Appendix B. Source and Accuracy of the Estimates

SAMPLE DESIGN

The 1987 estimates contained in this report are based on data collected from July 1987 through December 1987 for the American Housing Survey (AHS), which was conducted by the Bureau of the Census, acting as collection agent for the Department of Housing and Urban Development. The sample for this survey was spread over 394 sample areas (called primary sampling units) comprising 878 counties and independent cities, with coverage in each of the 50 States and the District of Columbia.

Approximately 55,800 sample housing units were selected for interview for the 1987 AHS. Of this number, about 4,500 were found to be ineligible because they no longer existed or information relevant to the 1987 housing inventory could not be obtained for the unit. Of the approximately 51,300 units (both occupied and vacant) that were eligible for interview, about 1,700 were classified as "noninterviews" because either no one was home after repeated visits, the respondent refused to be interviewed, or the interviewer was unable to locate the unit.

Selection of sample areas. The United States was divided into areas made up of counties and independent cities referred to as primary sampling units (PSU's). Of these PSU's, 170 were known as self-representing since the sample from the PSU represented only that PSU. These 170 PSU's were in sample with certainty. The remaining PSU's were grouped into strata and were referred to as non-self-representing, since the sample of housing units from the sample PSU represented all PSU's, both sample and nonsample, in the stratum. These non-self-representing sample PSU's were selected in two steps.

First, the Current Population Survey (CPS) formed groups consisting of one or more PSU's. In groups consisting of more than one PSU, one PSU was selected to represent all PSU's in a CPS stratum. The second step involved selecting a subset of PSU's selected by CPS. The PSU's selected for the CPS sample (some of which were self-representing for the CPS and some of which were non-self-representing for the CPS) were grouped again for AHS. For groups consisting of only one PSU selected for the CPS, that PSU was also selected for the AHS. For groups consisting of more than one PSU selected for the CPS, one PSU was selected for the AHS.

Selection of the sample housing units from the 1980 census. The overall sampling rate used to select the sample of housing units from the 1980 census for the 1987 AHS was about 1 in 2,148. The within-PSU sampling rate was determined so that the overall probability of selection for each sample housing unit was the same (e.g., if the probability of selecting a non-self-representing PSU was 1 in 10, then the within-PSU sampling rate would be 1 in 214.8).

In areas where addresses were, for the most part, complete and where new construction is monitored by permits (these areas will be referred to as address enumeration districts [ED's]), a sample of housing units that received long form questionnaires in the 1980 census was selected directly from a list of all such housing units based on certain housing and geographic information of the housing unit. A sample of living quarters that did not meet the definition of a housing unit (e.g., military barracks, college dorm) was selected independently from housing

units in address ED's. This sample of living quarters that were not housing units was used to identify units that converted to housing units since the census.

In areas where at least 4 percent of the addresses were incomplete or inadequate, or where new construction was not monitored by building permits (most rural areas), a sample of 1980 census units that received long form questionnaires was selected in several steps (these areas will be referred to as area ED's). First, the areas were grouped and a sample of areas was chosen. Next, an area of land, known as a segment, was chosen within each sample area. Finally, a sample of housing units that received 1980 census long forms was selected within the segment.

Selection of new construction housing units in permit-issuing areas. The sample of permit new construction was selected from building permits issued such that the units are expected to be completed after April 1, 1980. For certain areas and structure sizes, this included permits issued as early as March 1979, but, for the most part, includes permits issued since July 1979. Only nonmobile home new construction is covered by the building permit frame. Within each PSU, building permits were selected so that the sample would be representative in terms of geography and month of issue for permits. Clusters of approximately four housing units were created. Housing units in these clusters were subsampled at the rate of 1 in 4, yielding clusters of size 1.

Selection of supplement sample housing units in rural areas. The number of sample housing units from rural areas was increased by 50 percent in 1987 to increase the reliability of the AHS estimates of rural housing characteristics. The sample was selected using the same methods described above for the 1980 census sample in address and area ED's and for the new construction sample in permit-issuing areas. This supplementation increased the overall probability of selection for sample housing units in rural areas to about 1 in 1,432.

Housing Units Coverage Study sample. Housing units at addresses missed in the 1980 census, or units that were at inadequately described addresses in the census address registers, did not have a chance of being selected for the AHS sample. A special study, done as part of the 1980 census, called the Housing Unit Coverage Study, identified such units. A sample of these units in the Housing Unit Coverage Study was included in the AHS sample.

Housing units added since the 1980 census. Housing units added to the inventory since the 1980 census were represented using two methods. One method identified within-structure additions. These are units in structures that had a chance of being in sample because they contained at least one unit enumerated in the 1980 census.

This method was used for the Housing Unit Coverage sample as well. The other method identified whole-structure additions. These are units in structures for which none of the units in the structure were enumerated in the 1980 census.

In area ED's, all within-structure additions in structures containing at least one sample unit were interviewed for the AHS.

In address ED's, all within-structure additions in 1- to 15-unit structures containing at least one sample unit were interviewed for the AHS. In 16-or-more unit structures in address ED's, only units falling on AHS sample lines were interviewed for AHS. In address ED's, whole-structure additions were identified using area sampling methods. Under area sampling, all housing units within a land area are first listed, and then a systematic sample is selected using a start with and take every so that a desired sample size is achieved based on the expected number of units within the segment. Land areas in sample for the Health Interview Survey in 1985 were used. Only Health Interview Survey areas that were in AHS PSU's or in Health Interview Survey PSU's adjacent to AHS PSU's were used. Also, only units that were not already assigned to the Health Interview Survey were eligible. These units were then matched to the 1980 census address registers. If the address matched to the census, the unit was ineligible. (Only the basic address, i.e., 801 Main Street, had to match. Apartment number, mobile home site number, etc., did not have to match). At the time of listing, eligible units were then screened further so that only units with no previous chance of coming into sample were picked up. (The screening eliminated units such as nonmobile home new construction, which is covered by building permits, and census misses.)

In area ED's where new construction is not monitored by building permits, all land areas chosen for the sample in area ED's were used. An expected four units were chosen using area sampling methods within these land areas to identify whole- structure additions. This sample was screened at the time of listing using the same criteria as for address ED's. However, this sample was not matched to the census. One important difference to note is that new construction was not eliminated during the screening process.

In area ED's where new construction is monitored by building permits, only one-third of the land areas chosen for the sample in area ED's was used. An expected eight units were chosen using area sampling methods within these segments to identify whole- structure additions. This sample was screened at the time of listing using the same criteria as for address ED's. Again, this sample was not matched to the census. Nonmobile home new construction was eliminated by the screening process since it is covered by the building permit frame.

1987 telephone interviewing experiment. A large-scale Computer Assisted Telephone Interviewing (CATI) experiment was conducted as part of the 1987 enumeration of the AHS-National in order to investigate the effects of CATI interviewing on AHS-National data. The results of the experiment will serve as a basis for determining whether CATI should be used in future AHS-National enumerations.

