, features are any part of the landscape portrayed on a map, including nonvisible boundaries of legal entities, such as city limits or county lines. See nonstreet features, nonvisible feature, visible feature.
federal information processing standards code	FIPS	A standardized set of numeric or alphabetic codes issued by the National Institute of Standards and Technology to ensure uniform identification of geographic entities through all federal government agencies. The entities covered are states, counties, metropolitan areas, congressional districts, foreign geographic entities, named populated and related location entities (such as places and county subdivisions), and American Indian and American Native areas.
field assignment	FA	A combination of the assignment areas used in a previous operation to form a better workload for an enumerator. See assignment area.
Field Division	FLD	Census Bureau. Plans and directs the collection of national sample survey, census, and other data at the local level. Data are collected through a flexible field organization of regional offices in 12 major cities across the country. The offices employ part-time interviewers who gather data by direct contact with the public. During major censuses, the division administers temporary regional census centers, district offices, and other offices.
field follow-up	FFU	A data collection procedure involving personal visits by enumerators to residential addresses to perform any of the following operations: resolve inconsistent or missing data items on returned questionnaires identified during content edit and possible enumeration errors discovered in coverage edit; conduct vacant/delete check; obtain data for blank or missing questionnaires; and check on addresses for which no questionnaire has been checked in.
field operations supervisor	FOS	Supervises activities of crew leaders and enumerators.
film optical sensing device for input to computers	FOSDIC	A device that reads microfilmed questionnaires and transfers the data to magnetic tape for the Census Bureau's mainframe computers. Created by the Census Bureau for the 1960 census.
follow-up	FU	A secondary census or survey operation, predominantly in data collection, carried out to successfully complete an initial operation. It is most often a telephone or personal visit interview to obtain missing data or clarify original responses. See field follow-up, nonresponse follow-up.
free-standing housing unit	FSHU	One of two kinds of housing units found at a special place. A FSHU is a living quarters that is physically separate from the group quarters at a special place. An example of an FSHU is a president's house at a college.

Term	Abbreviation	Description
Freedom of Information Act	FOIA	Created in 1974. An act that requires federal agencies to provide access to and copies of existing agency records to the public. Access can be denied only if records are within specific exempted categories, such as Title 13 data.
frontloading		Hiring and training approximately twice as many enumerators as are needed for decennial field operations to compensate for expected turnover.
functional status		The classification of a geographic entity as a legal or statistical entity. It further identifies a legal entity as an active, inactive, false, functioning, or nonfunctioning entity and, if active, denotes its fiscal independence and whether it provides general or limited special services. Functional status may determine an entity's eligibility to participate in various Census Bureau programs.
functioning entity		A generic term that refers to both active and inactive governmental units. (Even though inactive, a governmental unit has the legal capacity to carry out governmental functions; local people simply choose not to do so.) See active entity, governmental unit, inactive entity, nonfunctioning entity.
gated community		A community, composed of individual houses, duplexes, or apartment buildings, surrounded by a secured fence or other barrier allowing limited access through a secure gate.
General Services Agency	GSA	A central management agency that sets federal policy in such areas as federal procurement, real property management, and information resources management.
geocode		A code that identifies a specific geographic entity. For example, geocodes needed to identify a census block for data collection are the state code, the county code, and the block number.
geocoding		The assignment of an address, structure, key geographic location, or business name to a location that is identified by one or more geographic codes.
Geographic Base File/Dual Independent Map Encoding	GBF/DIME	The predecessor of TIGER®.
Geographic Catalog of Legal and Statistical Entities	GEO-CAT	A file that controls and describes the inventory of the higher-level geographic entities maintained by the Census Bureau, including their names, codes, attributes and hierarchical relationships. The GEO-CAT, which is part of the TIGER® system, does not include lower-level entities such as census tracts, block groups, and census blocks.
geographic code		A code, consisting of one or more alphanumeric or special-text characters, used to identify a specific geographic entity. Every geographic entity recognized by the Census Bureau is assigned one or more geographic codes. Also referred to as a geocode. See census code, federal information processing standards code.
geographic database		A computer-readable database whose primary structure includes geographic codes and/or coordinates (latitude and longitude), together with associated attributes. The TIGER® database is a geographic database.
geographic entity		A geographic unit of any type, legal or statistical, such as a state, county, place, county subdivision, census tract, or census block.

Term	Abbreviation	Description
geographic hierarchy		A geographic presentation that shows the geographic entities in a superior/subordinate structure. In this system of relationships among geographic entities, each entity (except the smallest one) is divided into lower-order units that in turn may be subdivided further. For example, states are subdivided into counties, which are subdivided into both county subdivisions and census tracts. The Census Bureau uses three sets of hierarchies: one is based on states and counties; another on American Indian areas, Alaska Native areas, and Hawaiian Home Lands; and a third on metropolitan or urban areas. See census geography, tabulation geography.
geographic information system	GIS	A computer system for the input, storage, processing, applications development, retrieval, and maintenance of information about the points, lines, and areas that represent the streets and roads, rivers, railroads, geographic entities, and other features on the surface of the Earth—information that previously was available only on paper maps.
geographic program participant database	GPP	A Census Bureau control file that records information about participation by local governments in census programs designed to improve the content of TIGER® and expand the master address list.
geographic reference file	GRF	A generic term for a file that contains geographic information such as area names, geographic codes, and selected x, y coordinate values. These files are necessary for the Census Bureau to organize the address list for the field activities and for production of tabulation displays.
Geographic Support System	GSS	The TIGER® system plus all other activities supporting the census and survey activities of the Census Bureau. This includes all decennial census geographic products, all economic and agriculture censuses geographic products, all American Community Survey geographic products, and the related computer systems. The Census Bureau's GSS also includes the geographic activities related to the master address file, the special census program, the current sample survey program, the Census Bureau's research and development activities, the operations that use the information collected by the Boundary and Annexation Surveys, references for map sources, etc.
Geographic Update System	GUS	The operations in the regional offices (ROs) and regional census centers (RCCs) that implemented the update of the information in the TIGER® database. Also, a computer software package for the 1990 census that enabled census staff in the Census Bureau's ROs/RCCs and the then Data Preparation Division to view, analyze, and interactively update and revise the information in the TIGER® database as a result of various field operations. See Geographic Update System for X Window (GusX).
Geographic Update System for X Window	GusX	The Census 2000 version of the Geographic Update System (GUS) software. It was more flexible, object-oriented, and user-friendly than the GUS, with operators at various decentralized sites using the Census Bureau's UNIX workstations to access and manipulate information in the TIGER® database. The X refers to the software that runs the X Window Utility program, together with a Motif graphical user interface, on a UNIX platform.
Geography Division	GEO	Census Bureau. GEO defines decennial census geography; creates and maintains the master address file; spatially locates addresses using the TIGER® database; maintains and updates TIGER®; and provides geographic support for other business, economic, and government surveys and censuses.

Term	Abbreviation	Description
Government Accountability Office	GAO	An investigative arm of the Congress that performs audits and evaluations of government programs and activities.
Government Printing Office	GPO	U.S. government. The mission of the Government Printing Office is to inform the nation by producing, procuring, and disseminating printed and electronic publications of the Congress as well as the executive departments and establishments of the federal government.
governmental unit	GU	A governmental unit is an organized entity which, in addition to having governmental character, has sufficient discretion in the management of its own affairs to distinguish it as separate from the administrative structure of any other governmental unit. To have governmental character, an entity must have existence as an organized entity and responsibility to the public.
group quarters	GQ	A place where people live or stay other than the usual house, apartment, or mobile home. Two general types of group quarters are recognized: institutional (for example, nursing homes, mental hospitals or wards, hospitals or wards for chronically ill patients, hospices, and prison wards) and noninstitutional (for example, college or university dormitories, military barracks, group homes, shelters, missions, and flophouses). Group quarters may have housing units on the premises for staff or guests.
group quarters enumeration		An operation designed to enumerate people living or staying in group quarters. Enumerators visit each special place with group quarters, list the names of the people living or staying there, and leave an Individual Census Report for each person to complete. Enumerators return at a later date to pick up the forms and, if necessary, conduct interviews to obtain any missing information or conduct interviews with nonrespondents. See group quarters.
hard to enumerate	HTE	A term used to describe an area whose environment or population may present difficulties for enumeration.
Hawaiian Home Lands	HH	Areas created as a result of the Hawaiian Homes Commission Act of 1920 to provide agricultural, pastoral, and residential land for native Hawaiians.
headquarters	HQ	A term sometimes used to designate the Census Bureau facility, staff, and operations in Suitland, MD.
heterogeneity		Heterogeneity occurs when blocks of housing units assigned to sampling strata or groupings do not have equal chances of being included or missed by the census or survey. Heterogeneity creates difficulty for the small area estimation process because the correction factor is applied to all people with the specified characteristic in that sampling poststratum even though some of them do not actually have the coverage characteristics.
highest elected official		The elected or appointed person who is the chief executive official of a governmental unit and is most responsible for the governmental activities of the governmental unit, such as the governor of a state, chair of a county commission, or mayor of an incorporated place.
historic areas of Oklahoma		The area encompassing the former American Indian reservations that had legally established boundaries during the period 1900 through 1907 but were dissolved during the 2- to 3-year period preceding the establishment of Oklahoma as a state in 1907. The 1980 census tabulated data for this entity, but it was replaced for the 1990 census by tribal jurisdiction statistical areas.

