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2010 CENSUS PLANNING MEMORANDA SERIES

No. 246

MEMORANDUM FOR The Distribution List

From: Burton Reist *[signed]*
Acting Chief, Decennial Management Division

Subject: 2010 Census Alternative Coverage Followup Questions and Design Evaluation Report

Attached is the 2010 Census Alternative Coverage Followup Questions and Design Evaluation Report. The Quality Process for the 2010 Census Evaluations, Experiments, and Assessments was applied to the methodology development, specifications, software development, analysis, and documentation of the analysis and results, as necessary.

If you have questions about this report, please contact Tim Stewart at (240) 241-7604 or Danquan Prunty at (301) 763-9848.

Attachment

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October 19, 2012

2010 Census
Alternative Coverage Followup Questions and Design Evaluation Report

U.S. Census Bureau standards and quality process procedures were applied throughout the creation of this report.

Timothy D. Stewart and
Danquan Prunty

Decennial Statistical Studies
Division

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Executive Summary

Ensuring that every person in the United States is counted once, only once, and in the right place is a fundamental goal of the decennial census. For many decades, the Census Bureau has evaluated coverage in each census and documented that some people are typically missed in the census. These people are referred to as census omissions. The Census Bureau has also documented that some people are counted in the wrong place and found evidence that some people are counted more than once during the census. Both of these errors are referred to as erroneous enumerations.

These types of coverage issues may have been self-identified by respondents when they completed their initial 2010 Census forms. There were questions on the initial 2010 Census forms that attempted to identify census omissions and erroneous enumerations. Census omissions were identified by a question that asked if there were additional people staying at the housing unit who were not included in the housing unit's population count. This question was referred to as the undercount question. There were four types of census omission categories that were mentioned in the undercount question:

- Children, such as newborn babies or foster children
- Relatives, such as adult children, cousins, or in-laws
- Nonrelatives, such as roommates or live-in baby sitters
- People staying at the housing unit temporarily

Additionally, to identify erroneous enumerations, respondents were asked if people in the household sometimes lived or stayed somewhere else. This question was called the overcount question. The overcount question asked if each person sometimes lived or stayed elsewhere for one or more of these reasons:

- In college housing
- In a nursing home
- In the military
- In jail or prison
- At a seasonal or second residence
- For child custody
- For another reason

The Census Bureau attempted to resolve these coverage issues in the Coverage Followup operation. Coverage Followup was conducted via telephone interviews with respondents to determine if changes should be made to their housing-unit rosters as reported on their initial 2010 Census forms if the respondents had initially reported a coverage issue. The Coverage Followup questions probed to identify if people were missed or counted in error, and to collect missing demographic data for all people in the housing unit. Housing units could be selected for Coverage Followup for coverage issues besides the undercount and overcount questions. Those additional coverage issues that were resolved in Coverage Followup were:

- Large Households – Housing unit returns that could not collect all of the person data due to the space limitation of the initial 2010 Census form. (This was not really a coverage issue, but to collect information on more people and their demographic characteristics.)
- Count Discrepancies – Housing unit returns in which the number of people listed on the initial 2010 Census form did not match the population count provided by the respondent or enumerator.
- Administrative Records – Housing unit returns that were potentially missing people in the housing unit based on a comparison of the housing-unit roster from an administrative record with the housing unit roster from a 2010 Census return.
- Unduplication – Housing unit returns where the computer matching of the initial 2010 Census returns against themselves and against the universe of Group Quarter returns identified possible duplicate person links at various geographical locations.

Prior to the Coverage Followup telephone interviews, all of these coverage issues were divided into two groups based on a combination of reasons: how well they performed during the mid-decade census tests, the budget allocation assigned for the Coverage Followup operation, and the telephony constraints (volume and cost).

For the first group of coverage issues, all cases were sent to Coverage Followup because they were more likely to be successful in Coverage Followup at improving coverage, as determined through changes to housing-unit rosters with potential coverage issues. Below is a list of coverage issues included in the "production group":

- Large Households
- Count Discrepancies
- Undercount – Children
- Undercount – Relatives
- Undercount – Nonrelatives
- Undercount - Temporary
- Overcount – College
- Overcount – Nursing Home
- Overcount – Military
- Overcount – Jail/Prison
- Overcount – Person Multiple (One person had multiple overcount categories.)
- Overcount – Household Multiple (Multiple people had multiple overcount categories.)
- Administrative Records

For the second group of coverage issues, only a sample of cases were sent for Coverage Followup because past research indicated that they were not as likely to be successful at improving coverage. Below is a list of coverage issues included in the "evaluation group":

- Overcount – Seasonal/Second Residence
- Overcount – Child Custody
- Overcount – Another Reason
- Unduplication (For this research, we are only interested in those that also had one of the three evaluation overcount categories shown above.)

If a case had only one or more evaluation coverage issues, the results from this evaluation case were not included in the final 2010 Census counts. Most Coverage Followup cases had more than one coverage issue. There were some cases in the production group that also had one of the three evaluation coverage issues (i.e., those indicating that they lived at a seasonal or second residence, in child custody, or living elsewhere). Those cases were sent to Coverage Followup instead of being sampled and included for this research, and the results from those cases were included in census production files and the final 2010 Census counts.

This evaluation report looked into several research areas concerning Coverage Followup.

Coverage Followup Cases with Evaluation Coverage Issues

The first research area is evaluating how well the three different evaluation coverage issues performed in Coverage Followup. All of the estimates for these coverage issues are weighted; there were 572,641 cases (with a weighted total of 572,641 housing units) that had both production and evaluation coverage issues, and 96,940 cases sampled with only the evaluation coverage issues (with a weighted total of 6,510,546 housing units). Combined, the weighted total is 7,083,187 housing units that had one of the three evaluation coverage issues.

An estimated 16.2 percent of the overall 7,083,187 housing units deleted a person (with an estimated total of 1,611,365 deleted people).

An estimated 3,216,289 housing units indicated a person living at a seasonal or second residence. Of those housing units, an estimated 18.6 percent deleted a person (with an estimated total of 897,218 deleted people). A majority of these deleted people were in ages 60-64 and 65 years and over. Also, a majority of these people were householders or their spouses.

An estimated 1,620,233 housing units indicated a person in child custody. Of those housing units, an estimated 15.2 percent added or deleted a person (with an estimated total of 355,369 deleted people). A majority of these added or deleted people were in ages 10-14. Also, a majority of these people were biological sons and daughters of the householder.

An estimated 2,130,507 housing units indicated a person who had another reason for living elsewhere. Of those housing units, an estimated 13.2 percent deleted a person (with an estimated total of 329,985 deleted people).

In the table below, the three evaluation coverage issues within the shaded area did not perform as well as or better than production Coverage Followup issues within the unshaded area. The results were the same as found during the mid-decade census tests.

Table of Overcount Coverage Issues and their Deletion Rates

Overcount Coverage Issue	Deletion Rate
College	74.5
Nursing Home	49.9
Household Multiple	35.9
Military	20.1
Person Multiple	18.9
Jail/Prison	6.3*
Seasonal	18.6
Child Custody	15.2
Another Reason	13.2

*Should be around 40 percent due to an internal processing error; some were misclassified as residents of their housing units when they should have been non-residents.

Sources: 2010 Census Coverage Followup Assessment Report for unshaded area and 2010 Census Coverage Followup Analysis Files for shaded area

More research is needed to understand the complex living situations of these individuals and how Coverage Followup could guide respondents to determine whether those individuals should be counted in the housing units or not.

The Experimental Questions (Module Q)

On the 2010 Census questionnaires, respondents could indicate if a person sometimes lived or stayed at another address or if a person lived at their address that they did not include in their housing unit's roster. Selected categories of these self-reported coverage issues are resolved in the Coverage Followup operation. Coverage Followup is a reinterview that asks more detailed probes to resolve these issues. However, a Coverage Followup respondent does not always mention the coverage issues that were reported in their initial questionnaire. An experimental module referred to as "Module Q" was designed and added to the end of the Coverage Followup interview to explore the living situations of overcounted people as well as to gain insight into why some Coverage Followup respondents did not mention missing people during the Coverage Followup interview. The Coverage Followup experimental questions probed the thought process of Coverage Followup respondents who do not make changes to the roster, with the objective of understanding why no changes were made. A sample of all the Coverage Followup cases (production and evaluation cases) was asked the Module Q questions if they did not mention their initial coverage issue. The questions in Module Q were directed to capture the information that the traditional Coverage Followup interview could not solicit from the respondent. In the traditional Coverage Followup interview, the same questions were asked of each housing unit and their members in order to capture

missing demographic data, add undercounted people, and delete overcounted people from the housing unit roster. The mention of the coverage issue identified on the initial 2010 Census return was left to the respondent's discretion. In Module Q, the Coverage Followup interviewer mentioned the coverage issue immediately, and the thought process of the respondent that identified the potential coverage issue was then probed. There were specific questions in Module Q for undercount and overcount cases. Module Q responses were not included in final 2010 Census results.

Both production and evaluation cases were sampled for Module Q. The associated coverage issues included undercount: children, relative, nonrelatives, and temporary residents; and overcount: college, nursing home, military, jail/prison, seasonal/second residence, child custody, and another reason.

There were 164,756 cases eligible for Module Q while 79,701 cases were actually sent to Module Q and asked the experimental questions, accounting for an overall "sent" rate of 48.4 percent. Cases were sent to Module Q if the coverage issue for which it was included in Coverage Followup was not mentioned during the interview. On average, the highest "sent" rates came from the undercount categories, sending a cumulative 84.6 percent of its sampled-eligible cases opposed to a cumulative 43.7 percent of the overcount categories. Undercount temporary had the highest "sent" rate of Module Q undercount, with 88.8 percent of sampled cases not being resolved in Coverage Followup. About 62.7 percent of all returns sent to Module Q were comprised of Mailout/Mailback English returns. An estimated 32.0 percent of all cases sent originated from the 2010 Census Nonresponse Followup operation. The 2010 Nonresponse Followup operation sent field workers to followup on housing units who did not return a 2010 Census form.

A case was considered complete if all of the questions in its interview path were answered, successfully leading to the "exit" module (Module H of the Coverage Followup interview). Households containing potentially overcounted people not resolved in Coverage Followup accounted for 80.3 percent of the total Module Q completed universe. Module Q overcount cases were completed 99.6 percent of the time, while Module Q undercount cases completed 98.4 percent of its sent workload.

In Module Q undercount, a series of questions was asked of the household to see if anyone was missing from the household roster that was staying there most of the time on April 1, 2010. These questions probed for both demographic data and information regarding when and how long one stayed at the census address. The term "Module Q undercount person" refers to a person listed during the first Module Q question that was not added to the roster during the traditional Coverage Followup interview. First and last name needed to be captured in order to be considered a Module Q undercount person for this analysis.

Since Module Q was conducted only on a sample of cases in Coverage Followup, the following results have been weighted. Weights were applied to the Module Q universe to

represent what would have happened to the entire Coverage Followup universe if Module Q were a part of the original Coverage Followup interview.

An estimated 1,128,413 people were captured during the experimental Module Q undercount probes. Of those people added from the Module Q undercount probes, undercount relatives accounted for 35.8 percent of the added people and undercount temporary residents accounted for 37.3 percent of the added people. Biological son or daughters of the householder comprised 19.6 percent of the universe. Those under the age of 5 years old were 10.0 percent of the Module Q undercount universe and age group 20-24 years was 9.0 percent.

If a Module Q undercounted person was reported as not staying at any other place besides the household in followup, then that person is a resident of the household. Overall, 35.3 percent of Module Q undercount people were reported as staying at no other address. An estimated 55.8 percent of undercount children reported as not staying at any other address and thus would be coded as residents.

To see if a Module Q undercount person should have been counted at the census address, further probing was necessary to establish residency. The Census Bureau's residence rule states that a person staying at an address most of the time around April 1, 2010, is a resident of that address. Overall, 46.3 percent of Module Q undercount people reportedly stayed at the census address most of the time and would have been deemed residents.

An estimated 35.3 percent of undercount people staying at no other address coupled with 46.3 percent of those staying mostly at the address in followup resulted in 60.3 percent of the people captured in Module Q being coded as residents. An estimated 8.9 percent of all Module Q people who would be considered residents were not found at any address in the 2010 Census, determined by matching to the 2010 Census Unedited File. These people were not counted in the 2010 Census but would have been enumerated if the Coverage Followup interview had included Module Q probing; 50.1 percent of were found only in the census address in followup. These people were counted where they should be.

During the Coverage Followup interview, if a respondent marked an overcount category on the initial 2010 Census return but then failed to identify the potentially overcounted person during the interview, then the sampled case went to Module Q overcount. In this experimental module, the respondent was probed as to why that particular person was not mentioned for its particular overcount reason. In Module Q overcount, a series of questions were asked to probe the thought process of the respondent when an overcount category was marked on the initial 2010 Census return but was not reported during the Coverage Followup interview.

The overcount probes in the traditional Coverage Followup interview asked the respondent if there was anyone in the household that had those coverage issues. Conversely, Module Q focused on the specific household member with the coverage

issue, asking for the thought process leading to the overcount category being marked on the initial 2010 Census return.

A weighted 4,815,754 people were probed for being potentially overcounted during the experimental Module Q overcount probes. If a Module Q overcount person was reportedly away in 2009 or earlier or stayed at the census address only, then the person would have remained a resident of the housing unit, with no further probing necessary. An estimated 4.5 percent of Module Q overcount people reportedly were away from the household in Coverage Followup in 2009 or earlier and 8.1 percent reported staying at no other address but the census address in followup and did not need further probing. There were four living situations in Module Q overcount that would require further probing to determine residency. An estimated 5.6 percent of Module Q overcount people reportedly were away in March or April 2010, 9.5 percent were away briefly, 5.7 percent were away sometime in 2010 but not during March or April, and 7.2 percent stayed at another address always. These living situations required further probing to determine residency.

Where the potentially overcounted person stayed most of the time was also probed. According to the residence rule, if a person stayed at another address most of the time, then they are not a resident of the housing unit in followup. An estimated 14.9 percent of the Module Q overcount people reportedly stayed at another address most of the time and would have been deleted from the housing unit. An estimated 68.5 percent reportedly stayed at the census address most of the time and would not have been removed from the housing unit.

Overall, 91.3 percent of Module Q overcount people would have remained residents of the housing unit while 8.7 percent would have been removed from their housing unit rosters in Coverage Followup. An estimated 5.4 percent of Module Q overcount people were only found in the census address in Coverage Followup and would have been deleted with Module Q and thus removed entirely from the 2010 Census. An estimated 2.6 percent of Module Q overcount people were found in multiple addresses and would have been deleted from the housing unit roster in followup, thus reducing duplication in the 2010 Census.

Coverage Followup Added People

Coverage Followup interviewed respondents in housing units with coverage issues in order to determine who should be added to a housing unit roster and who should be removed. Many situations could arise when changing the rosters of housing units. It was possible that a person was added to a housing unit that was already on another housing unit roster, thus causing duplication in the 2010 Census. It was possible for a person to be added to a housing unit and not found in any other address in the 2010 Census, thus capturing someone who would have been missed if not for the followup.

In Coverage Followup, 350,901 people were added to a housing unit as a result of undercount probing. An estimated 89.5 percent of the Coverage Followup added people were found only in the census address they were added to in Coverage Followup. These

people would not have been enumerated at all if not for Coverage Followup. An estimated 10.4 percent of the Coverage Followup added people were found in more than one address; thus, Coverage Followup caused these people to be duplicated in the 2010 Census.

Coverage Followup Deleted People

In Coverage Followup when a person was deleted from a housing unit, if that person was not enumerated in any other address in the 2010 Census, that potentially valid person was removed completely from the 2010 Census. It was also possible to remove someone from a housing unit who was enumerated at another address, thus resolving duplication in the 2010 Census. The following analysis looked at people deleted in Coverage Followup to see where these people were actually found in the final 2010 Census count as a result of the Coverage Followup interview.

In Coverage Followup, 1,235,096 people were removed from a housing unit as a result of overcount probing. An estimated 37.9 percent of the Coverage Followup deleted people were found only in another address after being removed from the household in followup, thus resolving duplication in the 2010 Census. An estimated 61.7 percent of people deleted in Coverage Followup were not found in any address in the 2010 Census, thus completely removing them from the 2010 Census.

Geocoding Results

During the Coverage Followup interview, different probes asked for addresses of places where the undercounted or overcounted person could have been duplicated or should be counted. For this evaluation, the Coverage Followup address information was sent to the Geography Division to see if the address provided existed in the Census Bureau's Master Address File.

Of the 350,901 Coverage Followup added people, 205 added people were found in another address and 36,386 were found in multiple addresses. This accounts for 36,591 Coverage Followup added people found in other addresses besides the address Coverage Followup checked. A total of 4,206 Coverage Followup added people provided an alternative address in the Coverage Followup interview that could be matched to a Master Address File Identification. A check was then performed to see if these people were counted at the addresses provided in Coverage Followup.

Overall, of the 4,206 Coverage Followup added people that provided alternative addresses during the Coverage Followup interview that matched to the Master Address File, 70.3 percent were counted at the provided address while 29.7 percent were not. Of the 1,235,096 Coverage Followup deleted people, 467,844 deleted people were found in another address and 5,434 were found in multiple addresses. This accounts for 473,278 Coverage Followup deleted people potentially found in other addresses besides the address Coverage Followup checked. A total of 155,458 Coverage Followup deleted

people provided an alternative address in the Coverage Followup interview that could be matched to a Master Address File Identification number. Similar to the Coverage Followup Added people, a check was performed to see if the people counted in these other addresses were counted at the addresses provided in Coverage Followup.