The 1987 sample was divided into six panels. Two of the six panels (panels 5 and 6), or one-third of the basic sample, was randomly assigned to a maximum CATI treatment (about 16,000 cases). Units in the CATI treatment sample that were not eligible to be interviewed by CATI were screened out and sent to the field for a personal visit interview. These screened units included new construction added since 1985, the supplemental rural sample added in 1987, 1985 noninterviews, 1985 vacant units, 1985 URE's, households with eight or more members, multiunit mobile homes, special places, unit address/structure type inconsistencies, and units interviewed in 1985 indicating that they didn't have a telephone number at which they could be contacted. The remaining 10,400 units, which were units interviewed in 1985 and for which a telephone number was provided, were assigned to the Hagerstown Telehone Center (HTC) to attempt CATI. Actually interviewed by CATI were 6,400 (61.5 percent) of the eligible cases: those that could be reached by telephone, had the same household present, and consented to an interview. The eligible units not interviewed by CATI were recycled to the field for a personal visit or decentralized telephone interview.

The other four panels, or two-thirds of the sample (about 32,000 units), were assigned to a maximum decentralized or local telephone interivewing treatment (i.e., the non-CATI treatment). Within this treatment, about 40 percent of the units were actually interviewed by telephone. Those units not eligible for interview by telephone, as well as the eligible units that could not actually be interviewed by telephone, were assigned for personal visit interviews.

ESTIMATION

After assigning each unit a weight that reflected the correct probability of selection for the unit, the AHS weighting procedure consisted of two phases. In the first phase, a series of adjustments were made to account for units that could not be interviewed for a number of reasons. For each of these adjustments, a factor was computed and applied to the appropriate units. The factors were equal to the following ratio:

$$\frac{\text{Housing units to be kept after factor applied} + \text{Housing units to be dropped after factor applied}}{\text{Housing units to be kept after factor applied}}$$

The housing units that are to be kept after a factor is applied will have that factor applied to them. The first of these adjustments was done in permit segments only to account for permits that could not be sampled and units that could not be located. These were represented by all other units in permit segments including both interviews and noninterviews (excluding unable-to-locate units). The second of the adjustments was done for units in structures built before April 1, 1980. It was done to account for units that could not be located. The unlocatable units were represented by both interviews and noninterviews (excluding unable-to-locate units). The last of these adjustments was done to account for units that could not be interviewed because either no one was home after repeated visits or the respondent refused to be interviewed. When 1985 AHS or 1980 census data were available, this information was used to determine the noninterview adjustment cell. The cells included characteristics such as tenure, geography, units in structure, and number of rooms. When previous data were not available, adjustment factors were computed separately using more general characteristics such as type of area and type of housing unit (i.e., mobile home, nonmobile home).

The second phase involved a three-stage ratio estimation procedure to adjust for the sampling of non-self-representing PSU's, to account for known sampling deficiencies in new construction and to bring the sample estimate of housing units into close agreement with estimates derived from independent sources for several key characteristics.

The first stage of this procedure was employed to reduce the contribution to the variance due to the sampling of non-self-representing PSU's. The procedure takes into account the differences that existed at the time of the 1980 census between the housing units estimated from the non-self-representing sample PSU's and the actual 1980 census count of housing units from all non-self-representing strata. Factors accounting for these differences were computed separately for 15 place-of-residence/tenure cells for the Northeast and Midwest regions, 35 place-of-residence/ethnicity-race/tenure cells for the South region and 25 place-of-residence/ethnicity/tenure cells for the West region. The first-stage ratio estimation factor was equal to the following ratio:

$$\frac{\text{Actual 1980 census housing units for all non-self-representing strata in a cell}}{\text{Number of 1980 housing units in the same cell estimated from the sample non-self-representing PSU's}}$$

The numerators of the ratios were calculated by summing the 1980 census housing units counts for each cell across all non- self-representing strata. For each cell, the denominators were calculated by weighting the 1980 census housing units counts from each non-self-representing sample PSU by the inverse of the probability of selection for that PSU and summing the weighted counts across all non-self-representing sample PSU's.

The second stage of the ratio estimation procedure was employed to adjust the AHS sample estimate of new construction (i.e., units built since the 1980 census) to

account for known deficiencies in the AHS sample (see the section on nonsampling errors). For nonmobile homes, the sample estimates were controlled to independently derived estimates from the Survey of Construction for 16 year-built/number-of-units-in-structure cells by region. For mobile homes, the sample estimates are controlled to independently derived estimates from the Survey of Mobile Home Placements for eight year-built cells by region. These estimates were considered to be the best estimates available for these types of units. Factors were computed separately for each region. The second-stage factor was equal to the following ratio:

$$\frac{\text{Independently derived estimate for a cell}}{\text{AHS sample estimate in that cell}}$$

The denominators of the above ratio were obtained by summing the existing weight on each record after the first stage of ratio estimation over all records for each cell in each region.

The third stage of the ratio estimation procedure was employed to adjust the AHS sample estimate of housing units to independently derived current estimates for certain key characteristics. It is believed that these characteristics are highly correlated with other characteristics of interest for the AHS. This stage of the procedure was actually done in two steps for occupied units. During the first step, the sample estimate of occupied housing units was controlled to an independently derived estimate for 12 tenure/ethnicity (i.e., Spanish head of household-non-Spanish head of household)/household-status cells for each region. After applying the factor computed in this step to the interviewed occupied units, the new sample estimate of occupied housing units was controlled to an independently derived estimate for 12 tenure/race (i.e., Black head of household-non-Black head of household)/household-status cells for each region. The sample estimate of vacant housing units was controlled to an independently derived estimate for four type-of-vacant cells for each region. All third-stage factors were calculated in a similar manner using the following ratio:

$$\frac{\text{Independently derived estimate of housing units in a cell}}{\text{AHS sample estimate of housing units in that cell}}$$

For occupied units, the numerators of the factors were derived from data based on the CPS and the 1980 census. The 1980 census count of housing units was adjusted for net undercoverage and overcoverage. The CPS was used to measure changes since the census and to derive the distribution for the third-stage occupied cells.

For vacant units, the numerators of the factors were derived based on the distribution of vacant units from the Housing Vacancy Survey (HVS), a quarterly vacancy survey conducted by the Bureau of the Census.

The denominators of the factors were obtained by summing the weights, with all previous factors applied, on all records in a cell. For the Spanish/non-Spanish and vacant cells, this was the weight after the second-stage of the ratio estimation procedure. For the Black/non-Black cells, this was the weight after the Spanish/non-Spanish portion of the third stage of the ratio estimation procedure.

The second stage and third stage of the ratio estimation procedure were iterated to bring the AHS sample estimates into closer agreement with all independent estimates used. The numerators of the factors were the same ones used previously.

The denominators of the factors in this iterative process were obtained by summing the existing weights on all records in a cell. For example, for the second stage of the ratio estimation procedure, the existing weight after the third stage of the ratio estimation procedure from the previous iteration was used. The final weight that resulted from all iterations was used to produce the tabulations in this report.

The overall estimation procedure reduced the sampling error substantially for most statistics below what would have been obtained by simply weighting the sample by the inverse of the probability of selection.

ACCURACY OF THE ESTIMATES

There are two types of possible errors associated with estimates based on data from sample surveys—sampling and nonsampling errors. A description of the sampling and nonsampling errors associated with the AHS National sample is given below.