Term	Abbreviation	Description
homogeneity		Homogeneity assumes that all people in a particular sampling stratum or poststratum have an equal chance of being included or missed by the census or survey. A lack of homogeneity in a particular sample block is not an error, but it does create difficulty for the small area estimation process. This happens because the correction factor is applied to all people with the specified characteristic in that poststratum even though some of them do not exhibit the same coverage characteristic.
hotels, motels, or other facilities		Hotels, motels, or other facilities for which vouchers are provided or that operate under contract to provide shelter to people without housing. These are service locations. See emergency shelters; regularly scheduled mobile food vans; service locations; shelters for children who are runaways, neglected, or without housing; soup kitchens; and transitional shelters.
house-number and street-name address	HN/SN	An address assigned to a specific structure, consisting of a number and the street name on which the structure is located. The address may or may not be used for mail delivery. See address, basic street address, city-style address, mailing address.
household		A person or group of persons who live in a housing unit. These equal the count of occupied housing units in a traditional census.
householder		The member of a household who lives at the housing unit and owns or rents the living quarters. If there is no such person present, any household member who is at least 15 years of age can answer the questionnaire.
Housing and Household Economic Statistics Division	HHES	Census Bureau. In concert with others at the Census Bureau, HHES compiles, analyzes, and publishes data on the physical, social, and financial characteristics of the nation's housing and on the socioeconomic characteristics of the nation's population.
housing unit	HU	A house, an apartment, a mobile home or trailer, a group of rooms, or a single room that is occupied as a separate living quarters, or, if vacant, is intended for occupancy as a separate living quarters. See separate living quarters.
identification number		See census identification number.
imputation		When information is missing or inconsistent, the Census Bureau uses imputation to assign values. Imputation relies on the tendency of households of the same size within a small geographic area to be similar in most characteristics. For example, the value of "rented" is likely to be imputed for a housing unit not reporting on owner/renter status in a neighborhood with multiunits or apartments where other respondents reported "rented" on the census questionnaire. There are two major types of imputation: (1) allocation, in which missing values for individual items are filled in on the basis of other reported information for the person or household (or from other persons or households with similar characteristics) and (2) substitution, in which <i>all</i> of the information for a person or household is created from other persons or households with similar characteristics.
incorporated place		A type of governmental unit incorporated under state law as a city, town (except the New England states, New York, and Wisconsin), borough (except in Alaska and New York), or village and having legally prescribed limits, powers, and functions. See consolidated city, governmental unit, independent city, legal entity, place.

Term	Abbreviation	Description
independent city		An incorporated place that is a primary division of a state and legally not part of any county. The Census Bureau treats an independent city as both a county equivalent and county subdivision for data tabulation purposes. See city, county equivalent, county subdivision, incorporated place.
independent place		In a state in which the Census Bureau recognizes minor civil divisions (MCDs), an incorporated place that is not legally part of any MCD. The Census Bureau treats an independent place as equivalent to a county subdivision and as an incorporated place for data presentation purposes. Independent places exist in 23 states and the District of Columbia.
index map		A map that shows the relationship between the map sheets, including inset maps, that cover a specific mapped geographic entity.
Individual Census Questionnaire	ICQ	A questionnaire that contains population questions for one person. The form is used at both soup kitchens and regularly scheduled mobile food vans. This form asks if the person has a usual residence but does not ask housing questions. It also asks about the person's use of services at shelters, soup kitchens, or mobile food vans. Enumerators conduct personal interviews using this form. See service-based enumeration, targeted nonsheltered outdoor location.
Individual Census Report	ICR	A questionnaire that is used during group quarters enumeration and at two service locations (shelters and targeted nonsheltered outdoor locations) that contains population questions for one person. There are both long- and short-form versions. In most group quarters, additional questions are asked of a sample (1 in 6) of the population. The forms ask if the person has a usual residence but does not ask housing questions. Enumerators distribute this form to the clients to complete. At targeted nonsheltered outdoor locations enumerators conduct personal interviews using this form. See group quarters enumeration, self-enumerating places.
industry and occupation	I&O	The current or most recent job activity reported on the census long-form questionnaire. These responses require coding and classification processing.
inset map		A Census Bureau map that displays an area at a larger scale than the scale of its parent sheet. Inset maps generally cover a densely developed area that cannot be shown clearly at the map scale of the parent sheet. See map inset.
Inspector General	IG	Department of Commerce. The IG conducts and supervises audits, inspections, and investigations of Department of Commerce programs and operations.

Term	Abbreviation	Description
Integrated Coverage Measurement	ICM	<p>This operation was proposed for Census 2000 but was not implemented. The objective of such an operation is to measure how well the Census Bureau counted people and housing in a census. A large-scale sample survey is conducted independently of regular census operations. The sample consists of block clusters in urban and rural areas. The results are matched to census results and estimates of the undercount are created. It is a micro-level approach; that is, case-by-case matching.</p> <p>There are three phases to such an operation. In the <i>housing unit phase</i>, an inventory of housing within sample blocks is conducted separately from the census. In the <i>computer-assisted personal interview (CAPI) phase</i>, an independent sample of nonrespondents is taken, and telephone and personal visit second interviews are conducted to create an independent roster. In the <i>person-matching phase</i>, persons enumerated in the census are matched to persons enumerated in the CAPI phase, follow-up interviews for discrepancies are conducted, unresolved cases are imputed as a last resort, and statistical procedures are used to produce estimates of the people missed or duplicated in the census. The final phase of such an operation is to use dual system estimation to compare the census counts to the ICM counts and create estimation factors to adjust the census results. Also called the Quality Check Survey.</p>
interactive voice recognition	IVR	An automated telephone system that offers callers different menu choices covering a variety of predetermined topics.
internal point		A set of geographic coordinates (latitude and longitude) that is located within a specified geographic entity. For many entities, this point represents the approximate center of the entity; for some, the shape of the entity or the presence of a body of water causes the central location to fall outside the entity or in water, in which case the point is relocated to land area within the entity. The geographic coordinates are shown in degrees to six decimal places in census products.
Internet Questionnaire Assistance	IQA	An operation which allows respondents to use the Census Bureau's Internet site to (1) ask questions and receive answers about the census form, job opportunities, or general questions about the purpose of the census and (2) provide responses to the short form.
Island Areas	IA	Islands included in the U.S. Census of Population and Housing are U.S. Virgin Islands, Guam, the Commonwealth of the Northern Mariana Islands, and American Samoa. Puerto Rico is sometimes called an island area. These were formerly called outlying areas.
invalid return detection	IRD	A procedure for identifying invalid non-ID'd forms, that is, forms returned in Census 2000 as an attempt to introduce error into the population count.
joint use area		Territory that is administered, claimed, and/or used by two or more American Indian tribes. It may consist of overlap of territory of adjoining American Indian reservations or Oklahoma tribal statistical areas, or off-reservation trust land for one tribe that is located within the reservation of another tribe. Such territory was referred to as joint area for the 1990 census.
key from image	KFI	An operation in which keyers enter data by referring to a scanned image of a questionnaire for which data could not be recognized by optical character recognition with sufficient confidence.

Term	Abbreviation	Description
key from paper	KFP	An operation in which keyers enter data directly from a hardcopy questionnaire which could not be read by optical character recognition.
large household	LHH	A housing unit with more than six persons.
large household follow-up	LHFU	A census operation that follows up on a household that indicated on the census form more than six persons in that housing unit. The questionnaire only allows for the reporting of information for six persons per household. This operation is included in the coverage edit.
late mail return	LMR	Mail received after the cut-off date for identifying nonresponding housing units for the nonresponse follow-up operation.
legal entity		An entity whose origin, boundary, name, and description result from charters, laws, treaties, or other administrative or governmental action, such as the United States, states, the Island Areas, counties, cities, townships, boroughs, towns, villages, American Indian reservations, Alaska Native Villages, congressional districts, and school districts. The legal entities recognized for a decennial census are those in existence on January 1 of the decennial census year.
list/enumerate	L/E	A method of data collection in sparsely populated (rural) and remote areas, such as remote Alaska. The procedures are to list addresses or physical locations for housing units, enumerate the household, and update the census map as needed. The enumerators list each residential address or location description and conduct the enumeration in one visit using a short- or long-form according to the sampling pattern for the assignment area.
lister		A census employee who obtains addresses and related information and records the information on address listing pages and census maps.
living quarters	LQ	A dwelling where people live, stay, or could live. Living quarters are classified as housing units or group quarters. They are usually found in structures intended for residential use but also may be found in structures intended for nonresidential use as well as tents, vans, shelters for people without housing, dormitories, barracks, and so forth.
local census office	LCO	Temporary Census Bureau offices established for Census 2000 data collection purposes. Called "district office" in previous censuses.
Local Update of Census Addresses	LUCA	A Census 2000 program, established in response to requirements of Public Law 103-430, that provided an opportunity for local and tribal governments to review and update individual address information in the master address file and associated geographic information in the TIGER® database to improve the completeness and accuracy of both computer files. The governments had to sign a confidentiality agreement to participate. Also called the address list review program.
Local Update of Census Addresses field verification		An operation verifying the existence and the residential status of addresses given to the Census Bureau by local officials during the LUCA program.
location description		A description of the physical location or characteristics of a living quarters that does not have a house-number and street-name address.