Overall, of the 155,458 Coverage Followup deleted people that provided a matched alternative addresses during the Coverage Followup interview, 58.8 percent were counted at the provided address while 41.2 percent were not and were counted somewhere else. This logic can be used to ensure that people removed from housing units in Coverage Followup are not removed completely from the 2010 Census.

Recommendations

Considering all results, the recommendations are:

- **Conduct more research on evaluation coverage issues, especially for people living in seasonal or second residences, people in child custody situations, and people with reasons for living elsewhere.**
- **After capturing a person's name and date of birth in the Module Q undercount, check the housing unit roster immediately in order to prevent duplication and reduce respondent burden.**
- **Update overcount coverage probes on the initial Coverage Followup questionnaire to emphasize the "April 1, 2010" time period.**
- **More interviewer training is needed for the Module Q section if it becomes part of the Coverage Followup interview.**
- **For Coverage Followup added people, check rosters of addresses solicited during the interview to prevent duplication.**
- **For Coverage Followup deleted people, check rosters of addresses solicited during interview to prevent missing a person from the census completely.**

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1. Introduction

1.1 Scope

The purposes of this evaluation are to identify ways to improve the Coverage Followup (CFU) interview and to investigate if people added or deleted in CFU were enumerated elsewhere. It is an effort to meet the fundamental goal of the decennial census, which is ensuring that every person in the United States is counted once, only once, and in the right place. For many decades, the Census Bureau has evaluated coverage in each census and documented that some people are typically missed in the census. These people are referred to as census omissions. The Census Bureau has also documented that some people are counted in the wrong place and found evidence that some people are counted more than once during the census. Both of these errors are referred to as erroneous enumerations.

Before presenting the three research questions for this evaluation, two concepts need to be defined:

- Evaluation case types are housing unit members who were indicated by the respondents on their 2010 Census forms as living at a seasonal or second residence, living in child custody situations, or living elsewhere.
- The CFU experimental questions were a set of questions added to the end of the CFU interview to explore the thought processes of CFU respondents with the objective of understanding why no changes were made to the roster in regard to the coverage issue the CFU respondents had reported on their initial 2010 Census form.

These concepts are explained further in the background section of this report.

The three main research questions for this report are:

(1) How does the CFU interview perform for cases with one or more evaluation case types?
(2) Can we use the results of the CFU experimental questions to enhance future CFU questions or probes?
(3) Were housing unit members who were added or deleted during the CFU interview enumerated elsewhere?

1.2 Intended Audience

This document assumes that the reader has at least a basic understanding of CFU. The goal is to use this document to help research, planning, and development teams in planning for the 2020 Census. To gain a basic understanding of CFU, please refer to the 2010 Census CFU Assessment Report (Govern et al, 2011).

2. Background

2.1 Coverage Issues and the Evolution of CFU within the Last Decade

In the past few decades, the Census Bureau has researched different types of coverage issues including:

- Large Households (LHH) – Housing unit (HU) returns where the population count was equal to or greater than the number of possible complete person records. For example, a Mailout/Mailback (MO/MB) English return could collect complete demographic information for six HU members as well as abbreviated demographic information for six additional HU members. So, it was sent to CFU to collect the remaining demographics of the six additional HU members.

- Count Discrepancies (CD) – HU returns in which the number of people listed on the form did not match the population count provided by the respondent or enumerator.

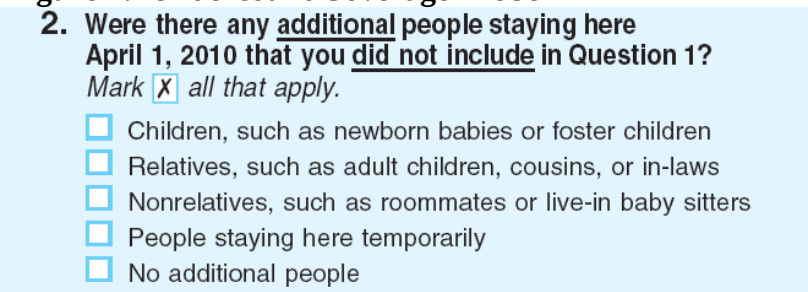
    - High CD – HU returns where the number of valid people listed on the form was greater than the reported population count.

    - Low CD – HU returns where the number of valid people on the form was less than the reported population count.

- Coverage Probes (CP) –Variations of the coverage probes were tested as part of the 2005 National Census Test. The undercount and overcount questions below are the versions used in the 2010 Census.

    - Undercount (UC) CP – HU returns that indicated, at a HU level, that there were additional people staying at the HU who were not included in the response to the question about the HU population count. See Figure 1 for the question wording on the MO/MB questionnaire.

Figure 1: Undercount Coverage Probe


2. Were there any additional people staying here April 1, 2010 that you did not include in Question 1?
Mark ✗ all that apply.
- ☐ Children, such as newborn babies or foster children
- ☐ Relatives, such as adult children, cousins, or in-laws
- ☐ Nonrelatives, such as roommates or live-in baby sitters
- ☐ People staying here temporarily
- ☐ No additional people

    - Overcount (OC) CP – HU returns that reported, at a person level, that at least one person sometimes lives or stays elsewhere. See Figure 2 for the question wording on the MO/MB questionnaire.

Figure 2: Overcount Coverage Probe

7. Does this person sometimes live or stay somewhere else?

☐ No ☐ Yes — *Mark* ☒ *all that apply.*

☐ In college housing
☐ In the military
☐ At a seasonal or second residence
☐ For child custody
☐ In jail or prison
☐ In a nursing home
☐ For another reason

- Administrative Records (AR) – HU returns where at least one person was matched between an administrative record and the 2010 Census return for that HU and at least one person was identified on the administrative record but not on the 2010 Census return.

- Unduplication – HU returns where the computer matching of the initial 2010 Census returns against themselves and against the universe of Group Quarter returns identified possible duplicate person links at various geographical levels.

The CFU research has evolved within the last decade. Census 2000 included a Coverage Edit Followup (CEFU) operation, following recommendations from the 1990 Census. CEFU was a telephone operation used to improve within-HU coverage and data quality in two ways. First, it collected person data for HU members beyond the first six fully captured on the 2010 Census MO/MB form. Second, it resolved count discrepancies between the reported HU's population count and the actual number of data-defined people[1] recorded on the 2010 Census form. Since enumerators were expected to resolve any issues at the time of the enumeration, no followup was conducted for enumerator completed returns.

Throughout the decade, research was conducted on ways to improve coverage. These approaches included the addition of overcount and undercount coverage probes on returns, the use of improved residence rule[2] instructions on mail returns, the use of administrative records, and the investigation into count discrepancies from enumerator completed forms. In addition, a followup field operation was tested when a HU could not be reached via the telephone. Since Census 2000, there were four census tests that included similar coverage related operations that attempted to improve coverage[3]. The coverage probes have evolved within those four census tests leading up to the 2010 Census CFU operation.

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[1] A person was considered data-defined if the person record had valid entries for at least two demographic items.

[2] The residence rule was in place to help respondents determine whether a person should be counted at the HU as of April 1 of the census year.

[3] These operations were Coverage Research Followup (CRFU) in the 2004 Census Test (Krejsa et al, 2005; Pennington, 2005), CFU in the 2005 National Census Test (Sheppard et al, 2007), CFU in the 2006 Census Test (Krejsa et al, 2007; King, 2007), and CFU in the 2008 Dress Rehearsal (Govern et al, 2009).

2.2 2010 Coverage Followup

2.2.1 Coverage Followup Universe

The 2010 Census CFU universe consisted of responses from the following initial 2010 Census returns: MO/MB (including bilingual, replacement mailings, fulfillment, and experimental), Update/Leave (U/L), Enumerator Questionnaires[4], and Telephone Questionnaire Assistance (TQA) interviews. All HUs in the eligible universe had a Master Address File Identification number (MAFID). Additionally, the initial 2010 Census returns had to have sufficient information for a CFU interview (i.e., there was a last name on the form and at least one valid person with a name or age). For complete details of the eligible universe definitions, please see Kostanich (2009a). In addition, cases in the eligible universe had to have at least one source of coverage issue, which are discussed in the next section.

2.2.2 Indication of Potential Coverage Issues

While the mid-decade tests provided an opportunity to research numerous expansions to the CFU operation, it would have been impossible for all aspects to be included in the 2010 Census due to budget and telephony infrastructure constraints. The types of CFU cases were analyzed, prioritized, and limited for inclusion in the 2010 Census CFU operation. All case types eligible for CFU were separated into two groups, production and evaluation, based on efficiency rates of the different coverage issue types with the production case types believed to have the higher efficiency rates based on past research. The efficiency rate was determined by how successful the coverage probes were in sending cases to CFU and how often the probes identified people that were missed or counted more than once, as a percent of attempted cases.

Two 2010 Census case types, LHH and CD, were included in the 2010 Census CFU just as they were included in Census 2000 CEFU. The remaining possible case types were examined based on maximizing the number of corrections – the sum of the number of people added to the initial HU roster and the number of people deleted from the initial HU roster – that could be made for the available funds and sorted as such. Case types were then deemed eligible for the CFU production operation if their inclusion kept the cumulative estimated cost below the budget constraint based on estimates of workloads for each case type. These case types were included in their entirety. Some of the case types that fell below the acceptable cumulative estimated cost were sampled and included in CFU as evaluation case types. Further detail on the selection of case types to be included in CFU can be found in Poehler (2010a).

The coverage issue types included in production CFU were:

[4] Includes Nonresponse Followup, Nonresponse Followup Reinterview, Nonresponse Followup Vacant Delete Check, Nonresponse Followup Vacant Delete Check Reinterview, Nonresponse Followup Residual, Update/Enumerate, Update/Enumerate Reinterview, Remote Alaska, and Remote Update/Enumerate returns

- LHH
- CD:
    - High CD
    - Low CD
- UC CP:
    - UC – Temporary
    - UC – Relatives
    - UC – Children
    - UC – Nonrelatives
- OC CP:
    - OC – College
    - OC – Nursing Home
    - OC – Jail/Prison
    - OC – Military
    - OC – Person Multiple, where at least one person on the return marked more than one overcount category
    - OC – Housing Unit Multiple, where multiple people on one return marked different overcount categories
- AR

CFU results from production case types impacted the number of people counted in the 2010 Census. An important note to mention: During the CFU operation, the CFU workload was enlarged based on the high productivity of interviewers and on actual workload deliveries that were smaller than workload estimates. The UC – Children, OC – Person Multiple, and UC – Nonrelatives case types had initially been assigned as evaluation case types and were added to production when the workload was increased. In short, these three case types became production case types.

Mid-decade testing suggested that the coverage issues we classified as evaluation cases in 2010 were not as likely to produce results at the end of the CFU operation as the production case types; they all had lower efficiency rates than the production group in our testing. Some evaluation case types were sampled for the 2010 Census CFU operation and their CFU returns did not affect 2010 Census counts. The coverage issue types sampled for evaluation purposes were:

- OC – Seasonal
- OC – Child Custody
- OC – Another Reason
- OC – Yes-Only – If you look at Figure 2 on page 3, the "Yes" box was marked, but none of the specific overcount reasons was marked.
- Duplicate people at various geographical levels

One evaluation coverage issue type not sampled for evaluation purposes was the UC – Multiple, where a return marked more than one undercount case type. They were included in this report as they could overlap with other case types.

As a clarification, it was possible that a case (HU) could have more than one case type. These coverage issue overlaps fell into one of three categories:

- Production case overlaps – these cases had more than one production case type and no evaluation case types. They were discussed in the 2010 Census CFU Assessment Report and are not included in this evaluation.
- Production and evaluation case overlaps (or production-evaluation overlaps in this report) – these cases had one or more production case types and one or more evaluation case types. These are assessed in this evaluation.
- Evaluation case overlaps (or evaluation-evaluation overlaps in this report) – these cases had more than one evaluation case type and no production case types. These are assessed in this evaluation.

2.2.3 Processing for the Selection of CFU Cases

Preparing the 2010 CFU universe was an iterative process that took place over 11 waves, as shown in Table 1 below. This process minimized the time between the completion of the initial return and the CFU interview, which in turn minimized any recall bias. As 2010 Census returns came in, the Universal Response Database Schema (URdbS) was populated with the collected data. During all waves of CFU case selection, the Decennial Systems and Processing Office (DSPO) identified and selected all cases that met the criteria for CD, LHH, and production CP components. Cases were arranged into unique groupings by source of coverage issues referred to as "buckets", which allowed control over what case types were available for dialing during the operation. During later waves of processing, DSPO made the URdbS available so that the Center for Administrative Records and Research Application (CARRA) could identify AR cases. During this time, the Decennial Statistical Studies Division (DSSD) sampled three evaluation case types: OC – Seasonal, OC – Child Custody, and OC – Another Reason. Also, all forms for the experimental coverage MO/MB booklet (X13 forms) with OC – Yes Only responses were selected by DSSD and passed to DSPO[5].

[5] These cases were not sampled for the purpose of this evaluation but for another evaluation (2010 Census Avoid Followup Evaluation). However, they were included in the analysis sections of this report. Inferences should not be drawn from the OC – Yes Only case type because of their small number of cases.

Table 1: Date Waves Sent to DRIS

Wave	Date Sent to DRIS
1	4/7/2010
2	4/14/2010
3	4/21/2010
4	4/28/2010
5	5/5/2010
6	5/12/2010
7	5/19/2010
8	6/9/2010
9	6/30/2010
10	7/14/2010
11	7/28/2010

Source: 2010 Census CFU Assessment Report

In addition to sampling the evaluation case types, an independent process was conducted for sampling unduplication cases as described in the 2010 Census Effectiveness of Unduplication Evaluation report (Heimel et al, 2012). It was possible that a case could be sampled twice; once as part of the three overcount evaluation case types DSSD sampled and once as an unduplication case. CARRA and DSSD sent the selected cases to DSPO for further processing.

As a result of selecting the CFU eligible universe, multiple eligible responses existed for individual HUs. DSPO used the remove overlap processing system to select a primary response per HU (Kostanich, 2009b).

The selected cases were then identified in the Universal Enumeration and Control Table (UECT) and made available to the Decennial Response Integration System (DRIS) so that they could obtain the prescribed case data to administer the CFU interview. The management of the 2010 CFU operation was contracted out as part of the DRIS contract.

Once the CFU case selection was made available to DRIS via the UECT, Workflow Control and Management (WCM) put the cases through the CFU verification process. During CFU verification, cases with invalid telephone number lengths, invalid area codes, invalid prefixes, proxy responses, or other data errors were removed from the workload. WCM then performed a telephone lookup operation using an external database that was comprised of two commercial datasets (InfoUSA and QAS, formerly QuickAddress) that were linked with the Master Address File. Both the external database and commercial datasets were initially obtained and build for a different DRIS purpose and then leveraged for the CFU telephone lookup. This operation validated the phone numbers provided on the initial 2010 Census returns—or identified a phone number if none was provided—and appended up to three phone numbers for each HU that provided no phone number or an invalid phone number. WCM also determined the initial CFU interview language based on the initial 2010 Census return.

More processing is detailed in Section 2.2.5 (Experimental Questions).

2.2.4 2010 Coverage Followup Interview

The CFU interview contained probes to identify people who were not initially included on the HU roster as well as people who, according to the Census Bureau's residence rule, were on the roster but should not have been enumerated at the HU. Regardless of the source of coverage issues, all HUs sent for followup received the same core questions to identify missed and erroneously enumerated people. Information gathered during the initial enumeration was passed to the CFU interview, and respondents added or deleted people from the roster of the initial return.

The CFU interview was structured in modules, which were groupings of questions that addressed different coverage issue types. Not all interviews entered every module, and not all questions within a module were asked.

- Module A and Module P began the interview by verifying the HU and identifying an eligible respondent. New interviews began in Module A, and interviews partially completed in previous calls began in Module P.
- Module B was only entered if the respondent said that the incorrect household was reached in Module A. Questions in Module B attempted to collect information about the CFU household, and the interview could continue only if the respondent said that the CFU household had actually been reached.
- Module C verified the address of the HU and collected missing tenure information. If the respondent reported that the address reached differed from the CFU address, the interview could continue only if the householder had lived at the CFU address on Census Day[6] or if the CFU address was a place the householder sometimes lived or stayed.
- Module D removed duplicated or unknown roster members and probed for additional roster members.
- Module E asked if any HU members moved out of the HU before Census Day.
- Module F probed for other places where HU members sometimes lived or stayed.
- Module G collected missing demographic information.
- Module Q contained experimental questions (see Section 2.2.5 for further explanation).
- Module H ended the interview.

For more information on the 2010 CFU interview, please see the CFU Application Design Document (2010).

[6] Throughout this report, Census Day is April 1, 2010.

2.2.5 Experimental Questions (Mod Q)

DSSD wanted to explore why indications of potential omissions and erroneous enumerations on the initial 2010 Census form were not always mentioned and/or confirmed during the CFU interview. An experimental module, Module Q or "Mod Q", was designed and added to the end of the CFU interview. Only sampled Mod Q cases were asked the Mod Q questions if they met certain criteria as explained in the bullets below:

- A mixture of production and evaluation overcount and undercount case types were sampled to be eligible for Mod Q prior to the CFU interview in each wave. Additionally, any unduplication cases with a Mod Q eligible overcount or undercount case type were also eligible for Mod Q. The sampling schema is explained further in Section 3.2.2.
- These sampled Mod Q eligible cases were sent to CFU.
- During the CFU interview, if no changes were made to the HU roster in regard to the marked overcount or undercount boxes on the 2010 Census form, then the CFU respondent was asked the Mod Q questions based on the marked overcount or undercount category to further probe why no changes were made.