Sampling errors. These errors result from the fact that the particular sample used for this survey is only one of a large number of possible samples that could have been selected using the same sample design. Even if all interviewing conditions were the same, estimates from each of the samples would differ from each other. The amount by which the estimates from all possible samples differ from one another is known as the sampling error. The standard error is commonly used to measure sampling error. It indicates how precisely an estimate from a particular sample measures the average result from all possible samples. In addition, the standard error also partially reflects the variation in the estimates due to some nonsampling errors, but it does not measure any systematic biases in the data. The accuracy of the estimates contained in this report depends on the sampling and nonsampling errors, as measured by the estimated standard error, and biases and other nonsampling errors not measured by the standard error.

The sample estimate and the estimated standard error permit the construction of intervals such that the average result from all possible samples lies within the interval with a known level of confidence. For example, if all possible samples were selected and surveyed under the same general conditions and the estimate and estimated standard error were computed for all the samples, then approximately 90 percent of the intervals from 1.6 standard errors

below the estimate to 1.6 standard errors above the estimate would include the average result from all possible samples.

For intervals computed using estimates and estimated standard errors from this report, the average result from all possible samples either is or is not contained within the interval. However, it can be said that there is only a 1 in 10 chance that the sample selected will yield a 90-percent confidence interval that does not contain the average result from all possible samples.

The figures presented in the standard error tables are approximations to the standard errors for the estimates in this report. These approximations were necessary in order to produce standard errors applicable to a wide range of characteristics at a reasonable cost. The standard error tables provide an indication of the order of magnitude of the standard errors rather than the actual standard errors for any specific characteristic.

There are various types of estimates which can be made using the data in this report. For example, one can make an estimate of the total number of housing units having a specific characteristic (known as an estimate of a level); a percentage of housing units having a specific characteristic; a ratio of two different characteristics; the difference between two estimates, or medians. Other types of estimates can be made, but these are the most commonly used. Procedures for computing estimated standard errors for these types of estimates are given below.

Standard error table locator. To help identify which standard error table to use for a specific type of estimate from this report, a standard error table locator is provided. The rows of this table identify the population groups on the boxhead of the tables in this report and the columns indicate the types of housing characteristics. For example, for general characteristics of the national housing inventory, table 1a should be used for estimating standard errors of estimates of levels; table 1b should be used for estimating standard errors of estimated percentages of these housing units; for fuels and type of heating and cooling equipment in rural areas, table 6a should be used for estimating standard errors of estimates of levels; and table 6b should be used for estimating standard errors of estimated percentages of these housing units.

Standard errors of estimates of levels. Tables 1a to 7a present estimated standard errors for estimates of national and regional housing characteristics for 1987. Linear interpolation should be used to determine estimated standard errors for estimates not specifically shown in tables 1a to 7a. The following is an illustration of the use of table 1a.

Table 1-1 of this report shows that in the United States there were 5,411,000 occupied housing units with householders under the age of 25 years in 1987. The standard error table locator shows that table 1a should be used for this type of characteristic. Interpolation in standard error table 1a shows that the estimated standard error of an estimate of this size is 107,000. The following procedure was used in interpolating.

The information in the table below was taken from standard error table 1a multiplied by a factor of 0.92 according to the footnote from table 1a. The entry for x is the standard error sought.

Size of estimate (thousands)	Standard error (thousands)
5,000	104
5,411	x
7,500	125

By vertically interpolating between 104,000 and 125,000, "x" is determined to be 107,000.

$$104{,}000 + \frac{5{,}411{,}000 - 5{,}000{,}000}{7{,}500{,}000 - 5{,}000{,}000}(125{,}000 - 104{,}000) = 107{,}000$$

The 90-percent confidence interval for the estimated number of occupied housing units with householders under age 25 is from 5,240,000 to 5,582,000. Thus, the average estimate from all possible samples of these types of housing units will lie within an interval computed in this way for approximately 90 percent of all possible samples.

Standard errors of estimates of percentages. Estimated percentages from this report are computed using sample data for both the numerator and the denominator. The numerator is a subclass of the denominator. The reliability of an estimated percentage depends upon both the size of the percentage and the total upon which the percentage is based (i.e., the denominator). Estimated percentages are more reliable than the corresponding estimates of the numerators of the percentages, particularly if the estimated percentages are 50 percent or more. Tables 1b to 7b present estimated standard errors of national and regional estimated percentages of housing units for 1987. Two-way interpolation should be used for standard errors of estimated percentages not specifically shown in tables 1b to 7b.

Included in tables 1b to 7b are estimated standard errors for estimates of zero percent. These are considered to be overestimates of the true standard error and should be used primarily for the construction of confidence intervals for characteristics when an estimate of zero is obtained. The following is an illustration of the use of standard errors of estimated percentage tables.

Table 1-1 shows that of the 10,849,000 family units with female householders in the United States in 1987, 718,000 or 6.6 percent were of Hispanic origin with own children under 18. The standard error table locator shows that table 2b should be used. Interpolation in standard error table 2b (i.e., interpolation on both the denominator and the percent) shows that the standard error on the above percent is 0.3. The following procedure was used in interpolating.

The information in the table below was taken from standard error table 2b. The entry for p is the standard error sought.

Denominator of percent (thousands)	Estimated percent		
	5	6.6	10
10,000	0.3	a	0.5
10,849		p	
15,000	0.3	b	0.4

First, interpolate horizontally between 0.3 and 0.5 to get the entry for cell "a." The entry for cell "a" is 0.4.

$$0.3 + \frac{6.6 - 5}{10 - 5}(0.5 - 0.3) = 0.4$$

Next, interpolate horizontally between 0.3 and 0.4 to get the entry for cell "b." The entry for cell "b" is 0.3.

$$0.3 + \frac{6.6 - 5}{10 - 5}(0.4 - 0.3) = 0.3$$

Finally, interpolate vertically between 0.4 and 0.3 to get the entry for cell "p." The entry for "p" is 0.4.

$$0.4 + \frac{10{,}849{,}000 - 10{,}000{,}000}{15{,}000{,}000 - 10{,}000{,}000}(0.3 - 0.4) = 0.4$$

Thus, the 90-percent confidence interval for this estimated percentage is between 6.0 and 7.2 percent.

Standard errors of ratios. For ratios of the form (100) (x/y), where x is not a subclass of y, the standard error tables for estimated percentages underestimate the standard error of the ratio when there is little or no correlation between x and y. For this type of ratio, a better approximation of the standard error may be obtained by letting the standard error of the ratio be approximately equal to the following:

$$(100)\frac{x}{y}\sqrt{\left(\frac{S_x}{x}\right)^2 + \left(\frac{S_y}{y}\right)^2}$$

where x = numerator of the ratio
y = denominator of the ratio
s_x = estimated standard error of the numerator
s_y = estimated standard error of the denominator

S_x and s_y are computed according to the method used for estimated standard errors of levels. The following is an illustration on how to compute the estimated standard error of a ratio.

Table 2-1 of this report shows that there were 46,771,000 owner-occupied housing units with family households in the United States in 1987. The estimated standard error of this estimate is determined to be 220,000 using linear interpolation in standard error table 1a with a factor of 0.92 applied. Table 2-1 also shows that there were 11,393,000 owner-occupied housing units with nonfamily households in the United States in 1987. The estimated standard error of this estimate is 150,000.