Term	Abbreviation	Description
locator map		A census map that helps enumerators find the location of and determine how to travel to their assignment areas. The map covers more area than the assignment area.
long form	LF	The decennial census questionnaire containing 100 percent and sample questions. See short form.
long-form sampling		A variable rate sampling plan is used to determine which households receive the long form. The Census Bureau samples for the long form using four rates based on the size of a government. Nationally, or overall, 1 in 6 households receive a long form. This is a sample for content; that is, a sample determining which households receive the long-form content.
mail census area		The area covered by the mailout/mailback, update/leave, and urban update/leave methods of enumeration.
mail response rate		The total number of <i>checked-in</i> questionnaires returned by mail divided by the number of questionnaires mailed by the U.S. Postal Service or delivered by census enumerators. This check-in rate differs from a true mail response rate because it reflects forms that have been processed and not necessarily all of those that have been received.
mail return rate		The total number of households returning a questionnaire by mail divided by the number of <i>occupied</i> housing units that received a questionnaire by mail or by a census enumerator (the only ones that can return a questionnaire). This measure cannot be derived until the enumeration is completed and the final number of occupied housing units is determined.
mailing address		This address is used by a living quarters, special place, business establishment, and the like to receive mail. It may be a house number and street name, which may be followed by an apartment, unit, or trailer lot designation; building or apartment complex name and apartment designation; trailer park name and lot number; post office box or drawer; rural route or highway contract route, which may include a box number; or general delivery. A mailing address also includes a ZIP Code. A mailing address may serve more than one living quarters, establishment, or the like. See basic street address, city delivery area, city-style address, house-number and street-name address, non-city-style address, nondelivery area, rural delivery area, ZIP Code.
mailout/mailback	MO/MB	A method of data collection in which the U.S. Postal Service delivers addressed questionnaires to residents who are asked to complete and mail back the questionnaire to the appropriate Census Bureau office. This method is used for more than 80 percent of all households (usually city-style addresses).
Management Information System	MIS	Provides decision support functions, such as critical-path analysis and what-if analysis. Provided information on dates, the responsible organization, budget, cost to date, and current progress of Census 2000 operations. It includes the master activity schedule, the Executive Information System, and the Cost and Progress System.
map feature		Any part of the landscape, whether visible—either physical (i.e., natural features such as water bodies and their shorelines, mountain peaks) or cultural (i.e., manmade features such as roads, streets, railroads, power lines)—or invisible on the ground (e.g., boundaries of legal entities, national parks, and military installations; property lines; imaginary street extensions), that is portrayed on a map as a point, line, or area. See boundary, feature, nonstreet feature.

Term	Abbreviation	Description
map image metafile	MIM	A computer file that provides a full-image description of a census map in digital form (a human-readable format). The regional offices, regional census centers, and National Processing Center use MIMs to create maps for printing or placing on CD-ROM. See single MIM-based integrated mapping system.
map inset		A sketch map drawn by an enumerator, lister, etc., to represent an enlargement of an area that, on the original Census Bureau map, is too small to clearly display added streets and/or map spots and map-spot numbers. The map usually is drawn on the back of the map sheet that contains the enlarged area, but a separate sheet of paper may be used for this purpose. See inset map.
map legend		An illustrated list of map content: the symbols, type styles, and, if appropriate, shading or colors shown on a map or map series, and the meaning of each.
Map Plotting System	MAPS	The MAPS site or area is the portion of the regional office/regional census center in which maps are produced, assembled, and stored.
map spot		An enumerator places a dot on a census map to show the location of one or more living quarters. The enumerator assigns a number, unique within the census block, to each map spot to correspond to the entry in the address register for a basic street address or residential structure. The map spots are entered into the TIGER® system. For Census 2000, map spots were identified primarily by census listers and enumerators during address listing and list/enumerate operations but also created during the Local Update of Census Addresses, update/leave, rural update/enumerate, and some follow-up operations.
map spot number		The number assigned uniquely to each map spot within a census collection block. The same number could represent more than one living quarters if they were located in a multiunit structure. Map-spot numbers began with "1" in each collection block and continued until every residential structure in a block was represented by a map spot. Map-spot numbers could include one or more alphabetic suffixes, to account for residential structures added between previously listed ones during quality assurance rework of a listed block, update/leave, update/enumerate, and Census 2000 follow-up operations; e.g., if a missing living quarters was found between map spots 11 and 12, it could be assigned the number 11A. There could be gaps in the numbering system if a map spot had been deleted because a listed living quarters was found not to exist or to have been mislocated. If a map spot represented more than one living quarters, the number of living quarters was shown in parentheses after the map spot number on the map. The Census Bureau assigned special 4-digit numbers to represent various types of special places/group quarters.
Marketing Services Office	MSO	Census Bureau. The MSO creates innovative and effective marketing communication channels, enhances the corporate marketing infrastructure, infuses a marketing culture and customer orientation, institutionalizes internal customer information systems, and assists in new product development.
master activity schedule	MAS	A schedule of all activities involved in the planning, preparation, conduct, and data capture, processing, and dissemination of the Census 2000.

Term	Abbreviation	Description
master address file	MAF	The MAF is a list of every living quarters nationwide and their geographic locations. The computer file was created by combining the addresses in the 1990 address control file with the current versions of the U.S. Postal Service delivery sequence file, and supplementing this with address information provided by state, local, and tribal governments. The MAF ties to the TIGER® database. The MAF was updated throughout the decade to provide addresses for delivery of Census 2000 questionnaires, to serve as the sampling frame for the Census Bureau's periodic demographic surveys, and to support other Census Bureau statistical programs. See decennial master address file.
Master Address File Geocoding Office Resolution	MAFGOR	An operation where the regional offices and regional census centers try to find the location of addresses from the U.S. Postal Service that did not match to the records in TIGER®. Staff use atlases, maps, city directories, and the like to locate these addresses and add them to TIGER®.
master address file update file	MAFUF	Census Bureau staff do not individually key new addresses and address revisions directly into the master address file (MAF). Instead, using a specified format, they key the relevant information into a file—MAFUF—that stores the information until the Geography Division is ready to merge the complete updated file into the MAF in a batch process.
metropolitan area	MA	A collective term established by the federal Office of Management and Budget (OMB) in 1990 to refer to metropolitan statistical areas, consolidated metropolitan areas, New England county metropolitan areas, and primary metropolitan statistical areas. The OMB establishes MAs based on census data.
metropolitan statistical area	MSA	These are designated by the federal Office of Management and Budget for use by federal statistical agencies. These geographically based entities are a core area with a large population nucleus plus adjacent communities with a high degree of economic and social integration with the core. An MSA consists of one or more counties, except in New England, where MSAs are defined in terms of cities and towns; however, New England county metropolitan areas are defined in terms of counties. See consolidated metropolitan statistical area, metropolitan area, New England county metropolitan area, primary metropolitan statistical area, and statistical entity.
Military Census Report	MCR	Questionnaire used to conduct the census in military installations.
military/maritime enumeration		An operation counting domestic military installations and ships assigned to a home port in the United States and maritime vessels in operation on Census Day.
minor civil division	MCD	For demographic census purposes, a primary government, such as a township, or an administrative subdivision of a county, such as a precinct or magisterial district.
multiunit structure		A building that contains more than one housing unit (for example, an apartment building).
municipality		A legally established entity in Alaska and the Northern Mariana Islands. The Census Bureau treats a municipality as equivalent to a county for data presentation purposes. The Bureau also treats the municipality (Anchorage) in Alaska as an incorporated place. This designation in Alaska is new for Census 2000. See borough, census area, city and borough, county.