For example, an OC – Seasonal case was sampled to be eligible for Mod Q questions. During the CFU interview, if the respondent reported that no one on the 2010 Census form was an OC – Seasonal person or refused to answer the OC– Seasonal CFU questions, then this case went to the Mod Q overcount question series to probe further on the OC – Seasonal issue. However, if the respondent confirmed that there was an OC – Seasonal person during the CFU interview, then this case did not go to Mod Q for OC – Seasonal.

There were two different Mod Q question series: Mod Q undercount questions and Mod Q overcount questions.

The Mod Q undercount questions asked the following questions:

- Who were the missing people (Mod Q added people)?
- What were the missing people's relationships to the respondent and their birthdates?
- Was there any other place the Mod Q added people stayed besides the census address in the last 12 months?
- If the Mod Q added people stayed in more than one place, where did they stay most of the time in March and April and how much time did they spend at each address in the last 12 months?

The Mod Q overcount questions probed for the living situations of overcounted people:

- If the overcounted people (Mod Q deleted people) stayed elsewhere other than the census address, what was the alternative address?
- Where did they spend most of the time in March and April?
- How much time did they spend at each address in the last 12 months?

Please refer to Appendix A for the Mod Q experimental questions. The responses from Mod Q were excluded from consideration for the final 2010 Census response unlike CFU added and deleted people.

When DRIS received the UECT from the Census Bureau, they conducted the sampling for Mod Q. The eight production case types DRIS sampled for Mod Q were OC – College, OC – Nursing Home, OC – Jail, OC – Military, UC – Temporary, UC – Children, UC – Relative, and UC – Nonrelative. For each CFU wave, DSSD provided DRIS the sampling rates for each production case type. The sampling rates were determined by two factors: (1) How many production cases for each production case type were passed to DRIS from DSPO in the current CFU wave, and (2) How many production cases for each production case type DRIS sampled in the previous CFU wave. DSSD also oversampled the CFU production cases to compensate for the possibility of losing some cases during DRIS's CFU verification process.

The three evaluation overcount case types DSSD sampled for Mod Q (OC – Seasonal, OC – Child Custody, and OC – Another Reason) were 100 percent eligible for Mod Q so no additional sampling by DRIS was needed. Using the CFU eligible universe files and mimicking the CFU Verification conducted by DRIS, DSSD created the universes for each evaluation case type and sampled the evaluation cases in CFU Wave 8 and Wave 9. Cases went through DSPO and later to DRIS, so it was also possible that some cases dropped out of the selection process. Thus, the three evaluation overcount case types were oversampled to compensate for this possibility.

The CFU production and evaluation sample design and the CFU weighting process are explained in the Methodology Section in Section 3.2 and Section 3.3, respectively.

2.2.6 Residence Coding

The foundation of the decennial census is to successfully count each person once, only once, and in the correct place. Sometimes, people live or stay in more than once place and their patterns of movement and lengths of residency may make it difficult to ascertain which one place is the correct place at which to count them in the decennial census. People who spend time at more than one place, and consequently may have been enumerated more than once, are considered to have complex living situations. The Census Bureau has a residence rule with detailed situations to assist in determining where to count people with complex living situations. Essentially,

- A person should be on the roster at the HU where they live or stay most of the time.
- However, a person should be counted at a group quarters if they were there on April 1, 2010.[7]

[7] There are exceptions to this rule. There are group quarters that were classified as usual-home-elsewhere eligible; if a person enumerated at that group quarter indicated that they live at a HU, then they were counted at that HU.

The CFU operation attempted to resolve these cases with complex living situations. Upon completion of CFU interviews, production CFU returns were sent to DSPO (also known as Headquarters Processing (HQP)) for processing. All roster members on those returns underwent residence coding. This process used information collected during the CFU interview to determine if any existing roster members or people who were attempted to be added to or deleted from HU rosters were actually residents of the HU.

For evaluative purposes, DSSD applied the residence rule to cases with only one or more evaluation case types and no production case types since DSPO did not process these cases. Keep in mind that the CFU results from these cases had no effect on determining the final 2010 Census response for a HU.

3. Methodology

3.1 Data Sources

3.1.1 2010 Decennial Response Files (DRF)

The DRF includes the core response data that comprise the Universal Response Database from all questionnaires that were data captured. DSPO created the DRF.

3.1.2 2010 Census Unedited File (CUF)

The 2010 CUF includes the core response data for only the questionnaires that were included in the final 2010 Census counts. The 2010 CUF has one record for each address in the 2010 Census. Only the people counted in the 2010 Census are included in the CUF.

3.1.3 2010 Duplication File

The 2010 Duplication File includes results from person duplication matching performed by DSSD.

3.1.4 2010 CFU Analysis Files

The 2010 CFU Analysis File is a combination of the DRF entries for initial returns sent to CFU, the CFU returns sent to DSSD, and some additional information from data files related to the selection of AR and Unduplication cases.

3.1.5 2010 CFU Geocoding File

The 2010 CFU Geocoding File includes the results of the additional automated address matching done by Geography Division for addresses mentioned during the CFU interviews. This additional processing was done to determine whether the respondent provided addresses matched to an existing 2010 Census living quarters so that DSSD could determine if the person was counted at that address.

3.2 Research Questions

3.2.1 Research Question 1: Analysis of CFU Evaluation Case Types

The question examined the counts of some sampled evaluation case types, the counts of all CFU cases with evaluation case types that went to CFU, subsequent CFU completion rates, and the overlaps between production and evaluation type cases. Also, roster changes, including added and deleted people, were examined. These counts were further examined by looking at characteristics of the evaluation, and overlap, case types by source of coverage issue, initial form type, and demographic characteristics of added or deleted people.

The data sources for this analysis were the 2010 DRF and 2010 CFU Analysis Files.

3.2.2 Research Question 2: CFU Experimental Questions Evaluation

The question examined the counts of cases that were eligible to be sampled for, asked (sent to), and completed the experimental Mod Q questions. Mod Q added people were examined by relationship to the householder, age, whether the person stayed at another address besides the census address, where the person spent most of the time in March or April 2010, and where the person was found in the 2010 Census, according to the 2010 CUF. Mod Q deleted people were examined by living situation, whether an address was provided for the other place, where they stayed most of the time, and where they were found in the 2010 Census, according to the 2010 CUF. These counts were further examined by looking at characteristics by coverage issue and initial form type.

The data sources for this analysis were the 2010 CFU Analysis Files, the 2010 DRF, the 2010 Duplication File, the person-matching file, and the 2010 CUF.

3.2.3 Research Question 3: CFU Evaluation of Added and Deleted People

The question examined the counts of people added and deleted in CFU by where they were enumerated in the 2010 Census. Also, if an address was solicited from the interview, counts were examined by whether the added or deleted people were enumerated at the address provided in CFU. These counts were further examined by looking at characteristics of the undercounted people by the undercount probe that captured them and by the overcount probe or roster review reason that deleted people, such as coverage issue, initial form type, relationship to the respondent, sex, Hispanic origin, race, collapsed age, and geographical location.

The data sources for this analysis were the 2010 CFU Analysis Files, the 2010 DRF, the 2010 Duplication File, the person-matching file, the 2010 CFU Geocoding File, and the 2010 CUF.

3.3 Sample Design

DSSD developed a sampling plan to outline how many CFU cases were eligible for the Mod Q experimental questions. This sampling plan evolved over time. For Wave 1 through Wave 7, DSSD selected the estimated variance of 0.015 (with 1,110 HUs as the sample size needed in order to have sufficient data for analysis) based on budget constraints. For Wave 8 through Wave 11, DSSD lowered the estimated variance to 0.005 and increased the sample size needed to 10,000 HUs as DSSD became more confident in how much DRIS could handle the CFU workloads within budget.

Before detailing the sampling plan, DSSD made some assumptions. DSSD assumed that the roster change rates (including addition and deletion rates) for each undercount or overcount case type for the 2010 Census would be approximately the same as they were for the mid-decade census tests. Also, it was assumed that we would have a 60 percent CFU completion rate[8].

There were two parts to the actual sampling process. Section 3.2.1 details the process of how DSSD worked with DRIS in sampling the production overcount and undercount case types. Section 3.2.2 details the process of how DSSD sampled the evaluation overcount case types.

3.3.1 DRIS Sampling Process for Production Case Types eligible for Mod Q

DRIS sampled the production overcount and undercount case types eligible for Mod Q using the random sequential stratified sampling approach. All overcount and undercount case types were divided into its own stratum and samples were selected from each stratum. For example, suppose that DRIS sampled 1 of every 20 cases within a stratum for OC – College, a random number *n* was generated between 1 and 20 and that *n*th case was sampled to be eligible for Mod Q. Then, for cases between 21 and 40, a new random number *n* was generated and that *n*th case was sampled to be eligible for Mod Q. This process was repeated for the next 20 cases until all of the cases within a stratum had a chance to be sampled.

DSSD utilized information gathered from DRIS and DSPO to determine the sampling rates for each production overcount or undercount case type for each CFU wave.

3.3.2 DSSD Sampling Process for Cases with only one or more Evaluation Case Types Eligible for Mod Q

In Wave 8 and Wave 9, DSSD sampled the OC – Seasonal, OC – Child Custody, and OC – Another Reason cases containing only one or more evaluation case types which were eligible for Mod Q using the simple stratified randomized sampling approach. The cases were randomly sampled regardless of the form type and the order these cases arrived to be included in the CFU eligible universe files. The sampling process was done twice,

[8] The completion rate expectation for DRIS was 65 percent. Sixty percent was a conservative estimate to ensure enough sample cases.

once during Wave 8 for the eligible CFU cases available in Wave 1 through Wave 8, and once during Wave 9 for eligible CFU cases available since Wave 8 processing.

It was discovered later that a small percentage of the sampled cases did have one or more production case types. The reason for this was because only the overcount production cases types were excluded and the remaining production case types (i.e., LHH, CD, UC, and AR) that were not already sent to CFU were included. A further discussion of the sampling process can be found in, "2010 Census Coverage Followup Evaluation Sampling Specification and 2010 Census Coverage Followup Experimental Module Documentation" (Stewart, 2010).

The number of cases sampled for the evaluation case types are summarized in Section 5.1.1.

3.4 Sample Weighting

There were two separate weights generated for this analysis. The first weighting process in Section 3.3.1 was for analyzing the first research question on how well CFU cases containing one or more evaluation case types performed in CFU. The second weighting process in Section 3.3.2 was for analyzing the second research question on Mod Q.

3.4.1 Weighting Process for Analyzing CFU Cases with one or more Evaluation Case Types Results

There were two separate sub-processes for weighting cases with evaluation case types: one for production-evaluation overlaps and one for cases with only the evaluation case types including evaluation-evaluation overlaps.

The production-evaluation overlaps (or any cases with one or more production case types and one or more evaluation case types) were assigned a weight of one because production cases were sent with certainty and no sampling was conducted.

The weight determination sub-process for cases with only one or more evaluation case types was much more complex than it was for the production-evaluation overlaps. First, if any X13 cases[9] had only the evaluation case types containing one of the four overcount evaluation case types (OC – Seasonal, OC – Child Custody, OC – Another Reason, or OC – Yes Only), they were automatically assigned a weight of one as they were included 100 percent of the time. Then, for the remaining cases with one of the three overcount evaluation case types (OC – Seasonal, OC – Child Custody, and OC – Another Reason) from other form types, their weights were determined using this formula:

[9] X13 cases were the 2010 Census experimental Mailout/Mailback forms used for the 2010 Census Avoid Followup Evaluation research. Those that overlapped with only the evaluation case types were sent to CFU as those that overlapped with the production case types were already sent to CFU.

$$\text{Evaluation Weight}_{OC\ case\ type} = \frac{\text{Overall Population Total}_{OC\ case\ type}}{\text{Interviewed Population Total}_{OC\ case\ type}}$$

Table 2 summarizes the weights for the three overcount evaluation case types.

Table 2: Summary of the Weighting Process per Overcount Evaluation Case Type

	Original Population Total	Adjusted Population Total	Total Cases with Only Evaluation Case Types	Weight per case
OC – Seasonal	2,602,214	2,601,913	20,560	126.55
OC - Child Custody	1,253,024	1,252,850	23,435	53.46
OC - Another Reason	1,732,389	1,732,162	11,326	152.94

Source: CFU Analysis Files

The "Original Population Total" column has the totals obtained at the time of sampling. These totals were inaccurate[10], because DSSD excluded only the overcount production case types. DSSD should have also excluded other production case types, and the "Adjusted Population Total" values were flawed attempts to remove some cases overlapping with production case types. The cases in the "Evaluation Cases Only Total" column were the actual counts of cases with only one or more evaluation case types (and no production case types). The "Weight per Case" values were determined by dividing the "Adjusted Population Total" values by the "Total Cases with Only Evaluation Case Types" values for each overcount evaluation case type.

As mentioned in the last paragraph of Section 2.2.3, it was possible that a case with only more than one evaluation case type and no production case types could be sampled twice: once as part of the three overcount evaluation case types DSSD sampled and once as an unduplication case. For these cases, their weights were adjusted using this formula:

Adjusted Weight =

$$\frac{1}{\frac{1}{Evaluation\ Weight} + \frac{1}{Unduplication\ Weight} - \left(\frac{1}{Evaluation\ Weight} * \frac{1}{Unduplication\ Weight}\right)}$$

Other unduplication cases that were not sampled by DSSD but overlapped with the three overcount evaluation case types were assigned the unduplication weight, according to the 2010 Census Effectiveness of Unduplication Evalaution report (Heimel et al, 2012).

[10] The original universes from which DSSD sampled were not saved; it was not expected that the CFU eligible universe files would be continually updated until the end of the CFU operation. So, recreating the original universes was impossible.

3.4.2 Weighting Process for Analyzing Mod Q Results

Only the case types sampled and eligible for Mod Q and interviewed in Mod Q received the Mod Q weights. There were three different universes from which the Mod Q cases came: (1) Cases with production case types were sampled from the CFU production universe as explained in Section 3.3.1, (2) Most[11] cases with only the evaluation case types were sampled as explained in Section 3.3.2, and (3) Sampled unduplication cases with any overcount or undercount coverage issues were included (refer to Heimel et al (2012)). It was possible that a case could have both overcount and undercount coverage issue types; only one was kept (i.e., the reason why this case was sampled) and the other was discarded from analysis. The cases interviewed in Mod Q were those that did not mention the coverage issue issue during the CFU interview.

Each overcount or undercount case type had its own Mod Q weight; there were 11 different Mod Q weighting case types total. The formula for determining the Mod Q weights for each overcount or undercount case type was:

$$\text{Mod Q Weight} = \frac{\text{Number of Cases Sent to CFU * Proportion}}{\text{Number of Mod Q Eligible Cases Interviewed in Mod Q}},$$

$$\text{where Proportion} = \frac{\text{Number of Mod Q Eligible Cases Interviewed in Mod Q}}{\text{Number of Mod Q Eligible Cases Interviewed in CFU}}$$

Table 3 summarizes the Mod Q weights for each overcount or undercount case type.

[11] Some of these cases had one or more production case types.

Table 3: Summary of the Mod Q Weight per Mod Q Case Type

Mod Q case types	Number of Cases Sent to CFU	Number of Mod Q Eligible Cases Interviewed in CFU	Number of Mod Q Eligible Cases Interviewed in Mod Q	Mod Q Weight
OC – College	996,804	33,907	3,900	29.40
OC – Military	519,283	5,610	3,982	92.56
OC – Jail	90,271	5,763	4,981	15.66
OC – Nursing Home	105,942	5,372	4,253	19.72
OC – Child Custody	1,253,024[12]	36,890	11,851	33.97
OC – Seasonal	2,602,214[12]	34,994	14,475	74.36
OC – Another Reason	1,732,389[12]	23,434	20,375	73.93
UC – Children	396,330	4,955	3,983	79.99
UC – Relative	939,542	4,510	3,793	208.32
UC – Nonrelative	280,687	4,714	4,015	59.54
UC – Temporary	695,901	4,607	4,093	151.05

Source: CFU Analysis Files

4. Limitations

4.1 Person Numbers Greater Than or Equal to Ten

Before a case was sent to the telephone dialer, the HU roster was evaluated for validity, stripped of any invalid people, and renumbered. The person number variable, however, was a character variable in the database, and when a HU roster with ten or more people was sorted, any roster member with an original person number of ten through 19 was put before a roster member with an original person number of one. This oversight was eventually corrected, but not before a few waves of cases had already been sent to CFU.

The largest impact of this error is to the relationship question. While most questions are asked independent of other roster members, the relationship question is asked in relation to person one. See Figure 3 for the wording on the MO/MB questionnaire.

[12] They were not the number of cases sent to CFU; they were the estimated population totals from the CFU eligible universe files (see Section 3.2.2 for description).

Figure 3: Relationship Question from the MO/MB Form

2. How is this person related to Person 1? *Mark ☒ ONE box.*

- ☐ Husband or wife
- ☐ Biological son or daughter
- ☐ Adopted son or daughter
- ☐ Stepson or stepdaughter
- ☐ Brother or sister
- ☐ Father or mother
- ☐ Grandchild
- ☐ Parent-in-law
- ☐ Son-in-law or daughter-in-law
- ☐ Other relative
- ☐ Roomer or boarder
- ☐ Housemate or roommate
- ☐ Unmarried partner
- ☐ Other nonrelative

Since the CFU interview asked only the demographic items that were missing and saved all other demographic information, some cases had mixed reference people for the relationship question. While the CFU returns sent to HQP were resorted and resent, the relationship data could not have been changed without an additional CFU interview. This report does not attempt to correct any relationship values, but it does use the CFU return that was reordered.