This standard error also was determined using linear interpolation in standard error Table 1a. The ratio of owner-occupied family households to owner-occupied nonfamily households is 411. The estimated standard error of this ratio is 5.7 and is calculated as follows:

$$100\frac{46{,}771{,}000}{11{,}393{,}000}\sqrt{\left(\frac{220{,}000}{46{,}771{,}000}\right)^2 + \left(\frac{150{,}000}{11{,}393{,}000}\right)^2} = 5.7$$

Standard errors of differences. The estimated standard errors shown in tables 1a to 7a are not directly applicable to the difference between two estimates. The estimated standard error of a difference can be computed by the following:

$$s_{x-y} = \sqrt{S_x^2 + S_y^2}$$

where s_x and s_y are the estimated standard errors for the two estimates x and y, respectively. They can be computed in the same manner as for estimated standard errors of levels. This formula is quite accurate for the difference between estimates of the same characteristics in two different areas or the difference between separate and uncorrelated characteristics in the same area. If a high positive correlation exists between the two characteristics, the formula will overestimate the true error. If there is a high negative correlation, the formula will underestimate the true standard error. The following illustration shows how to compute the estimated standard error of a difference.

Table 2-1 shows that in the United States there were 48,162,000 owner-occupied one-unit, detached housing units in 1987. The estimated standard error on this estimate is 221,000. Table 2-1 also shows that there were 2,456,000 owner-occupied one-unit, attached housing units in the United States in 1987 with an estimated standard error of 74,000 housing units. The estimated difference between 1987 owner-occupied housing units with 1-unit detached and with 1-unit attached is 45,706,000 and the estimated standard error of this difference is 233,000, as computed by the following:

$$233{,}000 = \sqrt{(221{,}000)^2 + (74{,}000)^2}$$

The 90-percent confidence interval for the difference of 45,706,000 is from 45,333,000 to 46,079,000 and it can be concluded that the average estimate of this difference, derived from all possible samples, lies within an interval computed in this way for approximately 90 percent of all possible samples.

Standard errors of medians. For medians presented in certain tables in this report, the estimated standard error depends on the distribution of the characteristic and the

total number of housing units that comprise the distribution. A common method for approximating the reliability of the estimated median is to construct an interval about the estimated median such that the average median from all possible samples lies within the interval with a known level of confidence. The following procedure should be used to estimate the upper and lower limits of a 90-percent confidence interval of a median.

1. From the appropriate standard error table for estimated percentages, determine the estimated standard error of a 50-percent characteristic based on the total number of housing units from the distribution.
2. Add to and subtract from 50 percent 1.6 times the estimated standard error determined in step one to obtain the upper and lower percentage limits from which the confidence interval will be determined.
3. Determine the lower endpoint of the confidence interval by linearly interpolating within the category of the distribution which contains the lower percentage limit. The upper endpoint of the confidence interval is determined in the same manner using the upper percentage limit.

For about 90 out of 100 possible samples, the average median from all possible samples will lie within this 90-percent confidence interval. The following example illustrates how to compute a 90-percent confidence interval for a median. Table 1-1 of this report shows the median number of persons in occupied married-couple households with Black householders with own children under 18 was 4.1 in 1987. The total number of housing units upon which the distribution is based is 1,916,000 housing units.

1. From table 1b, the standard error of a 50-percent characteristic based on 1,916,000 housing units is 2.0 percentage points.
2. To obtain a 90-percent confidence interval, add to and subtract from 50 percent 1.6 times the estimated standard error from step 1 giving upper and lower percentage limits of 46.8 and 53.2.
3. From table 1-1, the interval for occupied married-couple households with Black householders with own children under 18 with four persons (for the purpose of calculating the median, the category of 4 persons is considered to be from 3.5 to 4.5 persons) contains the 46.8 percent derived in step 2. About 526,000 housing units or 27.4 percent fall below this interval, and 713,000 housing units or 37.2 percent fall within this interval.

By linear interpolation, the lower endpoint of the 90-percent confidence interval is found to be about 4.0.

$$3.5 + (4.5-3.5)\frac{(46.8-27.4)}{(37.2)} = 4.0$$

Similarly, the interval for owner-occupied married couple households with Black householders with 4 persons contains the 53.2 percent derived in step 2. About 526,000 housing units or 27.4 percent fall below this interval, and 713,000 housing units or 37.2 percent fall within this interview. The upper limit of the 90-percent confidence interval is found to be about 4.2.

$$3.5 + (4.5-3.5)\frac{(53.2-27.4)}{(37.2)} = 4.2$$

Nonsampling errors. Nonsampling errors can be attributed to many sources. Errors may be introduced because of the different modes of interview (telephone, personal visit). The respondent may be unable or unwilling to provide the correct response. The interviewers may be unable to find the unit or they may be unable to obtain information about all the cases. They may record the data incorrectly. Either the respondent or the interviewer may interpret the questions differently than they were intended. The collected data may be keyed incorrectly. The sample frames may be incomplete, introducing some coverage error. Processing of the data introduces errors due to rounding or adjusting for missing values. In addition to these errors, there are other errors of collection, response, processing, coverage, and estimation of missing data. Not all of these errors are unique to sample surveys since they can, and do, occur in complete censuses as well.

Reinterview Program. The 1987 AHS-N reinterview served as a check for interviewer evaluation and quality control. This check was made at a subsample of the original households to determine if the following was done during the original interview:

a. The sample unit and all units within the same structure of the sample unit were listed correctly.
b. The correct unit was visited.
c. The correct information on "tenure" was obtained.
d. The correct information on "household composition" was obtained.
e. The correct information on "type of housing unit" was obtained.
f. The correct information on "occupancy status" was obtained.

In 1985, a reinterview program was conducted in an attempt to measure some of the nonsampling errors associated with the AHS estimates in addition to serving as an interviewer evaluation and quality control check. This study was conducted using a subsample of the original AHS households. These households were revisited and

responses to select questions from the original questionnaire were obtained again. The original interview and the reinterview were assumed to be two independent readings and, thus, were the basis for the measurement of the response error associated with the AHS estimates. The 1985 AHS-N reinterview study was done for three groups of items. They are units in structure and description of structure, number and type of rooms, and appliances, including the age and fuel of appliances. All items measured showed low levels of inconsistency except those listed in the table below. Included in the table are the levels of inconsistency.

Item	Level of inconsistency, for occupied units
Number of living rooms	Moderate
Number of dining rooms	Moderate
Number of family rooms	Moderate
Number of "other" types of rooms	Moderate
Age of refrigerator	–
Age of garbage disposal	–
Age of oven/cooking burner	–
Age of dishwasher	–
Age of clotheswasher	Moderate
Central air conditioning fuel	High
Cookstove or range with oven	Moderate to High

Dashes in the table represent items for which there were not enough observations to compute reliable estimates or items that had low levels of inconsistency. Low levels of inconsistency indicate that the response error is insignificant relative to the standard error in this report. Moderate levels of inconsistency indicate that the response error is not insignificant compared with the standard error in this report. High levels of inconsistency indicate that the response error is very significant compared with the standard error in this report, and caution should be used when examining estimates of these characteristics.

Cross-tabulations involving those items that are subject to high levels of inconsistency may also be subject to a large distortion as a consequence and, thus, are considered to be less reliable than comparable cross-tabulations that do not involve these data. Since the reinterview programs only measured inconsistencies for a sample of the items on the AHS questionnaire, there may be other items with high levels of inconsistency.