Term	Abbreviation	Description
municipio		A type of governmental unit that is the primary legal subdivision of Puerto Rico. The Census Bureau treats municipios as the statistical equivalents of counties. See county equivalent and governmental unit.
must-hold boundary		A map feature that the Census Bureau agrees to recognize as the boundary of a tabulation census block. The purpose is to ensure that data are available for a specific geographic area because its component areas have been identified as unique census blocks.
National Academy of Sciences	NAS	U.S. government. The NAS is a private, nonprofit society of scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare.
National Archives and Records Administration	NARA	U.S. government. The NARA oversees the management of federal government records, including individual census records after 72 years, presidential diaries, historic correspondence, and a display of presidential gifts from around the world.
National Content Survey (1996)		One of the test censuses done as part of the planning and testing process for Census 2000. It was the principal vehicle for testing and evaluating subject content for Census 2000. It also provided information on questionnaire design and on mailing strategy and techniques to improve coverage.
National Institute of Standards and Technology	NIST	Department of Commerce. An organization under the Technology Administration. The NIST promotes United States economic growth by working with industry to develop and apply technology, measurements, and standards.
National Operations Center	NOC	The staff and facilities at the National Processing Center that served as one of the data capture centers for Census 2000.
National Processing Center	NPC	The permanent Census Bureau processing center in Jeffersonville, Indiana. It included the National Operations Center.
National Research Council	NRC	The council is the principal agency of the National Academy of Sciences for advising the government, the public, and the scientific and engineering communities.
National Technical Information Service	NTIS	Department of Commerce. An organization under the Technology Administration. The NTIS promotes the nation's economic growth and job creation by providing access to federally produced information for the public and production services to federal agencies.
National Telecommunications and Information Administration	NTIA	Department of Commerce. The NTIA is the executive branch's principal voice on domestic and international telecommunications and information technology issues.
New Construction Capture	NCC	This operation was conducted shortly before Census 2000. Local and tribal governments reported new living quarters built since the Local Update of Census Addresses (LUCA) operation.
New England county metropolitan area	NECMA	A county-based area designated by the federal Office of Management and Budget to identify metropolitan areas in New England.
no identification number	Non-ID	A response without a census identification number. The census identification number associates the response with a specific address in the master address file.

Term	Abbreviation	Description
non-city-style address		An address that does not use a house number and street name. This includes rural routes and highway contract routes, which may include a box number; post office boxes and drawers; and general delivery. See address, city-style address, mailing address, nondelivery area, and rural delivery area.
nondelivery area		An area in which the U.S. Postal Service does not deliver mail to homes, businesses, and the like. Instead, the residents must pick up their mail at a local post office, using either a post office box or drawer or general delivery. See city delivery area, noncity-style address, and rural delivery area.
nonfunctioning entity		A legal entity that cannot have elected or appointed officials to provide services or raise revenues. Such entities include administrative areas, such as voting districts, and areas from which people are elected to a legislative body, such as congressional districts and state legislative districts. Some counties and minor civil divisions are nonfunctioning entities. See legal entity.
nongovernmental organization	NGO	The partnerships developed during Census 2000 planning included national and local organizations and community groups. See partnerships.
nonresponse	NR	Housing units from which no questionnaire was returned by mail or from which a telephone response was not received.
nonresponse conversion operation	NRCO	A step in the Accuracy and Coverage Evaluation survey process during the person interviewing stage. At a cutoff date, all person interviewing cases are brought in from the field. The best interviewers are assigned to the unresolved cases. This is a last attempt to convert refusals to responses.
nonresponse follow-up	NRFU	The objective is to obtain a completed questionnaire from households for which a questionnaire was not received by mail or from which a telephone response was not received. A census follow-up operation in which temporary field staff, known as enumerators, visit the housing units in which these households reside.
nonsampling error		Errors that occur during the measuring or data collection process. Nonsampling errors can yield biased results when most of the errors distort the results in the same direction. Unfortunately, the full extent of nonsampling error is unknown. Decennial censuses traditionally have experienced nonsampling errors, most notably undercount, resulting from people being missed in the enumeration processes.
nonstreet feature		A natural or artificial part of the landscape, such as a stream, ridge, road, or power line. See feature, nonvisible feature, and visible feature.
nonvisible feature		A boundary of a legal entity, such as a county line, city limit, property line, and so forth. See feature, nonstreet feature, and visible feature.
occupied housing unit		A housing unit is classified as occupied if it is the usual place of residence of the person or group of persons living in it at the time of enumeration or if the occupants are only temporarily absent; for example, away on vacation. Occupied rooms or suites of rooms in hotels, motels, and similar places are classified as housing units only when occupied by permanent residents, that is, individuals for whom the facility is their usual place of residence.

Term	Abbreviation	Description
Office of Management and Budget	OMB	U.S. government. The OMB's predominant mission is to assist the President in overseeing the preparation of the federal budget and to supervise its administration in Executive Branch agencies.
Office of Personnel Management	OPM	U.S. government. The OPM is the federal government's human resources agency.
operational test dry run	OTDR	A practice test of the data capture centers.
Operations Control System 2000	OCS/2000	This system was one of the decennial field interface systems and was used for control, tracking, and progress reporting for all field operations conducted for Census 2000, including production of materials used by field staff to do their work.
optical character recognition	OCR	Technology that uses an optical scanner and computer software to "read" human handwriting.
optical mark recognition	OMR	Technology that uses an optical scanner and computer software to scan a page, recognize the presence of marks in predesignated areas, and assign a value to the mark depending on its specific location and intensity on a page.
outlying areas		Obsolete term. See Island Areas.
overseas enumeration		Counts federal employees assigned overseas (including members of the Armed Forces) and their dependents, and persons on board United States military ships assigned to a foreign home port.
P-sample		People identified as nonmovers or out-movers and were residents of the A.C.E. survey housing unit on Census Day.
paper-assisted personal interview	PAPI	A method of data collection in which the enumerator uses a paper form to complete the interview.
parish		A type of governmental unit that is the primary legal subdivision of Louisiana, similar to a county in other states. See county equivalent and governmental unit.
Participant Statistical Areas Program	PSAP	A Census 2000 program that provided tribal and local officials with the opportunity to review and revise existing statistical areas and identify new ones. The program included census tracts, block groups, census designated places, and census county divisions. See statistical entity.
partition		A portion of the TIGER® database separated to effectively manage the size of that database in order to support operations such as updating, processing, and mapping of a specific part of the database. A partition usually consists of an entire county or statistically equivalent entity, but a county that has many records in the database may be divided into multiple partitions to allow the computer to process, and enable staff to work with, smaller files. For most operations, only one person at a time can access a partition. Also referred to as a county partition.
partnerships		Agreements with state, local, and tribal governments and community groups that gave these groups an opportunity to participate in various ways in Census 2000.
personal visit	PV	Face-to-face contact between a member of the public and an enumerator to obtain data.

Term	Abbreviation	Description
physical/location description		A short written description of the location and physical characteristics of a living quarters that does not have a house-number/street-name address. The description, together with the Census Bureau map showing the location of the map spot number for the living quarters, is intended to help Bureau staff recognize this living quarters in the field. (Note: After Census 2000, the Census Bureau changed this to “physical description,” relying on the location of the numbered map spot on the Census Block Map to identify the approximate site of each residential structure.)
place		A concentration of population either legally bound as an incorporated place or identified by the Census Bureau as a census designated place. See census designated place, incorporated place, legal entity, and statistical entity.
place of birth	POB	State or foreign country in which a person was born.
place of work	POW	The street address or location of a person’s current workplace.
planning database		A geographic database containing prior census housing, demographic, and socioeconomic variables correlated with nonresponse and undercounting data and used to identify specific geographic areas (for example, tracts) that could benefit from special enumeration methods to improve coverage.
Planning, Research, and Evaluation Division	PRED	Census Bureau. Provides technical expertise and executive leadership for planning future censuses and surveys. Coordinates policy and program related activities for future censuses and surveys.
political entity		See governmental unit and legal entity.
Population Division	POP	Census Bureau. Provides regularly updated information on the population of the United States and its demographic, geographic, and social characteristics. The division’s International Programs Center provides demographic and socioeconomic data on all major countries.
postal validation check	PVC	The U.S. Postal Service workers validate the master address file for addresses within the mailout/mailback area. Formerly called casing.
post-enumeration survey	PES	Evaluates coverage on a case-by-case basis using the Dual System Estimation methodology. Provides undercount information for detailed categories, such as renter/home owner and racial and ethnic group, which is not possible with demographic analysis. The Census 2000 Accuracy and Coverage Evaluation was a post-enumeration survey.
postmaster return	PMR	See undeliverable as addressed.
poststratum		The grouping of people within a particular stratum: for example, all white, non-Hispanic male renters ages 18–22 (poststratum) in a rural area (stratum).
Pre-Appointment Management System/Automated Decennial Administrative Management System	PAMS/ADAMS	An integrated structure of administrative management programs that supports applicant tracking and processing, background checks, selection records, recruiting reports, personnel and payroll processing, and archiving of historical data. This system was used in the hiring of temporary workers for Census 2000.
precanvass		See block canvassing.
prelist		See address listing.