4.2 Multiple Returns

Two DRIS servers housed all CFU data during the operation. While these servers frequently communicated to each other throughout the operational period, they did not communicate in real time. As a result, a single case was occasionally contacted multiple times in one day by different call centers that pulled cases from the two servers. Consequently, some cases were interviewed multiple times because the completed interview data housed in one server had not yet been shared with the other server. In addition, due to a telephony miscommunication, some CFU returns were occasionally sent to HQP multiple times; that is, multiple CFU returns existed for some cases where the information was exactly the same across the CFU returns for each case. To prepare the data for this evaluation, the last and most complete CFU return was selected from multiple returns for each case. Therefore, for cases where multiple returns were received by DSSD, not all completed interviews are represented in this evaluation. The order of receipt from DSSD may have differed from HQP's order of receipt, so this evaluation may choose a completed production interview for analysis that differs from the completed interview selected for processing by HQP but is still considered an acceptable completed interview.

Also, the updating of MAFIDs for originally unique returns that were determined to be the same HU during post-processing sometimes caused CFU returns that were initially from unique cases to be identified with the same MAFID. Thus, while a case may have been completed only once in CFU, the updated MAFID may link to multiple CFU returns. This report considers cases as unique by CFU standards – i.e., before any MAFID changes were made; therefore, data within this report may not compare to data from other sources.

During case selection, cases were screened to ensure that each case was sent to the CFU operation only once. Sixteen cases, however, were sent to CFU twice, and in some cases,

multiple CFU interviews were completed for these cases. Of the sixteen cases, thirteen cases had evaluation case types. Two different returns were selected and sent to CFU for each of the sixteen cases, and one of the two returns for each of the sixteen cases was sent in Wave 8 with a non-production source of coverage issue. Either these cases were not initially flagged as having been already sent, or the selection algorithm did not properly note the flag, but these sixteen cases were sent to CFU again in error. Similar to instances where multiple CFU returns existed for one case, the last, most complete interview was selected for the results sections of this report.

4.3 Residence Coding

During attempts to duplicate the residence coding for verification purposes, DSSD noticed that the production residence coding done by DSPO was slightly different than expected. The impact was that roster members who indicated they were living in a jail or prison should have been identified as non-residents but were instead identified as residents. For this evaluation, we used DSPO's version to be consistent with the 2010 Census CFU Assessment Report.

4.4 Recall Bias

The CFU interview was conducted weeks or even months after a respondent completed the 2010 Census form. This lag between the initial 2010 Census response and the followup interview could have impacted respondents' ability to recall information on what they and their HU members were doing around April 1, 2010 (Census Day).

4.5 Person-Matching File

If a person was added to a roster and was already on the roster, the matching process did not link the duplicated person within that same 2010 Census return. This led to a problem with determining whether Mod Q undercount people were counted at the census address. To alleviate this issue, the "Already on Roster" flag was used from the Mod Q interview to determine where they were counted in the final 2010 Census counts.

The Census Bureau has developed computer matching algorithms that match the census universe against itself and identify potentially duplicated people. The algorithms use characteristics such as first name, last name, middle initial, age, date of birth, phone number, and geographic distance to match people. Each time a person record is matched to another person record, it is given a score that reflects the strength of the match. The scores are then ranked and the matches are reviewed to establish a cutoff point. Cutoffs are set very high during the review to establish a high level of certainty that only true duplicates and not false matches are identified. All matches with scores above the cutoff were considered to be duplicate person records. Matching was performed across HUs but not within the same form sequence. For more information on the person matching process, please see the 2010 Census Effectiveness of Unduplication Evaluation Report.

5. Results

5.1 Evaluation of CFU Cases with one or more Evaluation Case Types

5.1.1 CFU Sampling Results for Cases with only one or more Evaluation Case Types

For the three overcount evaluation case types (OC – Seasonal, OC – Child Custody, and OC – Another Reason), DSSD sampled cases from the remaining form types not including X13 forms. When the CFU sampling programs were run during CFU Wave 8 and Wave 9 using the CFU eligible universe files created by DSSD at that time, the evaluation overcount overall totals are shown in Table 4:

Table 4: Evaluation Overcount Universe Totals at Time of Wave 8 and Wave 9 Sampling

Overcount Evaluation Case Type	Sample in Wave 8	Sample in Wave 9	Total Sample
OC – Seasonal	2,453,259	148,955	2,602,214
OC – Child Custody	1,164,141	88,883	1,253,024
OC – Another Reason	1,641,471	90,918	1,732,389
Overcount Total	**5,258,871**	**328,756**	**5,587,627**

Source: CFU Eligible Universe Files

DSSD used the totals within this table to determine the weights for the CFU cases with only one or more evaluation case types sampled in Section 3.3.1.

During the analysis phase, it was determined that the CFU eligible universe files created within DSSD were not the same as they were at the time of Wave 8 and Wave 9 sampling. It was confirmed with a branch within DSSD that the CFU eligible universe files for each wave were continually updated by removing duplicate cases until the end of the CFU operation. So, when DSSD re-ran the sampling programs at the time of CFU analysis, the universe sizes decreased as shown in Table 5. DSSD was not able to recover the original CFU eligible universe files used for Wave 8 and Wave 9 sampling processes, so Table 5 and Table 6 were created for evaluation purposes.

Table 5: Evaluation Overcount Universe Totals at the Time of CFU Analysis

Overcount Evaluation Case Type	Universe for Wave 8	Universe for Wave 9	Total CFU Eligible Return Universe
OC – Seasonal	2,385,079	144,610	2,529,689
OC – Child Custody	1,105,736	85,255	1,190,991
OC – Another Reason	1,594,422	88,109	1,682,531
Overcount Total	**5,085,237**	**317,974**	**5,403,211**

Source: CFU Eligible Universe Files

Table 6 contains the distribution of the form type of overcount evaluation universes at the time of CFU analysis (not at the time of CFU evaluation sampling).

Table 6: Form Type of Evaluation Overcount Universe at Time of CFU Analysis

Form Type	CFU Eligible Returns	Percent of Total CFU Eligible Returns
Respondent Completed	**4,988,277**	**92.3**
MO/MB – English	4,684,517	86.7
MO/MB – Bilingual	292,125	5.4
MO/MB – Fulfillment	1,841	0.0
MO/MB – Experimental	9,423	0.2
U/L – English Stateside	371	0.0
U/L – Puerto Rico	0	0.0
Enumerator Completed	**414,934**	**7.7***
TQA	1,991	0.0
NRFU	389,437	7.2
U/E	23,506	0.4
Questionnaire Total	**5,403,211**	**100.0**

* Percentages may not sum up to 7.7 percent due to rounding.
Sources: CFU Eligible Universe Files and 2010 DRF

The majority of the forms were the respondent completed MO/MB English forms at 86.7 percent of the overall total. The majority of the enumerator completed forms were the NRFU forms at 7.2 percent of the overall total. The number of NRFU forms should be much higher; some of these cases were not processed in time for sampling in Wave 8 and Wave 9 and this was a limitation.

Table 7 contains the distribution of CFU overcount evaluation cases sampled before being sent to CFU.

Table 7: Overcount Evaluation Cases Sampled for CFU

Overcount Evaluation Case Type	Sampled for Wave 8	Sampled for Wave 9	Total Sampled
OC – Seasonal	28,861	3,169	32,030
OC – Child Custody	33,261	2,962	36,223
OC – Another Reason	16,252	1,748	18,000
Overcount Total	**78,374**	**7,879**	**86,253**

Sources: CFU Eligible Universe Files and 2010 DRF

The distribution of form types is shown in Table 8.

Table 8: Form Type of Sampled Overcount Evaluation Cases

Form Type	CFU Eligible Returns	Percent of Total CFU Eligible Returns
Respondent Completed	**77,030**	**89.3***
MO/MB – English	72,757	84.4
MO/MB – Bilingual	4,099	4.8
MO/MB – Fulfillment	22	0.0
MO/MB – Experimental	147	0.2
U/L – English Stateside	5	0.0
U/L – Puerto Rico	0	0.0
Enumerator Completed	**9,223**	**10.7**
TQA	32	0.0
NRFU	8,863	10.3
U/E	328	0.4
Questionnaire Total	**86,253**	**100.0**

* Percentages may not sum to 89.3 percent due to rounding.

Sources: CFU Eligible Universe Files and 2010 DRF

The respondent completed MO/MB English forms accounted for 84.4 percent of the overall total as well as the enumerator completed NRFU forms accounted for 10.3 percent of the overall total.

Below is the distribution of the completed CFU overcount evaluation cases in Table 9. The overall goal of at least a 65 percent CFU completion rate was achieved for each evaluation overcount case type.

Table 9: Completed CFU Overcount Evaluation Sampled Cases

Overcount Evaluation Case Type	Total CFU Evaluation Cases Sampled	Completed CFU Evaluation Cases	Percent of Sampled Cases Completed
OC – Seasonal	32,030	21,282	66.4
OC – Child Custody	36,223	24,425	67.4
OC – Another Reason	18,000	11,900	66.1
Overall Total	**86,253**	**57,607**	**66.8**

Sources: CFU Eligible Universe Files and 2010 DRF

Table 10 contains the form type distribution of the completed CFU overcount evaluation sampled cases. Again, the respondent completed MO/MB English forms as well as the enumerator completed NRFU forms comprised the majority of the overall totals at 86.8 percent and 8.2 percent, respectively.

Table 10: Form Type of Completed Overcount Evaluation Case Type

Form Type	CFU Eligible Returns	Percent of Total CFU Eligible Returns
Respondent Completed	**52,701**	**91.5**
MO/MB – English	50,009	86.8
MO/MB – Bilingual	2,565	4.5
MO/MB – Fulfillment	19	0.0
MO/MB – Experimental	107	0.2
U/L – English Stateside	1	0.0
U/L – Puerto Rico	0	0.0
Enumerator Completed	**4,906**	**8.5**
TQA	16	0.0
NRFU	4,697	8.2
U/E	193	0.3
Questionnaire Total	**57,607**	**100.0**

Sources: CFU Eligible Universe Files and 2010 DRF

Table 11 has the distribution of sampled CFU evaluation cases with or without one or more production case types.

Table 11: Distribution of Sampled CFU Evaluation Cases

Overcount Evaluation Case Type	Completed CFU Evaluation Cases with Production Case Type	Completed CFU Evaluation Cases with only Evaluation Case Type	Completed CFU Evaluation Cases
OC – Seasonal	722	20,560	21,282
OC – Child Custody	990	23,435	24,425
OC – Another Reason	574	11,326	11,900
Overall Total	**2,286**	**55,321**	**57,607**

Sources: CFU Eligible Universe Files and 2010 DRF

5.1.2 Completed CFU Evaluation Cases with Added or Deleted People

Now, we will look at how well CFU performed for any cases containing one or more evaluation case types. These cases may or may not include one or more production case types. Table 12 summarizes the unweighted counts of CFU cases with one or more evaluation case types. The last column is the total universe for the rest of this section.

Table 12: Unweighted Counts of CFU Cases with One or More Evaluation Case Types

Overcount Evaluation Case Type	Completed Sampled CFU Evaluation Cases from Table 11	"Completed Production CFU Cases with one or more Evaluation Case Types" or "Completed Unduplication Cases with one or more Evaluation Case Types"	Total Completed CFU Cases with one or more Evaluation Case Types
OC – Seasonal	21,282	206,292	227,574
OC – Child Custody	24,425	92,500	116,925
OC – Another Reason	11,900	230,136	242,036
OC – Yes Only	0	83,046[13]	83,046
Overall Total	**57,607**	**611,974**	**669,581**

Sources: CFU Eligible Universe Files and 2010 DRF

Table 13 contains another view of the distribution of completed evaluation CFU cases with or without one or more production case types. The overall weighted total for 669,581 cases is 7,083,187 HUs.

Table 13: Another View of the Unweighted Counts of CFU Cases with One or More Evaluation Case Types

	Total Completed CFU Cases with one or more Evaluation Case Types
With Production Case Type	572,641
Without Production Case Type	96,940
Overall Total	**669,581**

Sources: CFU Eligible Universe Files and DRF

In this section and the rest of the 5.1 Section, the counts are weighted and rounded to the nearest integer at the lowest level possible. The grand totals may vary slightly across the tables due to rounding. Standard errors are presented in parentheses.

Also, be aware that not all added or deleted people in this section were included as a final 2010 Census response. Some of the cases were production-evaluation overlaps (those containing one or more production case types and one or more evaluation case types) and were counted as a final 2010 Census response. The rest of the cases were evaluation-evaluation overlaps (those containing only one or more evaluation case types and no production case types) and were not counted as a final 2010 Census response.

[13] Any interviewed X13 form types or other production CFU cases that overlapped with OC – Yes Only evaluation reason.

5.1.2.1 Added or Deleted People by HU Variables

Table 14 shows the number of HUs with added or deleted people by different reasons that a case was sent to CFU. This table counts cases that have multiple coverage issues in each of the source's rows (refer to Sections 5.1.5 and 5.1.6 for a different view of the data).

Table 14: HUs with Added or Deleted People by Coverage Issue

Overcount Evaluation Case Type	Number of HUs Completed in CFU (Std. Error)	Number of HUs with Added or Deleted People (Std. Error)	Percent of Completed Cases with Added or Deleted People (Std. Error)	Number of Added or Deleted People (Std. Error)
OC – Seasonal	3,216,289 (6,172.1)	632,628 (4,717.5)	19.7 (0.18)	951,762 (7,050.4)
OC – Child Custody	1,620,233 (694.9)	261,805 (1,857.9)	16.2 (0.12)	376,813 (650.2)
OC – Another Reason	2,130,507 (5,230.1)	314,133 (285.0)	14.7 (0.05)	379,606 (5,026.4)
OC – Yes Only	116,158 (275.0)	25,992 (70.1)	22.4 (0.01)	36,898 (1,092.3)
Overcount Total	**7,083,187 (8124.5)**	**1,234,558 (5,078.6)**	**17.4 (0.09)**	**1,745,079 (8,751.5)**

Source: CFU Analysis Files

Of 7,083,187 HUs completed in CFU with one or more evaluation case types, an estimated 17.4 percent had at least one added or deleted person. Both OC – Seasonal and OC – Yes Only[14] case types were significantly larger than the 17.4 percent total. An estimated total of 1,745,079 people would have been added or deleted in CFU. A majority of these estimated added or deleted people were from the OC – Seasonal category at an estimated total of 951,762.

Table 15 contains the addition and deletion rates from the 2010 Census CFU Assessment Report as well as the four evaluation overcount coverage issues in the shaded area.

[14] The OC – Yes Only cases were limited to X13 forms or any CFU production cases overlapping with OC – Yes Only. So, any statements made about OC – Yes Only from the rest of Section 5.1 may not be representative of the overall OC – Yes Only universe.

Table 15: Comparing Addition or Deletion Rates with the CFU Assessment Rates

Coverage Issues	Addition or Deletion Rate
LHH	11.7
High CD	34.4
Low CD	35.8
AR	7.8
UC – Children	20.8
UC – Relatives	19.3
UC – Nonrelatives	16.4
UC – Temporary	19.4
OC – College	74.9
OC – Military	21.1
OC – Jail/Prison	9.7[15]
OC – Nursing Home	50.9
OC – Person Multiple	20.5
OC – Household Multiple	37.5
OC – Seasonal	19.7
OC – Child Custody	16.2
OC – Another Reason	14.7
OC – Yes Only	22.4

Sources: 2010 Census CFU Assessment Report for unshaded area and 2010 Census CFU Analysis Files for shaded area

The addition or deletion rates for the four evaluation case types in this table did not perform as well as or better than any of the rates for production case types in the 2010 CFU Assessment report. It may appear that the three overcount evaluation case types did as well as or better than LHH, AR, UC – Relatives, UC – Nonrelatives, or UC – Temporary coverage issues, but those coverage issues were mainly for adding people and the overcount evaluation case types were mainly for deleting people. OC – Yes Only was not sampled for this evaluation, so its result is ignored for this comparison.

Table 16 provides a distribution of the added or deleted people by form type.

[15] Due to an internal residence coding processing error, this percentage should be 44.6.

Table 16: HUs with Added or Deleted People by Form Type

Form Type	Number of HUs Completed in CFU (Std. Error)	Number of HUs with Added or Deleted People (Std. Error)	Percent of Completed Cases with Added or Deleted People (Std. Error)	Number of Added or Deleted People (Std. Error)
Respondent Completed	**6,558,162 (44,503.3)**	**1,125,146 (9,456.8)**	**17.2 (0.26)**	**1,580,475 (16,692.8)**
MO/MB – English	6,162,823 (44,494.8)	1,065,393 (9,318.0)	17.3 (0.28)	1,498,094 (16,517.0)
MO/MB -- Bilingual	386,570 (654.8)	58,053 (1,607.7)	15.0 (0.44)	79,683 (2,398.1)
MO/MB -- Fulfillment	3,206 (546.1)	634 (86.6)	19.8 (0.67)	1,132 (3.9)
U/L -- English Stateside	225 (171.1)	91 (82.9)	40.4 (7.67)	179 (77.9)
U/L -- Puerto Rico	5,338 (22.0)	975 (1.0)	18.3 (0.06)	1,387 (37.0)
Enumerator Completed	**525,025 (9,461.6)**	**109,413 (2,941.5)**	**20.8 (0.88)**	**164,605 (4,221.0)**
TQA	2,301 (3.1)	572 (85.9)	24.9 (3.70)	1,028 (278.5)
NRFU	499,677 (8,824.9)	104,787 (2,786.4)	21.0 (0.93)	158,052 (4,172.1)
U/E	23,047 (3,412.3)	4,054 (942.6)	17.6 (1.38)	5,525 (640.3)
Questionnaire Total	**7,083,187 (45,498.0)**	**1,234,559 (9,903.7)**	**17.4 (0.25)**	**1,745,080 (17,218.2)**

Source: CFU Analysis Files

Four form types had significantly larger percentages of completed cases with added or deleted people than the overall completion rate of 17.4 percent: Fulfillment MO/MB forms at 19.8 percent, U/L English stateside at 40.4 percent (but which has a small sample size), U/L Puerto Rico at 18.3 percent, and NRFU forms at 21.0 percent. In addition, enumerator completed form types altogether had a significantly larger percent of completed cases (20.8 percent) than the overall completed rate of 17.4 percent, but not all enumerator completed form type categories were significantly different from the overall completion rate of 17.4 percent.