Reinterview studies were also conducted in conjunction with AHS enumerations prior to 1985. These studies included items dealing with poor housing quality, attitudes about the neighborhood, certain housing costs, journey to work, and mobility data. The following table shows the items that had moderate or high levels of inconsistency. While these questions were not included in the 1985 reinterview study, questions from previous enumerations were not altered enough to lead one to believe that the level of inconsistent responses would change.

Item	Level of inconsistency
Open cracks or holes on inside of building	Moderate to High
Holes in floors	Moderate to High
Broken plaster or peeling paint on ceilings and walls	High
Mice or rats	Moderate
Working electric outlet in all rooms	High
Concealed wiring	High
Blown fuses/tripped circuit breakers	Moderate to High
Neighborhood conditions: street noise; roads in need of repair; crime; trash, litter, junk in streets or on properties; boarded up/abandoned structures; nonresidential activities; odors, smoke, gas	Moderate to High
Satisfactory neighborhood services: police protection; hospitals/health clinics; public transportation; shopping; elementary schools	Moderate to High
Electricity cost	High
Gas cost	High
Oil, coal, kerosene, wood or other fuel cost	Moderate to High
Fire/hazard insurance	Moderate to High
Real estate taxes	Moderate to High
Cost of real estate taxes	Moderate to High
Cost of water supply and sewage disposal	High
Cost of garbage collection	Moderate to High
Gross income	High
Type of vacant	Moderate to High
Prefer to live in same area or somewhere else	Moderate

A possible explanation for the results of the reinterview studies, as well as the surveys themselves, is that respondents may lack precise information. Also, since the results of the reinterview studies are derived from sample surveys, there is sampling error associated with these estimates of nonsampling error. The possibility of such errors should be taken into account when considering the results of these studies.

Reconciliation experiment. As part of the CATI experiment, a reconciliation study was conducted when the responses provided during the CATI interviews for any of the nine selected questions were different from the respective 1985 responses and beyond reasonable tolerance ranges.

Reconciliation questions were then asked immediately following the regular interview to determine whether there had been an actual change since 1985 or whether the 1985 or 1987 responses were wrong. This reconciliation study indicated that respondents have reporting difficulties with items such as type of basement, heating equipment, and heating fuel, based on the inconsistent responses provided between 1985 and 1987. These reporting difficulties are not necessarily due to the CATI mode of interviewing, but may reflect general reporting difficulties with select items. This is indicated by the fact that approximately an equal number of respondents stated that their 1985 responses were wrong, when all interviewing was conducted by personal visit, as did the number of respondents who stated that their 1987 responses were wrong. Caution should be taken when carrying out analyses using these data.

Possible effects of decentralized telephone interviewing on the data. The 1987 AHS-National interviews were conducted by decentralized telephone as much as possible, with the exception of cases assigned to the Computer Assisted Telephone Interviewing (CATI) facility. A large scale decentralized telephone interviewing experiment was conducted in conjunction with the 1983 AHS-National sample in order to provide more definitive information about the possible effect of decentralized telephone interviewing on AHS data. It was concluded that telephone interviewing has some effects on the data. The experimental data indicate that compared with personal visit interviewing, telephone interviewing had the effect of increasing item nonresponse rate for income items, although this effect does not appear to be causing any changes in the published estimates. There was some tendency to underreport problems with neighborhood quality as well, although this tendency was generally rather slight. Possible effects of Computer Assisted Telephone Interviewing (CATI) on the data. Preliminary analysis of the 1987 AHS-National CATI experiment indicated that CATI has some effect on the data. The most obvious evidence was underreporting problems with CATI for the Moderate-Physical-Problems subgroup. The Owner, Urban, and Below-Poverty-Level subgroups were determined to also exhibit differences between CATI and non-CATI estimates. In general, income estimates derived from CATI data were higher than those of the non-CATI data. Other characteristics affected include lot size, water leakage, cost and ownership sharing, fuel and routine maintenance costs, and neighborhood conditions.

Coverage errors. AHS misses approximately 25 percent of the new mobile homes (i.e., those built after January 1, 1980). It is believed that most of the difference is due to poor coverage of new mobile home parks in address ED's.

The coverage of old construction housing units is only as good as the coverage of the 1980 census. The third stage of the ratio estimation procedure attempted to correct for these deficiencies.

Another area of the AHS sample where coverage deficiencies exist is the sampling of building permits to represent conventional (i.e., nonmobile home) new construction. Due to time constraints, only permits issued more than 6 months before interviewing began were eligible to be selected to represent conventional new construction. This is more of a problem for single-unit rather than multiunit structures. In fact, the time lag between issuance of a permit and completion of construction for multiunit structures is generally more than 6 months depending on the size of the structure. Also, new construction in special places such as colleges or military bases is not covered. This is a deficiency in both permit and nonpermit areas.

In identifying whole-structure additions in address and area ED's, units that were in sample were screened to see if they were eligible for interview. The screening operation involved asking a series of questions. Therefore, the quality of coverage in these areas is only as good as the quality of the responses to these questions. It is conceivable that eligible units were omitted and ineligible units were included because the respondents' answers to the screening questions were incorrect. In addition, the quality of the listing of addresses will also affect the coverage of whole-structure additions.

It is also believed that a coverage deficiency exists for units that were nonresidential at the time of the 1980 census, but have since converted to residential units. The magnitude of this deficiency is not known.

The second and third stages of ratio estimation correct these deficiencies for the total number of housing units only. Biases of subtotals will still exist.

Processing errors. Several types of errors are associated that the processing of the data. The first type of processing error which may be introduced is keying error. A quality assurance operation conducted in conjunction with the keying of the data helps to insure that less than 0.4 percent of the data fields keyed from the questionnaire will be in error.

Another type of processing error is imputation error. If certain fields on a questionnaire are blank, values are assigned by the computer. These are generally items for which 1980 census data is available, as well as items that had an item nonresponse rate of 1.0 percent or less in 1983. It is not known how close these imputed values are to the actual values.

A problem may also exist for items for which there are no imputations for item response. Totals for these items and any subcategories of these items may be underestimated. Percent distributions may also be distorted.

Nonsampling error also occurs because of noninterview. The noninterview adjustments assume that interviewed units of similar size and geographic location (i.e., [P]MSA status, urban/rural status) can adequately represent noninterviews. The extent to which this assumption does not hold true will determine the magnitude of the nonsampling error from these units.

Finally, another type of processing error is rounding error. The data are processed using double precision to minimize the effect of the rounding errors. However, the error may still be significant for small percentages and small medians when these figures are derived from relatively large bases. Thus, confidence intervals formed from the standard errors may be distorted. This should be taken into consideration when analyzing the results of this survey.