Term	Abbreviation	Description
primary metropolitan statistical area	PMSA	A geographic entity designated by the federal Office of Management and Budget for use by federal statistical agencies. If an area meets the requirements to qualify as a metropolitan statistical area and has a population of 1 million or more, two or more PMSAs may be designated within it if they meet published statistical criteria and local opinion favors the designation. When PMSAs are designated within an MSA, the larger area of which they are components is designated a consolidated metropolitan statistical area. See statistical entity.
primary selection algorithm	PSA	Computer program applied to the decennial response file (DRF) to eliminate duplicate responses and to determine the housing unit record and the persons to include at the housing unit. After this procedure, the DRF is merged with the decennial master address file to create the census unedited file.
Privacy Act	PA	A 1974 act that places restrictions on the collection, use, maintenance, and release of information about individuals. It gives individuals the right to see records about themselves, to obtain copies of their records, to have records corrected or amended with agency approval, and to have a statement of disagreement filed in their records if the agency does not approve the correction or amendment.
Privacy Act notice		Form D-31 is a notice that advises persons of the authority under which the Census Bureau collects information, how it will use the information, and the effect of not answering a question.
production rate		A performance measure calculated as the number of cases completed within a specified time period: for example, cases completed per hour or cases completed per day.
Program for Address List Supplementation	PALS	This program was discontinued in 1997. It was created for Census 2000 to provide governmental units and regional and metropolitan agencies an early opportunity to submit lists of individual addresses for their communities to the Census Bureau for use in building the master address file.
program master plans	PMP	These documented all preparatory, field, processing, and statistical requirements for each major Census 2000 operation. The plans were coordinated by the Decennial Management Division program management staff.
Program Steering Committee	PSC	The PSC and the Management Integration Team provided the structure for the early planning of Census 2000 and were replaced by the Census Operational Managers, the Issue Resolution/Change Control Board, and the Decennial Division Chiefs Steering Committee.
pseudo-LCO		For Census 2000, where the land area under the authority of an American Indian tribe or the populated area of a military base was situated in more than one state or included widespread discontinuous parcels of land that could not satisfactorily be included within the boundary of a single local census office (LCO), the Census Bureau assigned such lands to the LCO that contained the administrative offices or headquarters of the tribe or base. As a result, each tribe or base worked with only one LCO for the census. The Census Bureau informally referred to the lands involved in the reassigned areas as pseudo-LCOs because they were not actually LCOs in their own right. Each pseudo-LCO was assigned a unique code; the first two digits were those of the regional census center (RCC) in which the pseudo-LCO was physically located and the last two digits were 66 through 89. Thus, an RCC could contain as many as 24 pseudo-LCOs.

Term	Abbreviation	Description
pseudo-tract		See interim census tract.
pseudo-voting district	pseudo-VTD	An area for which the Census Bureau reports voting district (VTD) data, even though the boundary of the actual VTD was adjusted by the reviewing officials so that it no longer matches the legally established boundary. Because the Census Bureau required that VTDs conform to census blocks for data presentation purposes, participants had to adjust some VTDs to use census block boundaries. Any VTD that was not identified by a participant as an actual VTD was shown with a "P" VTD indicator flag in the Census 2000 Redistricting Data (Public Law 94-171) Summary File. See voting district.
Public Information Office	PIO	Census Bureau. Manages relations with the news media, produces radio and video news releases, distributes daily newspaper clips of Census Bureau stories, administers the foreign visitors program, and writes and edits a variety of publications.
Public Law 94-171	P.L. 94-171	The public law requiring the Census Bureau to provide selected decennial census data tabulations to the states by April 1 of the year following the census. These tabulations are used by the states to redefine the areas included in each congressional district and the areas in other districts used for state and local elections, a process called redistricting.
Public Law 103-430	P.L. 103-430	The public law that amends Title 13, U.S. Code, to allow designated local and tribal officials access to the address information in the master address file to verify its accuracy and completeness. This law also requires the U.S. Postal Service to provide its address information to the Census Bureau to improve the master address file.
public use form	PUF	A form issued by a federal agency to obtain information from the public. A PUF that is to be administered to ten or more persons requires prior approval and clearance by the Office of Management and Budget.
public use microdata area	PUMA	A geographic entity for which the Census Bureau provides specially selected extracts of raw information from a small sample of long-form census records that have been screened to protect confidentiality of the census records. The extract files are referred to as public use microdata samples. For Census 2000, PUMAs, which must have a minimum census population of 100,000 and cannot cross a state line, received a 5 percent sample of the long-form records; these records were presented in state files. These PUMAs were aggregated to form "super-PUMAs," which required a minimum census population of 400,000 and received a 1 percent sample in a national file. (For the 1990 census, the 1 percent PUMAs needed a minimum census population of only 100,000, could cross state lines, and could cover areas that were different from the 5 percent PUMAs.) An area received both the 5 percent and 1 percent files when a super-PUMA coincided with a single PUMA. PUMAs for Census 2000 were delineated by state officials and comparable officials in the District of Columbia and Puerto Rico. As in 1990, the Census Bureau provided a 10 percent sample file each for Guam and the Virgin Islands. Data users can use these files to create their own statistical tabulations and data summaries. PUMAs were referred to as county groups for the 1980 and earlier censuses.
public use microdata sample	PUMS	Computerized files containing a small sample of individual long-form census records showing the population and housing characteristics of the people included on those forms. See public use microdata area.

Term	Abbreviation	Description
Puerto Rico	PR	See Island Areas.
Puerto Rico area office	PRAO	This is equivalent to a mini regional census center and has nine local census offices reporting to it.
quality assurance	QA	A systematic approach to build excellence into a process.
quality check		See Integrated Coverage Measurement.
quality control	QC	Using various statistical methods to validate that products meet standards.
questionnaire		The census or survey form on which a respondent or enumerator records information requested by the Census Bureau for a specific census or special survey.
Questionnaire Assistance Center	QAC	Centers established by local census offices to assist respondents in completing their questionnaires. Established in community centers, large apartment buildings, and so forth and staffed by volunteers and Census Bureau employees. See Walk-In Questionnaire Assistance Center.
<i>Questionnaire Reference Book</i>	QRB	This book provides detailed instructions to enumerators on how to fill out the census form.
Race and Ethnic Advisory Committees	REAC	An in-house term referring to the separate advisory committees on the race and ethnic populations. The original committees were the Census Advisory Committee on the African American Population, Census Advisory Committee on the American Indian and Alaska Native Populations, Census Advisory Committee on the Asian and Pacific Islander Populations, and Census Advisory Committee on the Hispanic Population. In 2000, the Asian and Pacific Islander Populations Committee became two committees—the Asian Advisory Committee and the Native Hawaiian and Other Pacific Islander Advisory Committee.
Race and Ethnic Targeted Test	RAETT	A test, conducted in 1996 in selected areas of the country, to evaluate alternative formats and sequencing of the race, Hispanic-origin, and ancestry questions.
ready for use	RFU	Indicates that the installation of hardware and software has passed testing and is ready for use.
reapportionment		The redistribution of seats in the U.S. House of Representatives among the states on the basis of the most recent decennial census as required by Article 1, section 2 of the Constitution. See apportionment, redistricting.
redistricting		The process of revising the geographic boundaries of areas from which people elect representatives to the U.S. Congress, a state legislature, a county or city council, a school board, and the like to meet the legal requirement that such areas be as equal in population as possible following a census. See apportionment, reapportionment.
Redistricting Data Program	RDP	A decennial census program that permits state officials to identify selected map features they want as block boundaries and specific areas, such as voting districts for which they need census data. See Block Boundary Suggestion Project, redistricting, voting district.
refusal		Reluctance by residents, apartment managers, local officials, or others to cooperate with census employees.
region (census geographic)		A grouping of states established by the Census Bureau for the presentation of census data. Each region (Northeast, South, Midwest, and West) is subdivided into divisions. See division (census geographic), statistical entity.

Term	Abbreviation	Description
regional census center	RCC	One of 12 temporary Census Bureau offices established to manage local census office activities and to conduct geographic programs and support operations, such as automated map production. The Census Bureau also operates an area office to manage census operations in Puerto Rico.
regional director	RD	The head of a regional office.
Regional Elected Officials Meeting	REOM	One of a series of regional meetings conducted by the Census Bureau with elected officials of local and state governments to encourage their support for Census 2000.
regional office	RO	One of 12 permanent offices established for the management of all census operations in an area that covers several million housing units.
regularly scheduled mobile food vans		Includes mobile food vans that are regularly scheduled to visit designated street locations for the primary purpose of providing food to people without housing. These are service locations. See service-based enumeration.
reinterview		The objective is to verify that enumerators collected accurate information. A sample of households in an assignment area is contacted again in person or by telephone. An enumerator re-asks certain questions and compares the answers to the original questionnaire. This verifies that the enumerator visited the correct address and that the questionnaire was completed accurately. This operation is performed in all areas after nonresponse follow-up and list/enumerate or rural update/enumerate.
reminder/thank you card		This is a postcard sent to addresses on the decennial master address file to remind respondents to return their census questionnaires or to thank them if they already have. All addresses in mailout/mailback areas receive a postcard. The Census Bureau conducts a blanket-mailing of these postcards to postal patrons (no addresses) in update/leave areas.
remote Alaska enumeration		List/enumerate is used for remote parts of Alaska. The unique aspect of remote Alaska enumeration is it begins in mid-February so enumerators can reach people living in remote locations before the spring thaw. After the spring thaw, travel to these areas is difficult. Questions are asked as of Census Day.
replacement questionnaire		A second questionnaire sent to addresses on the decennial master address file in mailout/mailback areas to increase mail response rates as part of the questionnaire mailing strategy. This was not used for Census 2000.
request for proposal	RFP	A government announcement in the <i>Commerce Business Daily</i> and on the Internet requesting vendors to propose a technical solution with costs for a statement of need or a statement of work. See statement of need, statement of work.
requirements initiative	RI	The documentation of business plans in support of expenditure of funds for acquisition of information technology products and services.
research and development	R&D	The R&D program for Census 2000 started in 1991 and ended in 1995.
research and experimentation	REX	The program of studies used to evaluate a census, to research new procedures and techniques, and to conduct experiments under true census conditions. For Census 2000, this program was referred to as Testing, Experimentation, and Evaluation.