5.1.2.2 Added or Deleted People by Demographic Variables

There were 1,727,940 added or deleted data-defined people included on the 7,083,187 HUs that completed a CFU interview. A person could not be added to the roster without

being data-defined. Non-data-defined deleted people are not included in any demographic tables, but they are included in other tables. Thus, the number of added or deleted people in the demographic tables is less than the number of added or deleted people in the other tables.

Table 17 shows the ages of roster members added or deleted in the CFU interview.

Table 17: Added or Deleted People by Collapsed Age

Age in Years	Number of Added or Deleted People (Std. Error)	Percent of Added or Deleted People (Std. Error)
Under 5	70,980 (204.0)	4.1 (0.03)
5-9	141,363 (2,463.5)	8.2 (0.14)
10-14	179,274 (2,566.0)	10.4 (0.15)
15-19	127,137 (1,379.3)	7.4 (0.09)
20-24	105,479 (5,698.5)	6.1 (0.31)
25-29	62,844 (3,218.5)	3.6 (0.18)
30-34	48,328 (2,308.2)	2.8 (0.13)
35-39	41,421 (1,110.8)	2.4 (0.07)
40-44	60,548 (212.8)	3.5 (0.03)
45-49	81,289 (2,679.4)	4.7 (0.15)
50-54	106,858 (2,306.7)	6.2 (0.13)
55-59	141,151 (1,441.8)	8.2 (0.10)
60-64	168,149 (4,745.2)	9.7 (0.25)
65 and over	381,217 (4,760.8)	22.1 (0.25)
Missing	11,902 (327.8)	0.7 (0.02)
Total	**1,727,940 (11,131.3)**	**100.0***

* Percentages may not sum to 100 percent due to rounding.

Source: CFU Analysis Files

An estimated 22.1 percent of people 65 and over were added or deleted and significantly larger than the other percentages. The majority of these people were living in seasonal or second residence homes. The next two significantly highest percentages were in the 10-14 age group at 10.4 percent and in the 60-64 age group at 9.7 percent (but they were not significantly different from each other). The majority of those people in the 10-14 age group were in child custody situations, and the majority of those in the 60-64 age group were living in seasonal or second residence homes.

Table 18 shows the Hispanic Origin of added or deleted roster members.

Table 18: Added or Deleted People by Hispanic Origin

Hispanic Origin	Number of Added or Deleted People (Std. Error)	Percent of Added or Deleted People (Std. Error)
Not Hispanic or Latino checkbox only	1,581,722 (16,624.6)	91.5 (0.13)
Mexican checkbox only	68,008 (126.3)	3.9 (0.04)
Puerto Rican checkbox only	13,755 (55.2)	0.8 (0.01)
Cuban checkbox only	4,803 (606.4)	0.3 (0.04)
Another Hispanic checkbox only	2,569 (685.6)	0.1 (0.04)
Multiple checkboxes	2,074 (708.6)	0.1 (0.04)
Both Checkbox and Write-in	33,981 (1,429.2)	2.0 (0.08)
Write-in Only	4,928 (40.6)	0.3 (0.00)
Missing	16,100 (425.7)	0.9 (0.03)
Total	**1,727,940 (16,732.03)**	**100.0***

* Percentages may not sum to 100 percent due to rounding.

Source: CFU Analysis Files

Of the added or deleted roster members, an estimated 91.5 percent selected the "Not Hispanic or Latino" checkbox, which was significantly larger then the other Hispanic Origin categories. The next two highest percentages were also significantly different from the other Hispanic origin categories and from each other: "Mexican checkbox only" at 3.9 percent and "Both Checkbox and write-in" at 2.0 percent.

Table 19 shows the race checkbox selected by added or deleted roster members.

Table 19: Added or Deleted People by Race

Race	Number of Added or Deleted People (Std. Error)	Percent of Added or Deleted People (Std. Error)
White checkbox alone	1,412,833 (17,158.9)	81.8 (0.20)
Black or African American checkbox alone	122,870 (71.5)	7.1 (0.07)
American Indian and Alaska Native checkbox alone	1,537 (551.7)	0.1 (0.03)
Asian Indian checkbox alone	8,759 (317.2)	0.5 (0.02)
Chinese checkbox alone	18,545 (325.9)	1.1 (0.02)
Filipino checkbox alone	11,070 (366.3)	0.6 (0.02)
Japanese checkbox alone	3,662 (291.5)	0.2 (0.02)
Korean checkbox alone	6,763 (298.5)	0.4 (0.02)
Vietnamese checkbox alone	4,961 (210.7)	0.3 (0.01)
Other Asian checkbox alone	124 (83.9)	0.0 (0.01)
Native Hawaiian checkbox alone	503 (133.6)	0.0 (0.01)
Guamanian or Chamorro checkbox alone	222 (110.3)	0.0 (0.01)
Samoan checkbox alone	72 (4.0)	0.0 (0.00)
Other Pacific Islander checkbox alone	20 (2.0)	0.0 (0.00)
Some Other Race checkbox alone	778 (37.4)	0.0 (0.00)
Multiple checkboxes	23,696 (49.4)	1.4 (0.01)
Both Checkbox and Write-in	89,796 (820.6)	5.2 (0.07)
Write-in Only	7,252 (1,026.2)	0.4 (0.06)
Missing	14,477 (242.2)	0.8 (0.02)
Total	**1,727,940 (17,237.3)**	**100.0***

* Percentages may not sum to 100 percent due to rounding.

Source: CFU Analysis Files

The “White” checkbox was selected by 81.8 percent of the added or deleted roster members. The “Black or African American” checkbox and the “Both checkbox and write-in” were selected by 7.1 percent and 5.2 percent of the added or deleted roster members, respectively.

Table 20 shows the relationship to the householder checkbox selected by added or deleted roster members.

Table 20: Added or Deleted People by Relationship to the Householder

Relationship to the Householder	Number of Added or Deleted People (Std. Error)	Percent of Added or Deleted People (Std. Error)
Householder	531,192 (8,894.3)	30.7 (0.39)
Husband/Wife	343,915 (6,893.0)	19.9 (0.34)
Biological Son or Daughter	495,344 (1,390.9)	28.7 (0.21)
Adopted Son or Daughter	14,169 (483.3)	0.8 (0.03)
Stepson or Stepdaughter	59,936 (24.1)	3.5 (0.03)
Son-in-law or Daughter-in-law	6,934 (765.9)	0.4 (0.04)
Grandchild	51,498 (643.9)	3.0 (0.04)
Brother or Sister	18,335 (866.3)	1.1 (0.05)
Father or Mother	27,445 (1,763.7)	1.6 (0.10)
Parent-in-law	9,056 (625.7)	0.5 (0.04)
Other Relative	27,760 (873.1)	1.6 (0.05)
Related	2,495 (21.0)	0.1 (0.00)
Unmarried Partner	40,122 (1,633.4)	2.3 (0.09)
Roomer or Boarder	13,272 (1,435.0)	0.8 (0.08)
Housemate	20,706 (2,984.1)	1.2 (0.17)
Other Nonrelative	56,355 (624.4)	3.3 (0.04)
Not Related	927 (164.9)	0.1 (0.01)
Multiple	625 (119.9)	0.0 (0.01)
Missing	7,852 (14.2)	0.5 (0.45)
Total	**1,727,938 (12,201.3)**	**100.0***

* Percentages may not sum to 100 percent due to rounding

Source: CFU Analysis Files

Of the roster changes, 30.7 percent of the “Householder” checkbox, 28.7 percent of the “Biological Son or Daughter” checkbox, and 19.9 percent of “Husband/ Wife” were selected; all were significantly different from the other checkboxes and from each other. The large percentages of “Householder” and their spouses were because of the complex living situation of people living at a seasonal or second residence homes. The large percentage of “Biological Son or Daughter” was because of the child custody situation.

Table 21 shows the checkbox selected by added or deleted roster members for the sex question.

Table 21: Added or Deleted People by Sex

Sex	Number of Added or Deleted People (Std. Error)	Percent of Added or Deleted People (Std. Error)
Female	809,876 (1,037.9)	46.9 (0.39)
Male	912,569 (14,449.2)	52.8 (0.40)
Both	212 (4.0)	0.0 (0.00)
Unknown	5,283 (306.1)	0.3 (0.02)
Total	**1,727,940 (14,489.7)**	**100.0***

* Percentages may not sum to 100 percent due to rounding.

Source: CFU Analysis Files

An estimated 52.8 percent of added or deleted people were males. They were significantly different from an estimated 46.9 percent of added or deleted females.

Table 22 shows the tenure checkbox selected for HUs containing data-defined added or deleted roster members.

Table 22: HUs with Added or Deleted People by Tenure

Tenure	Number of HUs with Added or Deleted People (Std. Error)	Percent of HUs with Added or Deleted People (Std. Error)
Owned with a mortgage or a loan	636,699 (1,464.6)	51.9 (0.35)
Owned without a mortgage or a loan	335,596 (5,406.5)	27.4 (0.35)
Rented	233,251 (6,107.1)	19.0 (0.41)
Occupied without payment of rent	17,168 (627.8)	1.4 (0.05)
Multiple	2,562 (189.2)	0.2 (0.02)
Missing	1,201 (91.0)	0.1 (0.01)
Total	**1,226,477 (8,313.3)**	**100.0**

Source: CFU Analysis Files

At 51.9 percent, the “Owned with a mortgage or a loan” checkbox was selected more than any other field. The second largest percent of HUs with added or deleted people were “owned without a mortgage or a loan” at 27.4 percent. The third largest percent of HUs with added or deleted people were “rented” at 19.0 percent. All three highest percentages were significantly different from the other percentages and from each other.

5.1.3 Completed CFU Cases with one or more Evaluation Case Types with Added People

In this section, CFU cases with one or more evaluation case types with an added person are analyzed. Evaluation case types were expected to identify overcounted people and delete them, thus DSSD expects the number of added people in these HUs to be low. Evaluation cases that also overlapped with a production case targeted at undercounted people may explain some of the added people (see Section 5.1.6 for that analysis).

5.1.3.1 Added People by HU Variables

Table 23 provides the number of HUs with added people by overcount evaluation case type.

Table 23: HUs with an Added Person by Coverage Issue

Overcount Evaluation Case Type	Number of HUs Completed Cases in CFU (Std. Error)	Number of HUs with Added People (Std. Error)	Percent of Completed Cases with Added People (Std. Error)	Number of Added People (Std. Error)
OC – Seasonal	3,216,289 (15,893.0)	42,782 (3,248.9)	1.3 (0.09)	54,544 (1,315.5)
OC – Child Custody	1,620,233 (9,495.4)	17,655 (1,912.7)	1.1 (0.11)	21,443 (71.5)
OC – Another Reason	2,130,507 (8,244.6)	38,289 (3,327.5)	1.8 (0.15)	49,622 (1,984.0)
OC – Yes Only	116,158 (539.2)	5,659 (34.0)	4.9 (0.05)	8,105 (58.7)
Overcount Total	**7,083,187 (20,273.5)**	**104,385 (5,028.7)**	**1.5 (0.07)**	**133,714 (2,382.3)**

Source: CFU Analysis Files

The OC-Yes Only category was significantly larger than the overall 1.5 percent of cases with added people with an estimated 4.9 percent.

Table 24 contains the addition rates from the 2010 Census CFU Assessment Report as well as the four evaluation overcount coverage issues in the shaded area.

Table 24: Comparing Addition Rates with the CFU Assessment Rates

Coverage Issues	Addition Rate
LHH	4.3
High CD	2.8
Low CD	31.2
AR	4.1
UC – Children	8.5
UC – Relatives	5.9
UC – Nonrelatives	7.8
UC – Temporary	9.9
OC – College	1.4
OC – Military	1.4
OC – Jail/Prison	3.8
OC – Nursing Home	1.9
OC – Person Multiple	2.0
OC – Household Multiple	2.4
OC – Seasonal	1.3
OC – Child Custody	1.1
OC – Another Reason	1.8
OC – Yes Only	4.9

Sources: 2010 Census CFU Assessment Report for unshaded area and CFU Analysis Files for shaded area

When compared to the 2010 Census CFU Assessment results, the four overcount evaluation case types did not perform as well as or better than the production case types that usually resulted in adding a person (i.e., LHH, low CD, AR, and undercount case types). Again, OC – Yes Only was not sampled for this evaluation, so its result is ignored for this comparison.

Table 25 shows the full picture of the form type distribution.

Table 25: HUs with an Added Person by Form Type

Form Type	Number of HUs Completed in CFU (Std. Error)	Number of HUs with Added People (Std. Error)	Percent of Completed Cases with Added People (Std. Error)	Number of Added People (Std. Error)
Respondent Completed	**6,558,162 (44,503.3)**	**94,825 (1,612.4)**	**1.4 (0.02)**	**120,667 (1,420.1)**
MO/MB – English	6,162,823 (44,494.8)	85,412 (1400.6)	1.4 (0.01)	108,011 (1,388.0)
MO/MB – Bilingual	386,570 (654.8)	9,012 (798.4)	2.3 (0.21)	12,060 (299.1)
MO/MB – Fulfillment	3,260 (546.1)	87 (13.0)	2.7 (0.06)	149 (25.0)
U/L – English Stateside	225 (171.1)	0 (**)	0.0 (**)	0 (**)
U/L – Puerto Rico	5,338 (22.0)	314 (22.0)	5.9 (0.39)	447 (9.0)
Enumerator Completed	**525,025 (9,461.6)**	**9,559 (1,605.8)**	**1.8 (0.27)**	**13,047 (682.3)**
TQA	2,301 (3.1)	7 (1.0)	0.3 (0.04)	12 (0.0)
NRFU	499,677 (8,824.9)	8,832 (1,534.2)	1.8 (0.28)	12,222 (651.7)
U/E	23,047 (3,412.3)	720 (473.9)	3.1 (1.48)	813 (202.1)
Questionnaire Total	**7,083,187 (45,498.0)**	**104,384 (2,275.6)**	**1.5 (0.03)**	**133,714 (1,575.5)**

**Not enough sample to generate this standard error.

Source: CFU Analysis Files

Three respondent completed form types had larger percentages of completed cases with added people than the overall 1.5 percent of completed cases with added people: U/L – Puerto Rico at 5.9 percent, MO/MB fulfillment forms at 2.7 percent, and MO/MB bilingual forms at 2.3 percent. They were significantly different from the other form types with two exceptions: MO/MB bilingual and fulfillment forms were not significantly different from each other, and enumerator completed U/E forms had an unusually large standard error and this form type was not significantly different from the others.

5.1.3.2 Added People by Demographic Variables

There were an estimated total of 133,716 data-defined added people from 7,083,187 HUs with one or more evaluation case types. Table 26 shows the age distribution of people added to the roster.

Table 26: Added People by Collapsed Age

Age in Years	Number of Added People (Std. Error)	Percent of Added People (Std. Error)
Under 5	16,115 (843.5)	12.1 (0.62)
5-9	6,760 (1,077.9)	5.1 (0.77)
10-14	5,972 (900.1)	4.5 (0.65)
15-19	12,645 (440.2)	9.5 (0.37)
20-24	18,940 (789.2)	14.2 (0.60)
25-29	13,294 (710.5)	9.9 (0.53)
30-34	7,713 (517.5)	5.8 (0.39)
35-39	5,560 (1,031.5)	4.2 (0.75)
40-44	6,112 (613.9)	4.6 (0.45)
45-49	5,870 (506.9)	4.4 (0.38)
50-54	6,702 (1,418.2)	5.0 (1.01)
55-59	6,360 (204.6)	4.8 (0.18)
60-64	5,241 (1,177.1)	3.9 (0.85)
65 and over	11,570 (833.1)	8.7 (0.60)
Missing	4,862 (193.6)	3.6 (0.16)
Total	**133,716 (3,184.5)**	**100.0***

* Percentages may not sum to 100 percent due to rounding.

Source: CFU Analysis Files

The "Age 20-24" group saw the highest percentage of added people with 14.2 percent. A large majority of the added people in the age 20-24 group were temporarily living at homes as relatives, roommates, or people staying there often. The second highest was the "Under 5" group with 12.1 percent. A large majority of the added people in the "Under 5" group were newborn babies or relatives. The two percentages mentioned above were significantly different from the other age groups with two exceptions: they were not significantly different from each other, and the "Under 5" age group was not significantly different from the 25-29 age group.

Table 27 shows the Hispanic origin checkbox selected for added roster members.

Table 27: Added People by Hispanic Origin

Hispanic Origin	Number of Added People (Std. Error)	Percent of Added People (Std. Error)
Not Hispanic or Latino checkbox only	109,230 (534.0)	81.7 (0.70)
Mexican checkbox only	11,587 (178.7)	8.7 (0.15)
Puerto Rican checkbox only	1,682 (134.1)	1.3 (0.10)
Cuban checkbox only	637 (179.4)	0.5 (0.13)
Another Hispanic checkbox only	29 (1.0)	0.0 (0.00)
Multiple checkboxes	191 (105.7)	0.1 (0.08)
Both Checkbox and Write-in	5,281 (746.2)	3.9 (0.54)
Write-in Only	521 (167.2)	0.4 (0.13)
Missing	4,555 (789.4)	3.4 (0.57)
Total	**133,713 (1,259.4)**	**100.0**

Source: CFU Analysis Files

The “Not Hispanic or Latino” checkbox was selected by adding roster members 81.7 percent of the time. The “Mexican” checkbox was the second most selected Hispanic origin category by adding roster members 8.7 percent of the time. Both of the two percentages were significantly different from each other and the other percentages.