Standard Error Table Locator: Population Group by Type of Characteristic

(Tables "a" used for estimates; tables "b" used for percentages)

Population group[1]	Table number by characteristics group			
	General[2]	Fuel and type of heating/cooling equipment	Neighborhood[3]	Special[4]
United States:				
Total[5]	1a, 1b	5a, 5b	5a, 5b	6a, 6b
Year-round or seasonal vacants	4a, 4b	5a, 5b	5a, 5b	6a, 6b
Black	1a, 1b	5a, 5b	5a, 5b	6a, 6b
Hispanic	[6]2a, [6]2b	5a, 5b	5a, 5b	6a, 6b
Elderly	1a, 1b	5a, 5b	5a, 5b	6a, 6b
Urban	2a, 2b	5a, 5b	5a, 5b	6a, 6b
Rural	3a, 3b	6a, 6b	5a, 5b	6a, 6b
Mobile home	1a, 1b	6a, 6b	5a, 5b	6a, 6b
New construction	1a, 1b	5a, 5b	5a, 5b	6a, 6b
In (P)MSA's—Central Cities	2a, 2b	5a, 5b	5a, 5b	6a, 6b
In (P)MSA's—Suburbs	2a, 2b	5a, 5b	5a, 5b	6a, 6b
Outside (P)MSA's	4a, 4b	7a, 7b	7a, 7b	7a, 7b
Regions:				
Northeast	2a, 2b	5a, 5b	5a, 5b	6a, 6b
Midwest	1a, 1b	5a, 5b	5a, 5b	6a, 6b
South	3a, 3b	6a, 6b	5a, 5b	6a, 6b
West	1a, 1b	5a, 5b	5a, 5b	6a, 6b

[1]For multiple population groups (for example; Blacks in the Northeast or new construction in central cities) use the standard error table with the highest standard error for a given estimate.

[2]General includes all characteristics except fuels and heating/cooling equipment, neighborhood items, and special items.

[3]Neighborhood items include all characteristics in "neighborhood" tables except "mobile home in group."

[4]Special items include all characteristics pertaining to cooperatives or condominiums; no complete bathroom; less than 1,500 square feet of detached one-family or mobile homes; well serving 1 to 5 units; mobile homes in a group of seven or more; area within 300 feet includes open space, park, farm or ranch; and major street repairs needed.

[5]Total includes total housing units, year-round, occupied, owner, renter, physical problems, moved in past year, below poverty level.

[6]Use table 1 for the following Hispanic deficiency items: sagging roof; missing bricks, siding, and other outside material; broken windows; fuel other than electricity, gas, or oil; bars on windows of buildings within 300 feet; 1.51 or more persons per room; 400 to 699 square feet per person; water supply stoppage in last 3 months; no toilet working for at least 6 hours in last 3 months; sewage disposal—public sewer with breakdown lasting 6 hours or more in last 3 months; uncomfortably cold for 24 or more hours last winter; signs of rats in last 3 months; and broken plaster or peeling paint in interior.

Table 1a. Standard Errors of Estimated Numbers of Housing Units

(Number in thousands)

Size of estimate	Standard error				Size of estimate	Standard error			
	United States, elderly, new construction, mobile home, or Hispanic[1,2]	Midwest region[1]	West region	Black		United States, elderly, new construction, mobile home, or Hispanic[1,2]	Midwest region[1]	West region	Black
0	3	3	3	3	7,500	136	116	108	70
5	4	4	4	4	10,000	155	122	108	-
10	5	5	5	5	12,500	170	121	98	-
25	8	8	8	8	15,000	184	114	76	-
50	12	12	12	12	17,500	195	100	-	-
100	16	16	16	16	20,000	205	72	-	-
250	26	26	26	26	22,500	213	-	-	-
500	37	36	36	36	25,000	220	-	-	-
1,000	52	51	51	49	50,000	242	-	-	-
2,500	81	77	76	71	75,000	176	-	-	-
5,000	113	102	98	82	90,000	-	-	-	-

[1]For estimates pertaining to the United States total, elderly, new construction, or Midwest region, multiply the standard errors provided in the table by a factor of 0.92.

[2]For estimates pertaining to mobile homes, multiply the standard errors provided in the table by a factor of 0.88.

Table 1b. Standard Errors of Estimated Percentages of Housing Units

Base of percentage (thousands)	Estimated percentage[1,2]							
	0 or 100	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
5	35.1	35.1	35.1	35.1	35.1	35.1	35.1	36.8
10	21.3	21.3	21.3	21.3	21.3	21.3	22.5	26.0
25	9.8	9.8	9.8	9.8	9.9	11.7	14.2	16.4
50	5.1	5.1	5.1	5.1	7.0	8.3	10.1	11.6
100	2.6	2.6	2.6	3.6	4.9	5.9	7.1	8.2
250	1.1	1.1	1.5	2.3	3.1	3.7	4.5	5.2
500	0.5	0.7	1.0	1.6	2.2	2.6	3.2	3.7
1,000	0.3	0.5	0.7	1.1	1.6	1.9	2.3	2.6
2,500	0.11	0.3	0.5	0.7	1.0	1.2	1.4	1.6
5,000	0.05	0.2	0.3	0.5	0.7	0.8	1.0	1.2
7,500	0.04	0.2	0.3	0.4	0.6	0.7	0.8	0.9
10,000	0.03	0.2	0.2	0.4	0.5	0.6	0.7	0.8
12,500	0.02	0.15	0.2	0.3	0.4	0.5	0.6	0.7
15,000	0.02	0.13	0.2	0.3	0.4	0.5	0.6	0.7
17,500	0.02	0.12	0.2	0.3	0.4	0.4	0.5	0.6
20,000	0.01	0.12	0.2	0.3	0.3	0.4	0.5	0.6
22,500	0.01	0.11	0.2	0.2	0.3	0.4	0.5	0.5
25,000	0.01	0.10	0.15	0.2	0.3	0.4	0.5	0.5
50,000	0.01	0.07	0.10	0.2	0.2	0.3	0.3	0.4
75,000	0.01	0.06	0.08	0.13	0.2	0.2	0.3	0.3
90,000	0.01	0.05	0.08	0.12	0.2	0.2	0.2	0.3

[1]For estimates pertaining to the United States total, elderly, new construction, or Midwest region, multiply the standard errors provided in the table by a factor of 0.92.

[2]For estimates pertaining to mobile homes, multiply the standard errors provided in the table by a factor of 0.88.

Table 2a. **Standard Errors of Estimated Numbers of Housing Units**

(Numbers in thousands)

Size of estimate	Standard error		Size of estimate	Standard error	
	Urban, central city, MSA-suburb, or Hispanic[1]	Northeast region		Urban, central city, MSA-suburb, or Hispanic[1]	Northeast region
0	2	2	2,500	76	66
5	3	3	5,000	106	86
10	5	4	7,500	127	95
25	8	7	10,000	145	97
50	11	10	15,000	172	77
100	15	14	20,000	191	-
250	24	22	25,000	206	-
500	34	31	50,000	227	-
1,000	48	44	75,000	164	-

[1]For estimates pertaining to MSA-suburb, multiply the standard errors in the table by a factor of 0.92.