Term	Abbreviation	Description
residence status		Each person in the coverage measurement sample block is assigned a residence status code identifying the person as either a resident or nonresident of the housing unit on Census Day.
Residential Finance Survey	RFS	This survey has been done every 10 years following the census since 1950. The survey collects information about the acquisition and financing of residential properties in the United States.
respondent		The person supplying survey or census information about his or her living quarters and its occupants.
restricted access building/secured building		An apartment building (that is, multiunit building) that can be entered only through doors that are locked to the public.
rural		Territory, population, and housing units not classified as urban constitute rural. The urban and rural classifications cut across other hierarchies; for example, there are generally both urban and rural territories within both metropolitan and nonmetropolitan areas.
rural delivery area		An area within which a post office delivers mail to residents living on rural delivery routes, as designated by the U.S. Postal Service. While many housing units in a rural delivery area use non-city-style addresses, some rural delivery routes include a substantial number that use house number and street name addresses. See city delivery area, city-style addresses, non-city-style addresses, and nondelivery area.
rural update/enumerate	RU/E	The enumerator attempts to update address lists and enumerate housing units for selected hard-to-enumerate rural areas. They also update and correct the census maps if needed.
sample census edited file	SCEF	A file containing 100 percent and sample characteristics for housing units and persons in the long-form sample. Processing for the SCEF includes merging the results of industry and occupation coding and place of work and migration coding, coding several other items, and weighting the long form responses.
sample census unedited file	SCUF	The decennial response file is combined with the decennial master address file to create the 100 percent census unedited file and the SCUF. The SCUF contains the unedited 100 percent items and sample items for all sample housing units and their residents and all sample persons in group quarters in Census 2000.
sample data		Detailed social, economic, and housing information collected on the long form from a selected portion of all housing units and people living in group quarters. The 1990 census sampled approximately 15 percent of the nation's population and 16 percent of its housing units. See 100 percent data.
sample edited detail file	SEDF	A file containing 100 percent and sample characteristics for housing units and persons in the long-form sample. The SEDF was used to create the Census 2000 sample data products and other tabulations based on the sample data.
sampling error		Errors that occur because only part of the population is directly contacted. With any sample, differences are likely to exist between the characteristics of the sampled population and the larger group from which the sample was chosen. Sampling error, unlike nonsampling error, is measurable.

Term	Abbreviation	Description
sampling stratum		A grouping or classification that has a similar set of characteristics based on the previous census.
school district	SD	A geographic area delineated by state, county, or local officials designating the school(s) that students in a particular locale must attend.
seasonal/recreational/occasional use		A housing unit held for occupancy only during limited portions of the year, such as a beach cottage, ski cabin, or time-share condominium.
self-enumerating places		Includes military facilities and group quarters, such as hospitals and prisons where the safety of the residents or the enumerators is a concern. A staff member of the facility lists the names of all people staying in each group quarters at the facility and prepares the Individual Census Report packets. A crew leader returns in a day or two to collect the completed materials. Note: Military Census Reports are used at military installations. See group quarters, Individual Census Report.
separate living quarters		Quarters in which the occupants live separately from any other individual in the building and which have direct access from outside the building or through a common hall. For vacant units, the criteria of separateness and direct access are applied to the intended occupants whenever possible.
service-based enumeration	SBE	An operation designed to enumerate people at service locations that primarily serve people without housing, such as emergency or transitional shelters; shelters for children who are runaways, neglected, or without conventional housing; shelters for abused women; soup kitchens; and regularly scheduled mobile food vans. The SBE also included enumeration at targeted nonsheltered outdoor locations. See service locations and targeted nonsheltered outdoor locations.
service locations		Locations where clients are enumerated during the service-based enumeration operation, such as emergency or transitional shelters; shelters for children who are runaways, neglected, or without conventional housing; shelters for abused women; soup kitchens; and regularly scheduled mobile food vans.
shelters for children who are runaways, neglected, or without conventional housing		Includes shelters/group homes that provide temporary sleeping facilities for juveniles. These are service locations. See emergency shelters; hotels, motels, or other facilities; regularly scheduled mobile food vans; service locations; soup kitchens; and transitional shelters.
Shipboard Census Report	SCR	A census questionnaire used for military and maritime (civilian) personnel aboard ships.
short form	SF	The decennial census questionnaire containing only the 100 percent questions. See 100 percent data, long form.
simplified enumerator questionnaire	SEQ	A questionnaire that enumerators use for transient, or T-Night, enumeration and when conducting the non-response follow-up. See nonresponse follow-up and T-Night enumeration.
single MIM-based integrated mapping system	SMIMS	A software system for creating the Map Image Metafiles (MIM).
Source Selection Evaluation Board	SEB	An evaluation group that evaluates proposals and selects the source for the contract award.

Term	Abbreviation	Description
soup kitchens		Includes soup kitchens, food lines, and programs distributing prepared breakfasts, lunches, or dinners. These programs may be organized as food service lines, bag or box lunches, or tables where people are seated, then served by program personnel. These programs may or may not have a place for clients to sit and eat the meal. These are service locations. See service-based enumeration.
special census		A federal census conducted at the request and cost of a local government to obtain population figures between decennial censuses.
special notice		A page in the address register to remind the enumerator of the confidentiality of the information being collected and to remind the enumerator to make legible entries.
special place	SP	A place containing one or more group quarters where people live or stay, such as a college or university, nursing home, hospital, prison, hotel, migrant and seasonal farm worker camp, or military installation or ship. See group quarters.
Special Place Facility Questionnaire	SPFQ	A questionnaire used to interview an official at a special place for the purpose of collecting/Updating address information for the special place and any associated group quarters and housing units, determining the type of special place/group quarters, and collecting additional administrative information about each group quarters at the special place.
Special Place Facility Questionnaire operation		An operation where interviewers at telephone centers call each special place on the special place file and conduct computer-assisted telephone interviews to collect/update address information for the special place and any associated group quarters and housing units, determine the type of special place and any associated group quarters, and collect any additional information about each group quarters at the special place. If the interview cannot be completed by phone, an enumerator visits the facility to conduct the interview. See Special Place Facility Questionnaire.
special sworn status individual	SSS	Designation for a temporary employee hired to assist the Census Bureau on work authorized by Title 13 and subject to the same confidentiality requirements as regular Census Bureau employees. See confidentiality.
standard deviation		A measure of the dispersion of values in a frequency distribution from the average.
state		A type of governmental unit that is the primary legal subdivision of the United States. See governmental unit, state equivalent.
state certifying official	SCO	The official designated annually by the governor of each state and state equivalent to review and certify that the Census Bureau's inventory of local governmental units in that state is accurate and that the boundary changes were accomplished in accordance with state law. See Boundary and Annexation Survey.
state code		A two-digit code assigned by National Institute of Standards and Technology to identify each state and state equivalent. See census code, federal information processing standards code, geographic code.

Term	Abbreviation	Description
state data center	SDC	A state agency or university facility identified by the governor of each state and state equivalent to participate in the Census Bureau's cooperative network for the dissemination of census data. An SDC also may provide demographic data to local agencies participating in the Census Bureau's statistical areas programs and may assist the Census Bureau in the identification and delineation of statistical areas.
state-designated American Indian statistical area	SDAISA	A new program offered by the Census Bureau to the states for state-recognized American Indian tribes without a land base. A state government liaison can review and update the boundaries for these geographic areas, and the Census Bureau provides data for these areas.
state equivalent		A type of governmental unit treated by the Census Bureau as if it were a state for purposes of data presentation. For Census 2000, the state equivalents included the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands of the United States, American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. See governmental unit, Island Areas, state.
state legislative district	SLD	The area represented by a member of the upper or lower chamber of a state legislature (or, for Nebraska, its unicameral legislature).
statement of need	SON	A description of the services and/or final product solicited by the government. See statement of work.
statement of work	SOW	A description of the objectives and/or tasks required to be accomplished as a part of a request for proposals or in a contract for professional services. See statement of need.
statistical entity		Any specially defined geographic entity, such as a metropolitan area, urbanized area, tribal designated statistical area, census county division, census designated place, census tract, block group, or census block, for which the Census Bureau tabulates data. Statistical entity boundaries are not legally defined, and the entities have no governmental standing. See legal entity.
Statistical Research Division	SRD	Census Bureau. Conducts statistical and methodological research motivated by practical problems arising in all phases of data collection, processing, and dissemination.
street segment		The portion of a street or road between two features that intersect that street/road, such as other streets/roads, railroad tracks, streams, and governmental unit boundaries.
subbarrio		The primary legal subdivision of a barrio or barrio-pueblo (minor civil division) in 23 municipios in Puerto Rico. Census 2000 provides the same types of data for subbarrios as it does for barrios and barrios-pueblo. See sub-MCD.
sub-MCD		A legal subdivision of a minor civil division (MCD). For Census 2000, only Puerto Rico has sub-MCDs (subbarrios).
tabulation block		A physical block that does not have any legal or statistical boundaries passing through it OR each portion of a physical block after the Census Bureau recognizes any legal or statistical boundaries that pass through it. See block, block number, collection block.
tabulation geography		The geographic entities for which the Census Bureau tabulates and presents data, such as the United States, American Indian and Alaska Native areas, states, counties, county subdivisions, places, congressional districts, metropolitan areas, census tracts, and census blocks. See collection geography, geographic entity.