Table 28 shows the race checkbox selected by added roster members.

Table 28: Added People by Race

Race	Number of Added People (Std. Error)	Percent of Added People (Std. Error)
White checkbox alone	84,881 (1,340.2)	63.5 (0.52)
Black or African American checkbox alone	18,484 (996.7)	13.8 (0.70)
American Indian and Alaska Native checkbox alone	268 (147.6)	0.2 (0.11)
Asian Indian checkbox alone	1,010 (351.0)	0.8 (0.27)
Chinese checkbox alone	2,257 (540.5)	1.7 (0.39)
Filipino checkbox alone	824 (188.7)	0.6 (0.14)
Japanese checkbox alone	275 (85.2)	0.2 (0.07)
Korean checkbox alone	794 (287.9)	0.6 (0.22)
Vietnamese checkbox alone	931 (132.8)	0.7 (0.10)
Other Asian checkbox alone	6 (1.4)	0.0 (0.00)
Native Hawaiian checkbox alone	295 (132.6)	0.2 (0.10)
Guamanian or Chamorro checkbox alone	5 (1.0)	0.0 (0.00)
Samoan checkbox alone	39 (5.2)	0.0 (0.00)
Other Pacific Islander checkbox alone	2 (2.0)	0.0 (0.00)
Some Other Race checkbox alone	299 (157.6)	0.2 (0.12)
Multiple checkboxes	1,897 (304.9)	1.4 (0.23)
Both Checkbox and Write-in	16,163 (731.8)	12.1 (0.51)
Write-in Only	0 (**)	0.0 (**)
Missing	5,285 (413.0)	4.0 (0.31)
Total	**133,715 (1,923.2)**	**100.0**

**Not enough sample to generate this standard error.

Source: CFU Analysis Files

The “White” checkbox was selected most often by 63.5 percent of the added people and was significantly different from other percentages. The “Black or African American” checkbox and the “Both checkbox and write-in” were selected by 13.8 percent and 12.1 percent of the added roster members, respectively. They were significantly different from the other percentages, but not significantly different from each other.
Table 29 provides the relationship of added roster members to the householders.

Table 29: Added People by Relationship to the Householder

Relationship to the Householder	Number of Added People (Std. Error)	Percent of Added People (Std. Error)
Householder	0 (**)	0.0 (**)
Husband/Wife	10,458 (1,201.2)	7.8 (0.83)
Biological Son or Daughter	30,473 (302.5)	22.8 (0.37)
Adopted Son or Daughter	1,399 (65.7)	1.0 (0.05)
Stepson or Stepdaughter	3,198 (246.0)	2.4 (0.18)
Son-in-law or Daughter-in-law	2,726 (330.2)	2.0 (0.24)
Grandchild	14,534 (217.7)	10.9 (0.21)
Brother or Sister	4,981 (577.9)	3.7 (0.42)
Father or Mother	6,114 (469.1)	4.6 (0.34)
Parent-in-law	2,173 (327.2)	1.6 (0.24)
Other Relative	11,897 (729.0)	8.9 (0.51)
Related	0 (**)	0.0 (**)
Unmarried Partner	4,132 (408.7)	3.1 (0.30)
Roomer or Boarder	8,014 (256.3)	6.0 (0.20)
Housemate	5,773 (678.9)	4.3 (0.49)
Other Nonrelative	24,925 (209.7)	18.6 (0.30)
Not Related	0 (**)	0.0 (**)
Multiple	0 (**)	0.0 (**)
Missing	2,916 (113.7)	2.2 (0.09)
Total	**133,713 (1,923.2)**	**100.0***

* Percentages may not sum to 100 percent due to rounding.
**Not enough number sample to generate this standard error.
Source: CFU Analysis Files

Respondents selected the "Biological Son or Daughter" checkbox for 22.8 percent of the added roster members. In addition, 18.6 percent of the added roster members selected "Other nonrelative" and 10.9 percent selected "Grandchild." All of those percentages are significantly different from the other relationship categories and from each other.

Table 30 shows the checkbox selected by added or deleted roster members for the sex question.

Table 30: Added People by Sex

Sex	Number of Added People (Std. Error)	Percent of Added People (Std. Error)
Female	64,516 (1,144.2)	48.2 (0.55)
Male	67,980 (908.2)	50.8 (0.55)
Both	0 (**)	0.0 (**)
Unknown	1,217 (88.1)	0.9 (0.07)
Total	**133,713 (1,463.5)**	**100.0***

* Percentages may not sum to 100 percent due to rounding.
**Not enough sample to generate this standard error.
Source: CFU Analysis Files

Added roster members were nearly evenly divided between the two sex checkboxes marked; 48.2 percent selected "Female" and 50.8 percent selected "Male." The CFU interview did not allow both sex checkboxes to be selected.

Table 31 shows the response to the tenure question of HUs with added people.

Table 31: HUs with an Added Person by Tenure

Tenure	Number of HUs with Added People (Std. Error)	Percent of HUs with Added People (Std. Error)
Owned with a mortgage or a loan	51,792 (2,191.3)	49.6 (1.80)
Owned without a mortgage or a loan	20,185 (1,065.7)	19.3 (1.08)
Rented	29,649 (2,804.0)	28.4 (2.05)
Occupied without payment of rent	2,459 (528.5)	2.4 (0.50)
Multiple	271 (14.8)	0.3 (0.02)
Missing	28 (4.0)	0.0 (0.00)
Total	**104,384 (3,752.3)**	**100.0**

Source: CFU Analysis Files

At 49.6 percent of HUs with added people, more HUs selected only the "Owned with a mortgage or a loan" checkbox than any other. The next two highest percentages are "Rented" at 28.4 percent and "Owned without a mortgage or a loan" at 19.3 percent. All three percentages were significantly different from the other percentages and from each other.

5.1.4 Completed CFU Cases with one or more Evaluation Case Types with Deleted People

In this section, the completed CFU cases with one or more evaluation case types with deleted people are analyzed.

5.1.4.1 Deleted People by HU Variables

Table 32 shows the number of HUs with deleted people by different reasons that a case was sent to CFU.

Table 32: HUs with a Deleted Person by Coverage Issue

Overcount Evaluation Case Type	Number of HUs Completed in CFU (Std. Error)	Number of HUs with Deleted People (Std. Error)	Percent of Completed Cases with Deleted People (Std. Error)	Number of Deleted People (Std. Error)
OC – Seasonal	3,216,289 (15,893.0)	598,636 (3,444.1)	18.6 (0.20)	897,218 (5,734.9)
OC – Child Custody	1,620,233 (9,495.4)	247,076 (6,712.6)	15.2 (0.33)	355,369 (721.7)
OC – Another Reason	2,130,507 (8,244.6)	281,560 (5,058.7)	13.2 (0.19)	329,985 (3,042.4)
OC –Yes Only	116,158 (539.2)	21,236 (216.8)	18.3 (0.10)	28,793 (1,151.0)
Overcount Total	**7,083,187 (20,273.5)**	**1,148,508 (9,086.2)**	**16.2 (0.12)**	**1,611,365 (6,632.5)**

Source: CFU Analysis Files

Of 7,083,187 HUs completed in CFU, an estimated 16.2 percent had at least one deleted person. Both OC – Seasonal and OC – Yes Only case types were significantly larger than the overall 16.2 percent of deleted overcount people at 18.6 percent and 18.3 percent, respectively; they were not significantly different from each other. An estimated total of 1,611,365 people were deleted in CFU. A majority of these estimated deleted people were from the OC – Seasonal category with an estimated total of 897,218 people deleted.

Table 33 contains the deletion rates from the 2010 Census CFU Assessment Report as well as the four evaluation overcount coverage issues in the shaded area.

Table 33: Comparing Deletion Rates with the CFU Assessment Rates

Coverage Issues	Deletion Rate
LHH	7.9
High CD	32.4
Low CD	5.7
AR	4.0
UC – Children	12.9
UC – Relatives	14.0
UC – Nonrelatives	9.2
UC – Temporary	10.1
OC – College	74.5
OC – Military	20.1
OC – Jail/Prison	6.3[16]
OC – Nursing Home	49.9
OC – Person Multiple	18.9
OC – Household Multiple	35.9
OC – Seasonal	18.6
OC – Child Custody	15.2
OC – Another Reason	13.2
OC – Yes Only	18.3

Sources: 2010 Census CFU Assessment Report for unshaded area and CFU Analysis Files for shaded area

When compared to the 2010 Census CFU Assessment Report results, the four overcount evaluation case types did not perform as well as or better than production case types that usually resulted in deleting a person (i.e., high CD and overcount coverage issues). Again, OC – Yes Only was not sampled for this evaluation, so its result is ignored for this comparison.

Table 34 shows the full picture of the form type distribution.

[16] Due to an internal residence coding processing error, this percentage should be around 40 percent.

Table 34: HUs with a Deleted Person by Form Type

Form Type	Number of HUs Completed in CFU (Std. Error)	Number of HUs with Deleted People (Std. Error)	Percent of Completed Cases with Deleted People (Std. Error)	Number of Deleted People (Std. Error)
Respondent Completed	**6,558,162 (44,503.3)**	**1,047,074 (10,573.8)**	**16.0 (0.27)**	**1,459,808 (18,030.0)**
MO/MB – English	6,162,823 (44,494.8)	995,009 (10,486.1)	16.1 (0.29)	1,390,083 (17,905.0)
MO/MB -- Bilingual	386,570 (654.8)	50,718 (1,352.1)	13.1 (0.37)	67,623 (2,099.0)
MO/MB -- Fulfillment	3,206 (546.1)	561 (75.6)	17.5 (0.63)	983 (28.9)
U/L -- English Stateside	225 (171.1)	91 (82.9)	40.4 (7.67)	179 (77.9)
U/L -- Puerto Rico	5,338 (22.0)	695 (17.0)	13.0 (0.37)	940 (28.0)
Enumerator Completed	**525,025 (9,461.6)**	**101,433 (4,060.4)**	**19.3 (1.09)**	**151,558 (4,843.7)**
TQA	2,301 (3.1)	566 (85.9)	24.6 (3.70)	1,016 (278.5)
NRFU	499,677(8,824.9)	97,486 (4,029.0)	19.5 (1.15)	145,830 (4,823.8)
U/E	23,047 (3,412.3)	3,381 (504.1)	14.7 (0.01)	4,712 (438.2)
Questionnaire Total	**7,083,187 (45,498.0)**	**1,148,507 (11,326.6)**	**16.2 (0.26)**	**1,611,366 (18,669.2)**

Source: CFU Analysis Files

Two form types had significantly larger percentages of completed cases with deleted people than the overall 16.2 percent of cases with a deleted person: respondent completed U/L English stateside forms at 40.4 percent (but which has a small sample size) and enumerator completed NRFU forms at 19.5 percent. They were significantly different from the other form types with one exception: NRFU forms were not significantly different from the TQA forms (because of its large standard error) and MO/MB fulfillment forms.

5.1.4.2 Deleted People by Demographic Variables

There were 1,594,227 deleted data-defined people included in 7,083,187 HUs with one or more evaluation case types in the 2010 Census. Non-data-defined deleted roster members are not included in any demographic tables, but they are included in other

tables. Thus, the number of deleted people in the demographic tables is less than the number of deleted roster members in the other tables.

Table 35 shows the ages of roster members deleted in the CFU interview.

Table 35: Deleted People by Collapsed Age

Age in Years	Number of Deleted People (Std. Error)	Percent of Deleted People (Std. Error)
Under 5	54,865 (1,318.5)	3.4 (0.08)
5-9	134,603 (1,047.3)	8.4 (0.08)
10-14	173,302 (3,710.1)	10.9 (0.22)
15-19	114,493 (966.9)	7.2 (0.07)
20-24	86,540 (4,864.4)	5.4 (0.29)
25-29	49,550 (1,574.2)	3.1 (0.10)
30-34	40,615 (4,061.3)	2.5 (0.25)
35-39	35,861 (1,330.9)	2.2 (0.08)
40-44	54,437 (1,841.9)	3.4 (0.11)
45-49	75,419 (602.6)	4.7 (0.05)
50-54	100,156 (3,358.9)	6.3 (0.20)
55-59	134,791 (643.4)	8.5 (0.07)
60-64	162,909 (4,142.4)	10.2 (0.24)
65 and over	369,646 (3,115.7)	23.2 (0.21)
Missing	7,040 (897.4)	0.4 (0.06)
Total	**1,594,227 (10,250.2)**	**100.0***

* Percentages may not sum to 100 percent due to rounding.

Source: CFU Analysis Files

An estimated 23.2 percent of people in age group 65 and over were deleted; this percentage was significantly different from the other percentages for the other age groups. The majority of these people were living in seasonal or second residence homes. The next two highest percentages were in the 10-14 age group at 10.9 percent and in the 60-64 age group at 10.2 percent. They were significantly different from the other age groups, but not significantly different from each other. The majority of the deleted people in the 10-14 age group were in child custody situations. Also, most of the deleted people in the 60-64 age group were living in seasonal or second residence homes.

Table 36 shows the selected Hispanic origin of deleted roster members.

Table 36: Deleted People by Hispanic Origin

Hispanic Origin	Number of Deleted People (Std. Error)	Percent of Deleted People (Std. Error)
Not Hispanic or Latino checkbox only	1,472,491 (18,819.0)	92.4 (0.16)
Mexican checkbox only	56,420 (1,978.0)	3.5 (0.13)
Puerto Rican checkbox only	12,073 (735.4)	0.8 (0.05)
Cuban checkbox only	4,166 (420.1)	0.3 (0.03)
Another Hispanic checkbox only	2,540 (107.4)	0.2 (0.01)
Multiple checkboxes	1,883 (396.7)	0.1 (0.03)
Both Checkbox and Write-in	28,701 (124.0)	1.8 (0.02)
Write-in Only	4,407 (206.7)	0.3 (0.01)
Missing	11,545 (86.0)	0.7 (0.01)
Total	**1,594,226 (18,947.8)**	**100.0***

* Percentages may not sum to 100 percent due to rounding.

Source: CFU Analysis Files

The “Not Hispanic or Latino checkbox” was selected most often being selected for 92.4 percent of deleted roster members. The next two highest percentages were “Mexican checkbox only” at 3.5 percent and “Both Checkbox and Write-in” at 1.8 percent. All three percentages were significantly different from the other percentages and from each other.

Table 37 shows the selected race of deleted roster members.

Table 37: Deleted People by Race

Race	Number of Deleted People (Std. Error)	Percent of Deleted People (Std. Error)
White checkbox alone	1,327,952 (14,967.9)	83.3 (0.28)
Black or African American checkbox alone	104,386 (2,514.6)	6.5 (0.16)
American Indian and Alaska Native checkbox alone	1,269 (498.7)	0.1 (0.03)
Asian Indian checkbox alone	7,750 (682.2)	0.5 (0.04)
Chinese checkbox alone	16,288 (309.6)	1.0 (0.02)
Filipino checkbox alone	10,246 (918.9)	0.6 (0.06)
Japanese checkbox alone	3,388 (201.4)	0.2 (0.01)
Korean checkbox alone	5,968 (886.9)	0.4 (0.06)
Vietnamese checkbox alone	4,030 (174.4)	0.3 (0.01)
Other Asian checkbox alone	118 (73.9)	0.0 (0.01)
Native Hawaiian checkbox alone	209 (27.6)	0.0 (0.00)
Guamanian or Chamorro checkbox alone	217 (69.6)	0.0 (0.00)
Samoan checkbox alone	33 (1.0)	0.0 (0.00)
Other Pacific Islander checkbox alone	18 (4.0)	0.0 (0.00)
Some Other Race checkbox alone	479 (347.7)	0.0 (0.02)
Multiple checkboxes	21,799 (674.5)	1.4 (0.04)
Both Checkbox and Write-in	73,633 (2,907.1)	4.6 (0.18)
Write-in Only	7,252 (1,324.0)	0.5 (0.08)
Missing	9,192 (4.1)	0.6 (0.01)
Total	**1,594,227 (15,609.7)**	**100.0**

Source: CFU Analysis Files

Accounting for 83.3 percent of deleted roster members, people with only the “White” checkbox selected were deleted most often. The next two highest percentages of deleted roster members selected the “Black or African American checkbox alone” checkbox at 6.5 percent and the “Both Checkbox and Write-In” at 4.6 percent. All three percentages were significantly different from the other percentages and from each other.

Table 38 shows the selected relationship status of deleted roster members to the householder.

Table 38: Deleted People by Relationship to the Householder

Relationship to the Householder	Number of Deleted People (Std. Error)	Percent of Deleted People (Std. Error)
Householder	531,192 (10,772.6)	33.3 (0.47)
Husband/Wife	333,457 (3,670.8)	20.9 (0.24)
Biological Son or Daughter	464,871 (2,692.0)	29.2 (0.25)
Adopted Son or Daughter	12,770 (192.8)	0.8 (0.01)
Stepson or Stepdaughter	56,738 (1,178.3)	3.6 (0.08)
Son-in-law or Daughter-in-law	4,208 (774.7)	0.3 (0.05)
Grandchild	36,964 (437.4)	2.3 (0.03)
Brother or Sister	13,354 (510.9)	0.8 (0.03)
Father or Mother	21,332 (1,014.4)	1.3 (0.06)
Parent-in-law	6,883 (414.9)	0.4 (0.03)
Other Relative	15,863 (988.2)	1.0 (0.06)
Related	2,495 (19.0)	0.2 (0.00)
Unmarried Partner	35,990 (1779.2)	2.3 (0.11)
Roomer or Boarder	5,259 (501.5)	0.3 (0.03)
Housemate	14,933 (2,144.3)	0.9 (0.13)
Other Nonrelative	31,429 (1,284.4)	2.0 (0.08)
Not Related	927 (90.9)	0.1 (0.01)
Multiple	625 (145.2)	0.0 (0.01)
Missing	4,937 (424.0)	0.3 (0.03)
Total	**1,594,227 (12,300.4)**	**100.0**

Source: CFU Analysis Files

Of the deleted people, 33.3 percent were in the “Householder” checkbox and 29.2 percent were in the “Biological Son or Daughter” checkbox. A statistically significant larger number of “Householders” were living at a seasonal or second residence homes. A statistically significant larger number of “Biological Son or Daughter” were in child custody situations. The next highest percent was the “Husband/Wife ” at 20.9 percent; they were also living at a seasonal or second residence homes. All three percentages were significantly different from the other percentages and from each other.