Table 2b. **Standard Errors of Estimated Percentages of Housing Units**

Base of percentage (thousands)	Estimated percentage[1]							
	0 or 100	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
5	32.1	32.1	32.1	32.1	32.1	32.1	32.1	34.4
10	19.1	19.1	19.1	19.1	19.1	19.1	21.0	24.3
25	8.6	8.6	8.6	8.6	9.2	11.0	13.3	15.4
50	4.5	4.5	4.5	4.7	6.5	7.8	9.4	10.9
100	2.3	2.3	2.3	3.4	4.6	5.5	6.7	7.7
250	0.9	1.0	1.4	2.1	2.9	3.5	4.2	4.9
500	0.5	0.7	1.0	1.5	2.1	2.5	3.0	3.4
1,000	0.2	0.5	0.7	1.1	1.5	1.7	2.1	2.4
2,500	0.09	0.3	0.4	0.7	0.9	1.1	1.3	1.5
5,000	0.05	0.2	0.3	0.5	0.7	0.8	0.9	1.1
7,500	0.03	0.2	0.2	0.4	0.5	0.6	0.8	0.9
10,000	0.02	0.2	0.2	0.3	0.5	0.5	0.7	0.8
15,000	0.02	0.12	0.2	0.3	0.4	0.4	0.5	0.6
20,000	0.01	0.11	0.2	0.2	0.3	0.4	0.5	0.5
25,000	0.01	0.10	0.14	0.2	0.3	0.3	0.4	0.5
50,000	0.01	0.07	0.10	0.15	0.2	0.2	0.3	0.3
75,000	0.01	0.06	0.08	0.12	0.2	0.2	0.2	0.3

[1]For estimates pertaining to MSA-suburb or Northeast region, multiply the standard errors in the table by a factor of 0.92.

Table 3a. **Standard Errors of Estimated Numbers of Housing Units**

(Numbers in thousands)

Size of estimate	Standard error		Size of estimate	Standard error	
	Rural	South region		Rural	South region
0	2	3	2,500	67	75
5	3	3	5,000	93	101
10	4	5	7,500	112	117
25	7	8	10,000	128	127
50	10	11	15,000	151	135
100	14	16	20,000	169	128
250	21	25	25,000	182	101
500	30	35	30,000	191	13
1,000	43	49	33,000	195	

Table 3b. **Standard Errors of Estimated Percentages of Housing Units**

Base of percentage (thousands)	Estimated percentage[1] [2]							
	0 or 100	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	37.9
10	22.4	22.4	22.4	22.4	22.4	22.4	23.2	26.8
25	10.3	10.3	10.3	10.3	10.3	12.1	14.7	17.0
50	5.4	5.4	5.4	5.4	7.2	8.6	10.4	12.0
100	2.8	2.8	2.8	3.7	5.1	6.1	7.3	8.5
250	1.1	1.1	1.5	2.3	3.2	3.8	4.6	5.4
500	0.6	0.8	1.1	1.7	2.3	2.7	3.3	3.8
1,000	0.3	0.5	0.8	1.2	1.6	1.9	2.3	2.7
2,500	0.12	0.3	0.5	0.7	1.0	1.2	1.5	1.7
5,000	0.06	0.2	0.3	0.5	0.7	0.9	1.0	1.2
7,500	0.04	0.2	0.3	0.4	0.6	0.7	0.8	1.0
10,000	0.03	0.2	0.2	0.4	0.5	0.6	0.7	0.8
15,000	0.02	0.14	0.2	0.3	0.4	0.5	0.6	0.7
20,000	0.01	0.12	0.2	0.3	0.4	0.4	0.5	0.6
25,000	0.01	0.11	0.15	0.2	0.3	0.4	0.5	0.5
30,000	0.01	0.10	0.14	0.2	0.3	0.3	0.4	0.5
33,000	0.01	0.09	0.13	0.2	0.3	0.3	0.4	0.5

[1]For rural characteristics, multiply the standard errors provided in the table by a factor of 0.80.
[2]For estimates pertaining to the South region, multiply the standard errors provided in the table by a factor of 0.92.

Table 4a. Standard Errors of Estimated Numbers of Housing Units

(Numbers in thousands)

Size of estimate	Standard error[1,2]	Size of estimate	Standard error[1,2]
0	3	5,000	206
5	4	7,500	291
10	5	10,000	376
25	8	12,500	461
50	12	15,000	545
100	17	17,500	629
250	28	20,000	713
500	41	22,500	798
1,000	63	25,000	882
2,500	119		

[1]For estimates pertaining to year-round or seasonal vacants, multiply the standard errors provided in the table by a factor of 0.92.

[2]For estimates pertaining to outside (P)MSA's, multiply the standard errors provided in the tables by a factor of 0.88.

Table 4b. Standard Errors of Estimated Percentages of Housing Units

Base of percentage (thousands)	Estimated percentage[1,2]							
	0 or 100	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
5	36.2	36.2	36.2	36.2	36.2	36.2	36.2	37.6
10	22.1	22.1	22.1	22.1	22.1	22.1	23.0	26.6
25	10.2	10.2	10.2	10.2	10.2	12.0	14.6	16.8
50	5.4	5.4	5.4	5.4	7.1	8.5	10.3	11.9
100	2.8	2.8	2.8	3.7	5.0	6.0	7.3	8.4
250	1.1	1.1	1.5	2.3	3.2	3.8	4.6	5.3
500	0.6	0.7	1.1	1.6	2.3	2.7	3.3	3.8
1,000	0.3	0.5	0.7	1.2	1.6	1.9	2.3	2.7
2,500	0.11	0.3	0.5	0.7	1.0	1.2	1.5	1.7
5,000	0.06	0.2	0.3	0.5	0.7	0.8	1.0	1.2
7,500	0.04	0.2	0.3	0.4	0.6	0.7	0.8	1.0
10,000	0.03	0.2	0.2	0.4	0.5	0.6	0.7	0.8
12,500	0.02	0.15	0.2	0.3	0.5	0.5	0.7	0.8
15,000	0.02	0.14	0.2	0.3	0.4	0.5	0.6	0.7
17,500	0.02	0.13	0.2	0.3	0.4	0.5	0.6	0.6
20,000	0.01	0.12	0.2	0.3	0.4	0.4	0.5	0.6
22,500	0.01	0.11	0.2	0.2	0.3	0.4	0.5	0.6
25,000	0.01	0.11	0.15	0.2	0.3	0.4	0.5	0.5

[1]For estimates pertaining to year-round or seasonal vacants, multiply the standard errors provided in the table by a factor of 0.92.

[2]For estimates pertaining to outside (P)MSAs, multiply the standard errors provided in the tables by a factor of 0.88.

Table 5a. Standard Errors of Estimated Numbers of Housing Units

(Number in thousands)

Size of estimate	Standard error[1,2,3]	Size of estimate	Standard error[1,2,3]
0	3	7,500	152
5	4	10,000	172
10	6	12,500	189
25	9	15,000	204
50	13	17,500	217
100	18	20,000	227
250	29	22,500	237
500	41	25,000	245
1,000	57	50,000	270
2,500	90	75,000	195
5,000	126	90,000	-

[1]For estimates pertaining to the United States total, year-round or seasonal vacants, elderly, new construction, in (P)MSA's-suburbs, Northeast region, Midwest region, or South region, multiply the standard errors provided in the table by a factor of 0.92.

[2]For estimates pertaining to outside (P)MSA's or mobile homes, multiply the standard errors provided by a factor of 0.88.

[3]For rural characteristics, multiply the standard errors provided by a factor of 0.8.