Term	Abbreviation	Description
targeted canvassing		Used in the Census 2000 Dress Rehearsal. Replaced by block canvassing.
targeted mailing		The mailing of replacement questionnaires is targeted to nonrespondents, that is, households that did not return a completed questionnaire by a certain time.
targeted map update		An operation where census employees (updaters) go into the field to find the city-style address ranges that the regional offices and regional census centers (RCCs) were unable to resolve during Automated Master Address File Geocoding Office Resolution. The updaters identify the streets and address ranges by annotating census maps and lists of uncoded address ranges. They return the maps and lists to the RCCs, and the RCCs insert the information into the TIGER® database and flag errors in the master address file. The computer matches and geocodes the addresses. See Automated Master Address File Geocoding Office Operation, Boundary and Annexation Survey, census map preview, TIGER®, and TIGER® Improvement Program.
targeted multiunit check		Used in the Census 2000 Dress Rehearsal. Replaced by block canvassing.
targeted nonsheltered outdoor location	TNSOL	A geographically identifiable outdoor location open to the elements where there is evidence that people might be living without paying to stay there and those people do not usually receive services at soup kitchens, shelters, and mobile food vans. Sites must have a specific location description that will allow a census enumeration team to physically locate the site; for example, “the Brooklyn Bridge at the corner of Bristol Drive” or “the 700 block of Taylor Street behind the old warehouse.” Excludes pay-for-use campgrounds, drop-in centers, post offices, hospital emergency rooms, and commercial sites (including all-night theaters and all-night diners). See service-based enumeration.
targeting database		See planning database.
Technologies Management Office	TMO	Census Bureau. Develops and implements computer-assisted data collection and related support operations. Oversees the development of automated instruments for computer-assisted interviewing applications. Serves as liaison with production software contractors.
telephone follow-up	TFU	Telephone contact from a district office or a processing office to occupied housing units to complete or correct inadequate data for mail return questionnaires that failed the edit.
Telephone Questionnaire Assistance	TQA	A toll-free service that was provided by a commercial phone center to answer questions about Census 2000 or the census questionnaire and to conduct short-form telephone interviews.
Telephone Questionnaire Assistance field verification		An operation to verify the existence and the residential status of addresses given to the Census Bureau from the Telephone Questionnaire Assistance operation. Addresses verified by a field enumerator were added to the master address file.
tenure		All occupied housing units are classified as either owner-occupied or renter-occupied.
test census		A partial or complete census of population and housing that the Census Bureau conducts in selected areas prior to a decennial census to test the validity and effectiveness of a variety of operations, including alternatives.

Term	Abbreviation	Description
TIGER® Improvement Program	TIP	The TIGER® (Topologically Integrated Geographic Encoding and Referencing) Improvement Program provides all local governments and regional and metropolitan agencies the opportunity to assist the Census Bureau in locating and updating street features, street names, and address ranges identified as missing or incorrect in the TIGER® database. This information is needed to link U.S. Postal Service addresses with the TIGER® database. See Automated Master Address File Geocoding Office Operation, Boundary and Annexation Survey, census map preview, digital exchange file, geocode, targeted map update, TIGER®.
TIGER/Line® file		The computer-readable extract of the TIGER® (Topologically Integrated Geographic Encoding and Referencing) database that the Census Bureau makes available to the public. It contains data representing the roads, railroads, bodies of water, boundaries of legal and statistical entities, and other visible and nonvisible features, along with their attributes (names, address ranges, geographic codes, census feature class codes, and the like).
Title 13 (U.S. Code)	T-13	The law under which the Census Bureau operates and that guarantees the confidentiality of census information and establishes penalties for disclosing this information.
tool kit		Special census methods and procedures available for improving cooperation or enumeration in hard-to-enumerate areas. These are not normally scheduled operations but are available to the Census Bureau regional offices for use as needed. Examples: targeting database, team and blitz enumeration, and urban update/leave.
Topologically Integrated Geographic Encoding and Referencing	TIGER®	A computer database that contains a digital representation of all census-required map features (streets, roads, rivers, railroads, lakes, and so forth), the related attributes for each, and the geographic identification codes for all entities used by the Census Bureau to tabulate data for the United States, Puerto Rico, and Island Areas. The TIGER® database provides a resource for the production of maps, entity headers for tabulations, and automated assignment of addresses to a geographic location in a process known as “geocoding.” TIGER® was preceded by the GBF/DIME (Geographic Base File/Dual Independent Map Encoding) files. See Automated Master Address File Geocoding Office Operation, Boundary and Annexation Survey, census map preview, digital exchange file, geocode, targeted map update, TIGER® Improvement Program.
touchtone data entry	TDE	An automated data capture technology that allows a respondent, using the keypad of a touchtone telephone, to reply to computer-generated prompts.
town		A type of minor civil division in the New England states, New York, and Wisconsin and a type of incorporated place in 30 states and the Virgin Islands of the United States. See county subdivision, governmental unit, incorporated place.
township		A type of minor civil division in 16 states. In some states, many or all townships are nonfunctioning entities. In Michigan, some townships are legally designated as “charter townships.”

Term	Abbreviation	Description
tract		Small, relatively permanent statistical subdivisions of counties delineated by local committees of census data users in accordance with Census Bureau guidelines for the purpose of collecting and presenting decennial census data. These neighborhoods contain between 1,000 and 8,000 people, typically approximately 1,700 housing units and 4,000 people. Tracts are designed to have homogeneous population characteristics, economic status, and living conditions at the time they are established. Census tract boundaries normally follow visible features but may follow governmental unit boundaries and other nonvisible features. There were more than 60,000 census tracts in 2000. See statistical entity, census statistical areas committee.
tract number		Used to uniquely identify a census tract within a county.
traffic analysis zone	TAZ	An area defined by a metropolitan planning organization for tabulating transportation statistics from the census.
transient location		Includes living quarters with people who have no usual home elsewhere who were enumerated during Transient Night, or T-Night, enumeration at YMCAs, YWCAs, hostels, commercial and government-run campgrounds, campgrounds at racetracks, fairs, carnivals, and marinas. Census enumerators complete a simplified enumerator questionnaire for the residents who do not have a home elsewhere. These locations are classified as housing units.
Transient Night or T-Night, T-Night enumeration	T-NIGHT, TNE	A method of enumeration in which Census Bureau staff enumerate people at transient locations, such as campgrounds at racetracks, recreational vehicle campgrounds or parks, commercial or public campgrounds, fairs and carnivals, and marinas. Enumerators conduct a personal interview using a simplified enumerator questionnaire. No vacant units are generated by this operation. See simplified enumerator questionnaire, transient location.
transitional shelters		Includes shelters providing a maximum stay for clients of up to 2 years and offering support services to promote self-sufficiency and to help clients obtain permanent housing. These are service locations. See service locations.
tribal block group		A block group within a tribal census tract. Where a census tract numbered in the 9400 series crosses a county line, the same tribal block group may be located on both sides of that boundary. See block group, tribal census tract.
tribal census tract		A census tract or portion of a census tract located within a federally recognized American Indian reservation and/or off-reservation trust land. Thus, the boundary of a federally recognized American Indian reservation and off-reservation trust land is always a tribal census tract boundary. Some of these census tracts are numbered in the 9400 series, primarily where they cross a county line. See census tract, tribal block group.
tribal designated statistical area	TDSA	An area identified outside Oklahoma by federal- and state-recognized tribes without a land base or associated land trust.
tribal jurisdiction statistical area	TJSA	An area identified by Oklahoma tribal officials as containing the American Indian population over which they have jurisdiction.