Table 39 shows the selected sex of deleted roster members.

Table 39: Deleted People by Sex

Sex	Number of Deleted People (Std. Error)	Percent of Deleted People (Std. Error)
Female	745,360 (1,341.8)	46.8 (0.40)
Male	844,589 (13,382.3)	53.0 (0.40)
Both	212 (4.0)	0.0 (0.00)
Unknown	4,066 (251.4)	0.3 (0.02)
Total	**1,594,227 (13,451.8)**	**100.0***

* Percentages may not sum to 100 percent due to rounding

Source: CFU Analysis Files

Significantly more deleted roster members had selected only the "Male" checkbox than those who had selected the "Female" checkbox at 53.0 percent and 46.8 percent, respectively.

Table 40 shows the tenure checkbox selected for HUs with data-defined deleted roster members.

Table 40: HUs with a Deleted Person by Tenure

Tenure	Number of HUs with Deleted People (Std. Error)	Percent of HUs with Deleted People (Std. Error)
Owned with a mortgage or a loan	594,835 (11,781.5)	52.2 (0.51)
Owned without a mortgage or a loan	319,083 (636.1)	28.0 (0.30)
Rented	207,856 (1,968.1)	18.2 (0.24)
Occupied without payment of rent	14,838 (490.4)	1.3 (0.05)
Multiple	2,351 (302.3)	0.2 (0.03)
Missing	1,178 (590.0)	0.1 (0.05)
Total	**1,140,141 (11,990.0)**	**100.0**

Source: CFU Analysis Files

At 52.2 percent, the "Owned with a mortgage or a loan" checkbox was selected more than any other field. The other two large percentages of HUs with deleted people were "Owned without a mortgage or a loan" at 28.0 percent and "Rented" at 18.2 percent. All three percentages were significantly different from the other percentages and from each other.

5.1.5 CFU Evaluation Cases by Unique Sources of Coverage Issue

The following tables in this section group the cases into mutually exclusive categories so that the effects of certain case types can be observed. The tables also provide the high-level counts of multiple sources, and Section 5.1.6 will go into detail of the multiple sources. Cases that include only production sources of coverage issues are not included in these tables; they can be found in the 2010 Census CFU Assessment Report (Govern et al, 2011).

Table 41 shows the distribution of added or deleted people counts by unique sources of coverage issue.

Table 41: HUs with Added or Deleted People by Unique Source of Coverage Issue

Source of Coverage Issue	Number of Cases Completed in CFU (Std. Error)	Number of Cases with Added or Deleted People (Std. Error)	Percent of Completed Cases with Added or Deleted People (Std. Error)	Number of Added or Deleted People (Std. Error)
OC – Seasonal Only	2,575,896 (8,122.3)	412,469 (20,003.2)	16.0 (0.73)	611,713 (11,416.7)
OC – Child Custody Only	1,231,620 (3,651.3)	162,158 (700.0)	13.2 (0.02)	229,773 (5,407.5)
OC – Another Reason Only	1,708,531 (31,062.2)	215,616 (11,782.1)	12.6 (0.46)	252,800 (4,582.1)
OC – Yes Only Only	63 (3.0)	13 (7.0)	20.6 (12.10)	16 (8.0)
Multiple Sources (Production-Evaluation Overlaps)	572,641 (687.0)	158,079 (225.0)	27.6 (0.01)	224,091 (185.0)
Multiple Sources (Evaluation-Evaluation Overlaps)	994,436 (2,651.1)	286,223 (2,118.2)	28.8 (0.14)	426,684 (1,020.9)
Overall Total	**7,083,187 (32,429.4)**	**1,234,558 (23,323.3)**	**17.4 (0.28)**	**1,745,077 (13,477.9)**

Source: CFU Analysis Files

The multiple sources of coverage issues for production-evaluation overlaps (cases with one or more production case types and one or more evaluation case types) and evaluation-evaluation overlaps (cases with only one or more evaluation case types and no production case type) have higher percentages of completed cases with added or deleted people at 27.6 percent and 28.8 percent, respectively. They were significantly better than the overall added or deleted people rate of 17.4 percent. They were also significantly different from the other unique sources of coverage issue except for "OC – Yes Only Only" source, which had a large standard error and low sample size. Further analysis of the multiple sources of coverage issue for the production-evaluation overlaps and evaluation-evaluation overlaps are in Section 5.6.1.

When compared to the 2010 Census CFU Assessment Report results in Table 42, the unique evaluation overcount case types, excluding the overlaps, in the shaded areas did not perform as well as or better than the unique production case types that usually resulted in deleting a person (i.e., high CD and overcount coverage issues). Again, OC – Yes Only was not sampled for this evaluation, so its result is ignored for this comparison.

Table 42: Comparing Addition or Deletion Rates with the CFU Assessment Rates

Unique Coverage Issues	Addition or Deletion Rates
LHH	5.1
High CD	18.8
Low CD	38.5
AR	3.9
UC – Children	12.2
UC – Relatives	11.8
UC – Nonrelatives	13.6
UC – Temporary	14.5
OC – College	73.6
OC – Military	18.9
OC – Jail/Prison	7.3[17]
OC – Nursing Home	45.3
OC – Person Multiple	17.6
OC – Household Multiple	33.9
Production – Production Overlaps	41.6
OC – Seasonal	16.0
OC – Child Custody	13.2
OC – Another Reason	12.6
OC – Yes Only	20.6
Production – Evaluation Overlaps	27.6
Evaluation – Evaluation Overlaps	28.8

Sources: 2010 Census CFU Assessment Report for unshaded area and CFU Analysis Files for shaded area

Table 43 shows the distribution of only added people counts by unique sources of coverage issue.

[17] Due to an internal residence coding processing error, this percentage should be around 45 percent.

Table 43: HUs with Added People by Unique Source of Coverage Issue

Source of Coverage Issue	Number of Cases Completed in CFU (Std. Error)	Number of Cases with Added People (Std. Error)	Percent of Completed Cases with Added People (Std. Error)	Number of Added People (Std. Error)
OC – Seasonal Only	2,575,896 (8,122.3)	27,855 (4,055.7)	1.1 (0.15)	34,313 (888.9)
OC – Child Custody Only	1,231,620 (3,651.3)	11,615 (273.3)	0.9 (0.02)	14,025 (423.7)
OC – Another Reason Only	1,708,531 (31,062.2)	23,421 (2,911.8)	1.4 (0.20)	29,391 (1,534.4)
OC – Yes Only Only	63 (3.0)	0 (**)	0.0 (**)	0 (**)
Multiple Sources (Production-Evaluation Overlaps)	572,641 (687.0)	29,556 (152.0)	5.2 (0.03)	40,514 (208.0)
Multiple Sources (Evaluation-Evaluation Overlaps)	994,436 (2,651.1)	11,937 (589.1)	1.2 (0.06)	15,472 (351.2)
Overall Total	**7,083,187 (32,429.4)**	**104,384 (5,037.0)**	**1.5 (0.07)**	**133,715 (1,868.3)**

**Not enough sample to generate this standard error.

Source: CFU Analysis Files

The multiple sources of coverage issue for production-evaluation overlaps had a significantly higher percentage of completed cases with added people at 5.2 percent. The reason why the percentage was so high was because they overlapped with one or more production case types such as LHH, low CD, undercount categories, or AR, which were targeted to identify undercounted people.

When compared to the 2010 Census CFU Assessment Report results in Table 44, the unique overcount evaluation case types in the shaded area did not perform as well as or better than the unique production case types that usually resulted in adding a person to the roster (i.e., LHH, low CD, AR, and undercount coverage issues). Again, OC – Yes Only was not sampled for this evaluation, so its result is ignored for this comparison.

Table 44: Comparing Addition Rates with the CFU Assessment Rates

Unique Coverage Issues	Addition Rate
LHH	2.3
High CD	2.6
Low CD	36.6
AR	2.8
UC – Children	9.0
UC – Relatives	6.2
UC – Nonrelatives	7.9
UC – Temporary	12.2
OC – College	1.1
OC – Military	1.0
OC – Jail/Prison	3.0
OC – Nursing Home	1.6
OC – Person Multiple	1.4
OC – Household Multiple	1.6
Production – Production Overlaps	7.7
OC – Seasonal/Second Residence	1.1
OC – Child Custody	0.9
OC – Another Reason	1.4
OC – Yes Only	0.0
Production – Evaluation Overlaps	5.2
Evalaution – Evaluation Overlaps	1.2

Sources: 2010 Census CFU Assessment Report for unshaded area and CFU Analysis Files for shaded area

Table 45 shows the distribution of deleted people by unique sources of coverage issue.

Table 45: HUs with Deleted People by Unique Source of Coverage Issue

Source of Coverage Issue	Number of Cases Completed in CFU (Std. Error)	Number of Cases with Deleted People (Std. Error)	Percent of Completed Cases with Deleted People (Std. Error)	Number of Deleted People (Std. Error)
OC – Seasonal Only	2,575,896 (8,122.3)	390,310 (16,076.1)	15.2 (0.58)	577,401 (10,527.8)
OC – Child Custody Only	1,231,620 (3,651.3)	152,365 (214.8)	12.4 (0.02)	215,749 (5,831.2)
OC – Another Reason Only	1,708,531 (31,062.2)	195,408 (13,927.2)	11.4 (0.61)	223,409 (6,116.5)
OC – Yes Only Only	63 (3.0)	13 (7.0)	20.6 (12.10)	16 (8.0)
Multiple Sources (Production-Evaluation Overlaps)	572,641 (687.0)	133,495 (385.0)	23.3 (0.04)	183,577 (23.0)
Multiple Sources (Evaluation-Evaluation Overlaps)	994,436 (2,651.1)	276,917 (1,438.1)	27.8 (0.07)	411,215 (1,372.1)
Overall Total	**7,083,187 (32,429.4)**	**1,148,508 (21,323.1)**	**16.2 (0.24)**	**1,611,367 (13,570.0)**

Source: CFU Analysis Files

The multiple sources of coverage issues for evaluation-evaluation overlaps had the highest percentage of completed cases with deleted people at 27.8 percent; production-evaluation overlaps were the second highest percent of completed cases with deleted people at 23.3 percent. They were significantly better than the overall percentage with added or deleted people at 16.2 percent. They were also significantly different from each other and other percentages except for the "OC – Yes Only Only" source, which had a large standard error and low sample size. A possible explanation for the high percentage of production-evaluation overlap deleted people could be because of the production case types that have a high deletion rate such as high CD and production overcount case types. A possible explanation for the high percentage of evaluation-evaluation overlap deleted people could be because of unduplication cases. Further analysis of the multiple sources of coverage issues for the production-evaluation overlaps and evaluation-evaluation overlaps are in Section 5.1.6.

When compared to the 2010 Census CFU Assessment Report results in Table 46, the unique overcount evaluation case types, excluding overlaps, in the shaded area did not perform as well as or better than any of the unique production case types that usually resulted in deleting a person from the roster (i.e., high CD and overcount coverage issues). Again, OC – Yes Only was not sampled for this evaluation, so its result is ignored for this comparison.

Table 46: Comparing Deletion Rates with the CFU Assessment Rates

Unique Coverage Issues	Deletion Rate
LHH	3.0
High CD	16.7
Low CD	2.4
AR	1.3
UC – Children	3.5
UC – Relatives	5.9
UC – Nonrelatives	6.1
UC – Temporary	2.6
OC – College	73.3
OC – Military	18.1
OC – Jail/Prison	4.7[18]
OC – Nursing Home	44.5
OC – Person Multiple	16.4
OC – Household Multiple	32.8
Production – Production Overlaps	35.1
OC – Seasonal	15.2
OC – Child Custody	12.4
OC – Another Reason	11.4
OC – Yes Only	20.6
Production – Evaluation Overlaps	23.3
Evaluation – Evaluation Overlaps	27.8

Sources: 2010 Census CFU Assessment Report for unshaded area and CFU Analysis Files for shaded area

5.1.6 CFU Cases with one or more Evaluation Case Types by Multiple Sources of Coverage Issue

In this section is further analyses of the production-evaluation overlaps (cases with one or more production case types and one or more evaluation case types) and the evaluation-evaluation overlaps (cases with more than one evaluation case type and no production case types).

5.1.6.1 Analysis of Production-Evaluation Overlaps

In this section, DSSD examined the production-evaluation overlaps. These cases had one or more coverage issue types listed for production cases and one or more coverage issue types listed for evaluation cases. The following abbreviations are used in this section:

[18] Due to an internal residence coding processing error, this percentage should be around 45 percent.

- CD_High: High CD
- CD_Low: – Low CD
- UC_Child: Undercount – Children
- UC_Rel: Undercount – Relative
- UC_Nonrel: Undercount – Nonrelative
- UC_Temp: Undercount – Temporary
- UC_Multiple: Undercount – Multiple

Table 47 has the top 25 most frequent sources of coverage issue combinations for production-evaluation overlaps.

Table 47: Top 25 Most Frequent Sources of Coverage Issues Combinations for Production-Evaluation Overlaps

Source of Coverage Issue	Number of Cases Completed in CFU	Percent of Cases with Added or Deleted People (Std. Error)	Percent of Cases with Added People (Std. Error)	Percent of Cases with Deleted People (Std. Error)
Seasonal/CD_High	48,888 (66.0)	56.3 (0.02)	2.3 (0.15)	54.8 (0.07)
Another Reason/CD_High	36,971 (337.0)	39.7 (0.04)	2.4 (0.04)	37.9 (0.01)
Another Reason/UC_Temp	33,302 (68.0)	15.9 (0.01)	6.3 (0.06)	10.5 (0.02)
Another Reason/LHH	31,340 (86.0)	16.2 (0.16)	3.3 (0.12)	13.4 (0.03)
Another Reason/UC_Rel	27,788 (368.0)	16.7 (0.04)	4.6 (0.00)	12.9 (0.11)
Seasonal/UC_Temp	25,658 (58.0)	22.2 (0.04)	7.6 (0.12)	15.7 (0.05)
Seasonal/UC_Rel	24,385 (71.0)	22.7 (0.11)	5.3 (0.14)	18.2 (0.19)
Another Reason/UC_Temp/CD_High	22,748 (126.0)	19.8 (0.34)	2.8 (0.12)	17.6 (0.21)
Child Custody/LHH	21,826 (94.0)	21.7 (0.23)	1.7 (0.14)	20.4 (0.08)
Seasonal/LHH	20,412 (4.0)	17.4 (0.24)	2.9 (0.05)	15.2 (0.27)
Another Reason/UC_Rel/CD_High	18,144 (46.0)	23.1 (0.01)	2.1 (0.04)	21.5 (0.04)
Yes Only/CD_High	17,868 (120.0)	39.3 (0.21)	3.1 (0.13)	37.4 (0.20)
Yes Only/LHH	13,408 (98.0)	10.4 (0.20)	3.6 (0.25)	7.3 (0.11)
Seasonal/UC_Rel /CD_High	12,894 (36.0)	31.7 (0.01)	2.4 (0.14)	29.9 (0.08)
Seasonal/UC_Temp/CD_High	12,478 (58.0)	30.7 (0.24)	3.1 (0.11)	28.5 (0.32)
Seasonal/AR	10,898 (180.0)	12.7 (0.05)	3.1 (0.11)	10.0 (0.04)
Yes Only/UC_Rel	10,075 (153.0)	11.6 (0.08)	4.6 (0.25)	7.4 (0.34)
Child Custody/CD_High	9,880 (44.0)	48.3 (0.45)	1.8 (0.01)	47.2 (0.55)
Child Custody/UC_Child	9,718 (52.0)	29.0 (0.34)	4.8 (0.38)	25.0 (0.04)
Child Custody/UC_Child/CD_High	8,628 (120.0)	64.2 (0.20)	1.4 (0.12)	63.4 (0.21)
Yes Only/ UC_Temp	8,268 (88.0)	14.3 (0.14)	6.5 (0.13)	8.5 (0.12)
Seasonal/UC_Nonrel	8,226 (94.0)	21.7 (0.21)	7.7 (0.19)	15.0 (0.16)
Another Reason/AR	8,043 (63.0)	12.8 (0.51)	3.7 (0.02)	9.7 (0.46)
Another Reason/UC_Nonrel	7,521 (97.0)	18.3 (0.38)	6.2 (0.15)	12.9 (0.41)
Child Custody/ UC_Temp	6,713 (59.0)	28.0 (0.63)	11.1 (0.42)	18.5 (0.06)
Remaining Overlaps Combined	116,561 (135.0)	28.7 (0.00)	10.2 (0.02)	19.8 (0.00)
Overall Total	**572,641 (675.1)**	**27.6 (0.03)**	**5.2 (0.02)**	**23.3 (0.03)**

Source: CFU Analysis Files

The Seasonal/CD_High combination had the largest number of cases completed in CFU at 48,888 cases and 56.3 percent of cases with added or deleted people. Within the top 25, the Child Custody/UC_Child/CD_High combination had the significantly highest percent of cases with added or deleted people at 64.2 percent as well as the highest percent of cases with deleted people at 63.4 percent. Also, within the top 25, the Child Custody/UC_Temp combination had the significantly highest percent of cases with added people at 11.1 percent.