Table 5b. Standard Errors of Estimated Percentages of Housing Units

Base of percentage (thousands)	Estimated percentage[1,2,3]							
	0 or 100	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
5	40.1	40.1	40.1	40.1	40.1	40.1	40.1	40.9
10	25.1	25.1	25.1	25.1	25.1	25.1	25.1	28.9
25	11.8	11.8	11.8	11.8	11.8	13.1	15.8	18.3
50	6.3	6.3	6.3	6.3	7.8	9.2	11.2	12.9
100	3.2	3.2	3.2	4.0	5.5	6.5	7.9	9.1
250	1.3	1.3	1.6	2.5	3.5	4.1	5.0	5.8
500	0.7	0.8	1.1	1.8	2.5	2.9	3.5	4.1
1,000	0.3	0.6	0.8	1.3	1.7	2.1	2.5	2.9
2,500	0.13	0.4	0.5	0.8	1.1	1.3	1.6	1.8
5,000	0.07	0.3	0.4	0.6	0.8	0.9	1.1	1.3
7,500	0.04	0.2	0.3	0.5	0.6	0.8	0.9	1.1
10,000	0.03	0.2	0.3	0.4	0.5	0.7	0.8	0.9
12,500	0.03	0.2	0.2	0.4	0.5	0.6	0.7	0.8
15,000	0.02	0.15	0.2	0.3	0.4	0.5	0.6	0.7
17,500	0.02	0.14	0.2	0.3	0.4	0.5	0.6	0.7
20,000	0.02	0.13	0.2	0.3	0.4	0.5	0.6	0.6
22,500	0.01	0.12	0.2	0.3	0.4	0.4	0.5	0.6
25,000	0.01	0.12	0.2	0.3	0.3	0.4	0.5	0.6
50,000	0.01	0.08	0.11	0.2	0.2	0.3	0.4	0.4
75,000	0.01	0.07	0.09	0.15	0.2	0.2	0.3	0.3
90,000	0.01	0.06	0.09	0.13	0.2	0.2	0.3	0.3

[1]For estimates pertaining to the United States total, year-round or seasonal vacants, elderly, new construction, in (P)MSA's-suburbs, Northeast region, Midwest region, or South region, multiply the standard error provided in the table by a factor of 0.92.

[2]For estimates pertaining to outside (P)MSA's or mobile homes, multiply the standard errors provided by by a factor of 0.88.

[3]For rural characteristics, multiply the standard errors provided by a factor of 0.8.

Table 6a. Standard Errors of Estimated Numbers of Housing Units

(Numbers in thousands)

Size of estimate	Standard error[1 2 3]	Size of estimate	Standard error[1 2 3]
0	6	7,500	197
5	6	10,000	224
10	8	12,500	247
25	12	15,000	266
50	17	17,500	282
100	24	20,000	296
250	38	22,500	309
500	53	25,000	319
1,000	75	30,000	336
2,500	117	35,000	347
5,000	164	40,000	353

[1]For estimates pertaining to the United States total, year-round or seasonal vacants, elderly, new construction, in (P)MSA's-suburbs, Northeast region, Midwest region, or South region, multiply the standard errors provided in the table by a factor of 0.92.

[2]For estimates pertaining to outside (P)MSA's or mobile homes, multiply the standard errors provided by a factor of 0.88.

[3]For rural characteristics, multiply the standard errors provided by a factor of 0.80.

Table 6b. Standard Errors of Estimated Percentages of Housing Units

Base of percentage (thousands)	Estimated percentage[1 2 3]							
	0 or 100	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
5	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.3
10	36.2	36.2	36.2	36.2	36.2	36.2	36.2	37.7
25	18.5	18.5	18.5	18.5	18.5	18.5	20.6	23.8
50	10.2	10.2	10.2	10.2	10.2	12.0	14.6	16.9
100	5.4	5.4	5.4	5.4	7.1	8.5	10.3	11.9
250	2.2	2.2	2.2	3.3	4.5	5.4	6.5	7.5
500	1.1	1.1	1.5	2.3	3.2	3.8	4.6	5.3
1,000	0.6	0.7	1.1	1.6	2.3	2.7	3.3	3.8
2,500	0.2	0.5	0.7	1.0	1.4	1.7	2.1	2.4
5,000	0.11	0.3	0.5	0.7	1.0	1.2	1.5	1.7
7,500	0.08	0.3	0.4	0.6	0.8	1.0	1.2	1.4
10,000	0.06	0.2	0.3	0.5	0.7	0.9	1.0	1.2
12,500	0.05	0.2	0.3	0.5	0.6	0.8	0.9	1.1
15,000	0.04	0.2	0.3	0.4	0.6	0.7	0.8	1.0
17,500	0.03	0.2	0.3	0.4	0.5	0.6	0.8	0.9
20,000	0.03	0.2	0.2	0.4	0.5	0.6	0.7	0.8
22,500	0.03	0.2	0.2	0.3	0.5	0.6	0.7	0.8
25,000	0.02	0.15	0.2	0.3	0.5	0.5	0.7	0.8
30,000	0.02	0.14	0.2	0.3	0.4	0.5	0.6	0.7
35,000	0.02	0.13	0.2	0.3	0.4	0.5	0.6	0.6
40,000	0.01	0.12	0.2	0.3	0.4	0.4	0.5	0.6

[1]For estimates pertaining to the United States total, year-round or seasonal vacants, elderly, new construction, in (P)MSA's-suburbs, Northeast region, Midwest region, or South region, multiply the standard error provided in the table by a factor of 0.92.

[2]For estimates pertaining to outside (P)MSA's or mobile homes, multiply the standard errors provided by by a factor of 0.88.

[3]For rural characteristics, multiply the standard errors provided by a factor of 0.80.

Table 7a. Standard Errors of Estimated Numbers of Housing Units

(Numbers in thousands)

Size of estimate	Standard error	Size of estimate	Standard error
0	8	5,000	251
5	8	7,500	342
10	8	10,000	432
25	13	12,500	521
50	18	15,000	609
100	26	17,500	696
250	41	20,000	784
500	60	22,500	871
1,000	88	25,000	959
2,500	155		

Table 7b. Standard Errors of Estimated Percentages of Housing Units

Base of percentage (thousands)	Estimated percentage							
	0 or 100	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
5	56.6	56.6	56.6	56.6	56.6	56.6	56.6	57.1
10	39.5	39.5	39.5	39.5	39.5	39.5	39.5	40.4
25	20.7	20.7	20.7	20.7	20.7	20.7	22.1	25.5
50	11.5	11.5	11.5	11.5	11.5	12.9	15.6	18.1
100	6.1	6.1	6.1	6.1	7.7	9.1	11.1	12.8
250	2.5	2.5	2.5	3.5	4.8	5.8	7.0	8.1
500	1.3	1.3	1.6	2.5	3.4	4.1	4.9	5.7
1,000	0.6	0.8	1.1	1.8	2.4	2.9	3.5	4.0
2,500	0.3	0.5	0.7	1.1	1.5	1.8	2.2	2.6
5,000	0.1	0.4	0.5	0.8	1.1	1.3	1.6	1.8
7,500	0.09	0.3	0.4	0.6	0.9	1.1	1.3	1.5
10,000	0.07	0.3	0.4	0.6	0.8	0.9	1.1	1.3
12,500	0.05	0.2	0.3	0.5	0.7	0.8	1.0	1.1
15,000	0.04	0.2	0.3	0.5	0.6	0.7	0.9	1.0
17,500	0.04	0.2	0.3	0.4	0.6	0.7	0.8	1.0
20,000	0.03	0.2	0.3	0.4	0.5	0.6	0.8	0.9
22,500	0.03	0.2	0.2	0.4	0.5	0.6	0.7	0.9
25,000	0.03	0.2	0.2	0.4	0.5	0.6	0.7	0.8