Term	Abbreviation	Description
Tribal Review Program		A program in 1997 and 1998 to allow officials of all federally recognized American Indian and Alaska Native entities to review and update the maps for Census 2000 for their jurisdictions. Other programs involving map review for the American Indian/Alaska Native areas include Address List Map Review, Block Definition Project, Boundary and Annexation Survey, census map preview, and Local Update of Census Addresses.
turnover rate		The total number of workers who quit during a field operation divided by the total number of workers hired for that operation.
type of enumeration area	TEA	<p>A classification identifying how the Census Bureau takes the decennial census of a geographic area. Examples of possible TEAs include:</p> <ul style="list-style-type: none"> ▪ The area inside the “blue line.” For 2000, this was the mailout/mailback and urban update/leave operations. ▪ Address listing areas. ▪ List/enumerate areas. ▪ Remote areas of Alaska. <p>See address listing, blue line, list/enumerate, mailout/mailback, rural update/enumerate, update/leave, urban update/leave.</p>
undeliverable as addressed	UAA	A U.S. Postal Service notification that a mailing piece could not be delivered to the designated address. Formerly called a postmaster return.
unorganized territory	UT	The portion of a county that is not included in any legally established minor civil division (MCD) or incorporated place in a state in which the Census Bureau recognizes MCDs for purposes of decennial census data presentation. For purposes of data presentation, the Census Bureau may divide a large area of unorganized land into several UTs. See county subdivision, statistical entity.
update/enumerate	U/E	A method of enumeration in which enumerators update the mailing list obtained by address listing and other operations, update census maps, and simultaneously enumerate the area. For enumeration, they canvass selected blocks and pick up completed, unaddressed questionnaires previously left by a mail carrier or complete a census questionnaire for each occupied and vacant housing unit. For Census 2000, the Census Bureau implemented this methodology primarily in areas designated for rural update/enumerate. See rural update/enumerate, type of enumeration area, update/leave.
update/leave	U/L	A method of data collection in which the objective is to update the address register while delivering questionnaires. Enumerators personally deliver a census questionnaire to a household and at the same time update the address list and census maps. The household completes and returns the form by mail. This method is primarily used for houses without city-style addresses. See address listing, city-style address, list/enumerate, mailout/mailback, non-city-style address, type of enumeration area, rural update/enumerate.
urban		All territory, population, and housing units in urbanized areas and in places of 2,500 or more persons outside urbanized areas. The urban and rural classifications cut across other hierarchies; for example, there are generally both urban and rural territories within both metropolitan and nonmetropolitan areas.

Term	Abbreviation	Description
urban cluster	UC	A densely settled area that has a census population of 2,500 to 49,999. A UC generally consists of a geographic core of block groups or blocks that have a population density of at least 1,000 people per square mile, and adjacent block groups and blocks with at least 500 people per square mile. It may include less densely settled blocks that form enclaves or indentations or that connect discontinuous areas that have qualifying densities. A UC consists of territory outside of any place; all or part of one or more incorporated places and/or census designated places; or such a place(s) together with adjacent territory. See central place, extended place, urban, urbanized area. NOTE: Any urban area delineated in Guam is classified as an urban cluster regardless of its population size.
urban growth area	UGA	In Oregon, an "urban growth boundary" is delineated around each incorporated place or a group of incorporated places by state and local officials, and subsequently confirmed in state law, to control urban development. The Census Bureau refers to the resulting geographic entities as "urban growth areas." UGAs were new for Census 2000. ("Urban growth boundary" is a legal term; "urban growth area" is a Census Bureau term.)
urban update/enumerate	UU/E	A method of enumeration within mailout/mailback areas in selected cities to enumerate blocks occupied almost entirely by boarded-up structures. The objective is to update the address register while delivering questionnaires. Enumerators complete a census questionnaire for each occupied and inhabitable housing unit, and update the address register and the census maps. The Census Bureau did not use this type of enumeration in Census 2000.
urban update/leave	UU/L	Update/leave procedures are used in targeted urban areas where mail delivery may be a problem, such as an apartment building where the mail carrier may leave the forms in a common area. Enumerators deliver census questionnaires for residents to complete and mail back, update the address register, and update the census maps.
urbanized area	UA	An area, consisting of one or more places and the adjacent urban fringe, containing at least 50,000 people and an overall population density of at least 1,000 people per square mile of land. The Census Bureau uses published criteria to determine the qualification and boundaries of UAs. See statistical entity.
U.S. Postal Service	USPS	The organization responsible for delivering the mail questionnaires in Census 2000 and the producer of the delivery sequence file.
usual home elsewhere	UHE	A housing unit that is temporarily occupied by a person(s) who has a usual home elsewhere.
usual residence		The living quarters where a person spends more nights during a year than any other place.

Term	Abbreviation	Description
vacant housing unit		A housing unit is vacant if no one is living in it at the time of enumeration, unless the occupants are only temporarily absent. Units temporarily occupied at the time of enumeration entirely by individuals who have a usual residence elsewhere are classified as vacant. (Transient quarters, such as hotels, are housing units only if occupied. Thus, there are no vacant housing units at hotels and the like.) New units not yet occupied are classified as vacant housing units if construction has reached a point where all exterior windows and doors are installed and final usable floors are in place. Vacant units are excluded from the housing unit inventory if they are open to the elements. Also excluded from the housing unit inventory are units with a posted condemnation sign or units that are used entirely for nonresidential purposes.
vacant housing unit follow-up		The verification of the occupancy status of all cases originally identified by either the U.S. Postal Service or an enumerator as addresses without occupants or addresses that are no longer housing units.
village		A type of incorporated place in 20 states and American Samoa. The Census Bureau also treats all villages in New Jersey, South Dakota, and Wisconsin and some villages in Ohio as county subdivisions. See governmental unit, incorporated place.
visible feature		A feature that can be seen on the ground, such as a street or road, railroad track, power line, stream, shoreline, fence, ridge, or cliff. A visible feature can be a manmade or natural feature. See feature.
voice recognition entry	VRE	An automated data capture technology that allows a respondent, speaking over a telephone, to reply to computer-generated prompts.
voting district/legislative district	VTD	Any of a variety of types of areas, such as election districts, precincts, wards, and legislative districts, established by state and local governments for purposes of elections.
Walk-In Questionnaire Assistance Center		Places, such as post offices, libraries, stores and malls, schools and community centers, and other sites people frequent, where unaddressed questionnaires, called Be Counted forms, were offered in an attempt to ensure everyone had the opportunity to be counted. The centers were staffed by volunteers and Census Bureau employees.
whole household usual home elsewhere	WHUHE	See usual home elsewhere.
wide area network	WAN	A group of computers linked within a network, such as the Census Bureau's regional offices, to exchange and share information. Whereas a "local area network" may link computers within a building or among several buildings, a WAN covers more area and distance. See local area network.
work breakdown structure	WBS	A way of organizing a project by a hierarchy of its components. The master activity schedule was organized by a WBS with 13 components or major programs. All Census 2000 program documentation and planning was keyed to this.
ZIP + 4		A 4-digit code following a 5-digit ZIP Code established by the U.S. Postal Service for the purpose of expediting mail delivery. The 9-digit code generally identifies one side of a street segment or an entire cul-de-sac or similar dead-end street.

Term	Abbreviation	Description
ZIP Code	ZIP	ZIP Codes are administrative units established by the U.S. Postal Service for the distribution of mail. ZIP stands for zone improvement plan. It is a 5-, 7-, 9-, or 11-digit code assigned by the U.S. Postal Service to a street or portion of a street, a collection of streets, a business, or other establishment or structure, or a group of post office boxes to expedite the delivery of mail. The Census Bureau used only 5-digit ZIP Codes for the addresses and address ranges in most Census 2000 operations.
ZIP Code area		The addresses served by a 5-digit ZIP Code established by the U.S. Postal Service to expedite the delivery of mail. Most ZIP Codes do not have specific boundaries, and their implied boundaries do not necessarily follow clearly identifiable visible or invisible map features; also, the carrier routes for one ZIP Code may intertwine with those of one or more other ZIP Codes, and therefore this "area" is more conceptual than geographic. See ZIP + 4, ZIP Code, ZIP Code tabulation area.
ZIP Code tabulation area	ZCTA	A statistical entity developed by the Census Bureau to approximate the delivery area for a U.S. Postal Service 5-digit ZIP Code in the United States and Puerto Rico. A ZCTA is an aggregation of one or more census blocks that have the same predominant ZIP Code associated with the mailing addresses in the Census Bureau's master address file. Thus, the Postal Service's delivery areas have been adjusted to encompass whole census blocks so that the Census Bureau can tabulate census data for ZCTAs. For areas larger than 25 square miles for which the Census Bureau's master address file contained no addresses with ZIP Codes, the Census Bureau used the first 3 digits of the ZIP Code(s) that serve the area or a nearby area. For the dress rehearsal data, there were two blank spaces after such 3-digit codes; for Census 2000, there was a suffix of "XX." A water feature that could not logically be assigned to a specific ZCTA got assigned a 3-digit code followed by "HH" to indicate that the water feature could not be assigned meaningfully to any adjacent land ZCTA. ZCTAs do not include all ZIP Codes used for mail delivery. The Census Bureau first created ZCTAs for the Census 2000 Dress Rehearsal. See ZIP Code, ZIP Code area.
zona urbana	ZU	In Puerto Rico, an area consisting of the municipio seat of government and the adjacent built-up area. ZUs are delineated like census designated places, except that ZUs cannot cross municipio boundaries. ZUs have never had to meet a minimum population threshold to qualify for tabulation of census data, a criterion that for Census 2000 applied for the first time to all census designated places. See census designated place, comunidad.