Table 48 shows the 25 case type combinations with the highest percent of HUs with added or deleted people and at least 50 completed cases.

Table 48: Sources of Coverage Issues Production-Evaluation Combinations with the Highest Add or Delete Rates

Production-Evaluation Overlap Case Types	Number of HUs Completed in CFU	Number of HUs with Added or Deleted People (Std. Error)	Percent of HUs with Added or Deleted People (Std. Error)	Number of Added or Deleted People (Std. Error)
Child Custody/UC_Child/CD_High	8,628 (70.0)	5,538 (2.0)	64.2 (0.54)	7,437 (101.0)
Child Custody/UC_Temp/CD_High	2,990 (68.0)	1,845 (1.0)	61.7 (1.37)	2,483 (39.0)
Child Custody/UC_Child/LHH/CD_High	204 (28.0)	120 (12.0)	58.8 (2.22)	278 (10.0)
Child Custody/UC_Rel/CD_High	1,657 (81.0)	965 (13.0)	58.2 (2.07)	1,222 (28.0)
Seasonal/CD_High	48,888 (78.0)	27,531 (209.0)	56.3 (0.34)	39,123 (205.0)
Child Custody/UC_Multiple/CD_High	559 (11.0)	312 (18.0)	55.8 (4.32)	459 (37.0)
Child Custody/UC_Child/CD_Low	61 (1.0)	33 (9.0)	54.1 (13.88)	50 (6.0)
Child Custody/UC_Multiple/LHH/CD_High	50 (2.0)	27 (1.0)	54.0 (4.17)	49 (5.0)
Seasonal/AR/LHH/CD_Low	78 (4.0)	39 (3.0)	50.0 (6.42)	88 (2.0)
Child Custody/UC_Child/LHH/CD_Low	67 (3.0)	33 (3.0)	49.3 (6.70)	48 (6.0)
Child Custody/CD_High	9,880 (96.0)	4,774 (64.0)	48.3 (0.18)	6,404 (46.0)
Yes Only/UC_Child/CD_Low	116 (0.0)	55 (1.0)	47.4 (0.86)	93 (9.0)
Another Reason/UC_Child/CD_Low	142 (2.0)	65 (1.0)	45.8 (1.35)	130 (10.0)
Child Custody/UC_Temp/LHH/CD_High	164 (20.0)	75 (3.0)	45.7 (3.79)	169 (11.0)
Seasonal/UC_Child/CD_High	1,893 (37.0)	859 (11.0)	45.4 (0.31)	1,124 (28.0)
Child Custody/UC_Child/LHH	258 (4.0)	117 (15.0)	45.3 (6.51)	226 (24.0)
Child Custody/LHH/CD_High	638 (54.0)	285 (11.0)	44.7 (2.06)	580 (50.0)
Yes Only/AR/LHH/CD_High	90 (4.0)	40 (2.0)	44.4 (0.25)	82 (8.0)
Child Custody/UC_Rel/LHH/CD_High	111 (5.0)	48 (4.0)	43.2 (1.66)	96 (4.0)
Another Reason/AR/CD_Low	88 (2.0)	37 (1.0)	42.0 (2.09)	71 (1.0)
Another Reason/UC_Rel/CD_Low	508 (26.0)	213 (7.0)	41.9 (0.77)	320 (0.0)
Seasonal/CD_Low	5,477 (45.0)	2,287 (29.0)	41.8 (0.87)	3,045 (27.0)
Child Custody/UC_Rel/CD_Low	174 (10.0)	72 (6.0)	41.4 (1.07)	111 (13.0)
Another Reason/UC_Multiple/CD_Low	223 (3.0)	92 (6.0)	41.3 (3.24)	159 (17.0)
Another Reason/CD_High	36,971 (13.0)	14,682 (8.0)	39.7 (0.01)	18,094 (136.0)
Remaining Overlaps Combined	452,726 (408.0)	97,935 (75.0)	21.6 (0.04)	142,150 (78.0)
Overall Total	**572,641 (454.4)**	**158,079 (235.9)**	**27.6 (0.05)**	**224,091 (297.0)**

Source: CFU Analysis Files

The Child Custody/UC_Child/CD_High combination had the largest percentage of HUs with added or deleted people at 64.2 percent, but this percentage was not necessarily significantly different from the other combinations. Looking at the top 25 combinations, it appeared that the main reasons for the high add or delete rates are the OC – Child Custody and high CD case types. The performance for the Seasonal/CD_High and Another Reason/CD_High was notable for the number of HUs with added or deleted people: 27,531 and 14,682 HUs with added or deleted people, respectively.

Table 49 shows the form type distribution of the production-evaluation overlaps with an added or deleted person.

Table 49: Production-Evaluation Overlaps with an Added or Deleted Person by Form Type

Form Type	Number of HUs Completed in CFU (Std. Error)	Number of HUs with Added or Deleted People (Std. Error)	Percent of Completed Cases with Added or Deleted People (Std. Error)	Number of Added or Deleted People (Std. Error)
Respondent Completed	**555,424 (1,102.9)**	**151,806 (251.6)**	**27.3 (0.10)**	**214,957 (848.9)**
MO/MB – English	477,718 (1,102.0)	134,855 (217.0)	28.2 (0.11)	190,439 (835.0)
MO/MB -- Bilingual	69,797 (21.0)	15,439 (119.0)	22.1 (0.16)	22,312 (140.0)
MO/MB -- Fulfillment	1,289 (19.0)	197 (5.0)	15.3 (0.16)	316 (8.0)
MO/MB -- Experimental	1,227 (5.0)	326 (22.0)	26.6 (1.69)	478 (20.0)
U/L -- English Stateside	55 (5.0)	14 (6.0)	25.5 (8.62)	25 (5.0)
U/L -- Puerto Rico	5,338 (34.0)	975 (39.0)	18.3 (0.61)	1,387 (57.0)
Enumerator Completed	**17,217 (146.0)**	**6,273 (168.4)**	**36.4 (0.68)**	**9,134 (50.1)**
TQA	88 (8.0)	25 (5.0)	28.4 (3.11)	37 (1.0)
NRFU	16,618 (142.0)	6,052 (168.0)	36.4 (0.70)	8,789 (45.0)
U/E	511 (33.0)	196 (10.0)	38.4 (0.52)	308 (22.0)
Questionnaire Total	**572,641 (1,112.5)**	**158,079 (302.8)**	**27.6 (0.10)**	**224,091 (850.3)**

Source: CFU Analysis Files

Respondent completed MO/MB English forms with an added or deleted person (28.2 percent) were significantly higher than the overall percentage with an added or deleted people at 27.6 percent. Collectively, the overall enumerator completed percentage of completed cases was 36.4 percent, which was significantly higher than the overall 27.6 percent of completed cases with an added or deleted person. However, only two enumerator completed form types were significantly larger also: NRFU forms at 36.4 percent and U/E forms at 38.4 percent.

Table 50 shows the top 25 case type combinations with the highest percent of HUs with added people and at least 50 completed cases.

Table 50: Sources of Coverage Issue Production-Evaluation Combinations with the Highest Add Rates

Production-Evaluation Overlap Case Types	Number of Cases Completed in CFU (Std. Error)	Number of Cases with Added People (Std. Error)	Percent of Cases with Added People (Std. Error)	Number of Added People (Std. Error)
Yes Only/UC_Child/CD_Low	116 (22.0)	49 (7.0)	42.2 (1.99)	84 (6.0)
Seasonal/AR/LHH/CD_Low	78 (0.0)	30 (2.0)	38.5 (2.56)	65 (15.0)
Another Reason/UC_Child/CD_Low	142 (18.0)	54 (18.0)	38.0 (7.87)	112 (6.0)
Another Reason/AR/LHH/CD_Low	107 (7.0)	37 (1.0)	34.6 (3.21)	82 (4.0)
Another Reason/AR/CD_Low	88 (2.0)	30 (4.0)	34.1 (3.77)	57 (3.0)
Yes Only/CD_Low	3,157 (13.0)	1,041 (37.0)	33.0 (1.04)	1,433 (9.0)
Child Custody/UC_Child/CD_Low	61 (7.0)	20 (4.0)	32.8 (2.80)	30 (4.0)
Yes Only/UC_Rel/CD_Low	239 (17.0)	75 (7.0)	31.4 (0.70)	124 (10.0)
Yes Only/UC_Multiple/CD_Low	156 (4.0)	48 (0.0)	30.8 (0.79)	71 (9.0)
Yes Only/AR/CD_Low	82 (2.0)	25 (1.0)	30.5 (0.48)	44 (10.0)
Another Reason/CD_Low	4,550 (42.0)	1,369 (7.0)	30.1 (0.12)	1,778 (22.0)
Yes Only/UC_Nonrel/CD_Low	57 (1.0)	17 (1.0)	29.8 (1.23)	27 (3.0)
Seasonal/AR/CD_Low	82 (14.0)	24 (6.0)	29.3 (12.37)	32 (2.0)
Yes Only/UC_Temp/CD_Low	218 (0.0)	63 (5.0)	28.9 (2.29)	104 (6.0)
Yes Only/AR/LHH/CD_Low	119 (9.0)	34 (0.0)	28.6 (2.16)	94 (0.0)
Yes Only/UC_Multiple/LHH/CD_Low	140 (2.0)	40 (0.0)	28.6 (0.41)	116 (2.0)
Another Reason/UC_Temp/CD_Low	580 (2.0)	165 (15.0)	28.4 (2.49)	257 (13.0)
Another Reason/UC_Multiple/CD_Low	223 (21.0)	63 (9.0)	28.3 (6.70)	109 (5.0)
Another Reason/UC_Multiple/LHH/CD_Low	137 (9.0)	38 (6.0)	27.7 (2.57)	74 (10.0)
Seasonal/CD_Low	5,477 (39.0)	1,510 (54.0)	27.6 (0.79)	1,926 (42.0)
Another Reason/UC_Rel/CD_Low	508 (26.0)	139 (15.0)	27.4 (4.37)	213 (5.0)
Seasonal/UC_Multiple/CD_Low	171 (7.0)	46 (2.0)	26.9 (0.07)	79 (3.0)
Seasonal/UC_Temp/CD_Low	429 (5.0)	111 (7.0)	25.9 (1.33)	160 (8.0)
Yes Only/UC_Child/LHH/CD_Low	74 (4.0)	19 (5.0)	25.7 (5.36)	44 (2.0)
Seasonal/UC_Child/CD_Low	115 (3.0)	27 (1.0)	23.5 (0.26)	43 (1.0)
Remaining Overlaps Combined	555,535 (973.0)	24,482 (242.0)	4.4 (0.04)	33,356 (146.0)
Overall Total	**572,641 (976.2)**	**29,556 (253.1)**	**5.2 (0.04)**	**40,514 (157.2)**

Source: CFU Analysis Files

The Yes Only/UC_Child/CD_Low combination had the largest percent of cases with added people at 42.2 percent, but it was not necessarily significantly different from the other combinations. Looking across all top 25 combinations, it appeared that having a low CD case type contributed to the high rate of added people. The OC – Yes only/CD_Low, OC – Another Reason/CD_Low, and Seasonal/CD_Low combinations had a large number of cases with added people: 1,041 cases for Yes Only/CD_Low, 1,368 cases for Another Reason/CD_Low, and 1,510 cases for Seasonal/CD_Low.

Table 51 provides the form type distribution of production-evaluation overlaps with an added person.

Table 51: Production-Evaluation Overlaps with an Added Person by Form Type

Form Type	Number of HUs Completed in CFU (Std. Error)	Number of HUs with Added People (Std. Error)	Percent of Completed Cases with Added People (Std. Error)	Number of Added People (Std. Error)
Respondent Completed	**525,424 (1,102.9)**	**28,657 (107.2)**	**5.5 (0.03)**	**39,186 (168.0)**
MO/MB – English	477,718 (1,102.0)	24,397 (103.0)	5.1 (0.03)	32,780 (152.0)
MO/MB – Bilingual	69,797 (21.0)	3,794 (22.0)	5.4 (0.03)	5,722 (52.0)
MO/MB -- Fulfillment	1,289 (19.0)	87 (11.0)	6.7 (0.95)	149 (3.0)
MO/MB -- Experimental	1,227 (5.0)	65 (5.0)	5.3 (0.39)	88 (4.0)
U/L -- English Stateside	55 (5.0)	0 (**)	0.0 (**)	0 (**)
U/L -- Puerto Rico	5,338 (34.0)	314 (16.0)	5.9 (0.26)	447 (49.0)
Enumerator Completed	**17,217 (146.0)**	**899 (35.5)**	**5.2 (0.16)**	**1,328 (65.0)**
TQA	88 (8.0)	7 (3.0)	8.0 (2.69)	12 (0.0)
NRFU	16,618 (142.0)	863 (35.0)	5.2 (0.17)	1,271 (65.0)
U/E	511 (33.0)	29 (3.0)	5.7 (0.22)	45 (1.0)
Questionnaire Total	**542,641 (1,112.5)**	**29,556 (112.9)**	**5.2 (0.03)**	**40,514 (180.2)**

**Not enough sample to generate this standard error.

Source: CFU Analysis Files

Two form types had significantly larger percentages of completed cases with added people than the overall completed 5.2 percent of cases with an added person: respondent completed MO/MB bilingual forms at 5.4 percent and respondent completed U/L – Puerto Rico forms at 5.9 percent.

Table 52 shows the top 25 case type combinations with the highest percent of HUs with deleted people and at least 50 completed cases.

Table 52: Sources of Coverage Issues Production-Evaluation Combinations with the Highest Delete Rates

Production-Evaluation Overlap Case Types	Number of Cases Completed in CFU (Std. Error)	Number of Cases with Deleted People (Std. Error)	Percent of Cases with Deleted People (Std. Error)	Number of Deleted People (Std. Error)
Child Custody/UC_Child/CD_High	8,628 (194.0)	5,474 (154.0)	63.4 (0.36)	7,289 (125.0)
Child Custody/UC_Temp/CD_High	2,990 (14.0)	1,810 (4.0)	60.5 (0.15)	2,405 (29.0)
Child Custody/UC_Rel/CD_High	1,657 (35.0)	950 (2.0)	57.3 (1.33)	1,180 (12.0)
Child Custody/UC_Child/LHH/CD_High	204 (16.0)	116 (8.0)	56.9 (0.54)	271 (29.0)
Seasonal/CD_High	48,888 (420.0)	26,796 (124.0)	54.8 (0.22)	37,674 (24.0)
Child Custody/UC_Multiple/CD_High	559 (17.0)	298 (12.0)	53.3 (0.53)	431 (21.0)
Child Custody/CD_High	9,880 (108.0)	4,667 (75.0)	47.2 (0.24)	6,190 (0.0)
Child Custody/UC_Multiple/LHH/CD_High	50 (10.0)	23 (5.0)	46.0 (0.81)	40 (0.0)
Child Custody/UC_Temp/LHH/CD_High	164 (8.0)	72 (0.0)	43.9 (2.15)	157 (3.0)
Seasonal/UC_Child/CD_High	1,893 (63.0)	802 (22.0)	42.4 (0.25)	1,024 (64.0)
Child Custody/LHH/CD_High	638 (22.0)	270 (0.0)	42.3 (1.46)	550 (22.0)
Child Custody/UC_Child/LHH/CD_Low	67 (1.0)	28 (4.0)	41.8 (5.34)	42 (14.0)
Child Custody/UC_Rel/LHH/CD_High	111 (9.0)	45 (7.0)	40.5 (3.04)	92 (12.0)
Another Reason/CD_High	36,971 (201.0)	14,028 (162.0)	37.9 (0.23)	16,893 (275.0)
Child Custody/UC_Child/LHH	258 (14.0)	97 (3.0)	37.6 (0.88)	195 (9.0)
Yes Only/CD_High	17,868 (260.0)	6,676 (24.0)	37.4 (0.41)	8,827 (11.0)
Yes Only/UC_Child/CD_High	939 (23.0)	320 (4.0)	34.1 (1.26)	422 (18.0)
Seasonal/AR/CD_High	295 (21.0)	99 (15.0)	33.6 (2.71)	114 (10.0)
Another Reason/UC_Child/CD_High	2,537 (71.0)	845 (21.0)	33.3 (0.11)	1,026 (44.0)
Child Custody/UC_Rel/CD_Low	174 (4.0)	55 (5.0)	31.6 (2.15)	76 (8.0)
Child Custody/UC_Nonrel/CD_Low	102 (10.0)	32 (10.0)	31.4 (6.78)	48 (2.0)
Yes Only/AR/LHH/CD_High	90 (8.0)	28 (2.0)	31.1 (0.55)	60 (2.0)
Yes Only/LHH/CD_High	1,525 (59.0)	474 (26.0)	31.1 (0.50)	1,296 (12.0)
Seasonal/UC_Child/LHH/CD_High	127 (9.0)	39 (3.0)	30.7 (4.54)	85 (9.0)
Seasonal/UC_Rel/CD_High	12,894 (166.0)	3,859 (149.0)	29.9 (0.77)	4,678 (38.0)
Remaining Overlaps Combined	423,132 (1,176.0)	65,592 (366.0)	15.5 (0.04)	92,512(338.0)
Overall Total	**572,641 (1,327.0)**	**133,495 (479.6)**	**23.3 (0.04)**	**183,577 (466.44)**

Source: CFU Analysis Files

The Child Custody/UC_Child/CD_High combination had the largest percent of cases with added or deleted people at 63.4 percent, but not necessarily significantly different from the other combinations. Among the top 25 combinations, it appeared that having a high CD or OC – Child Custody case type was the main reason for the successful delete rates. The Seasonal/CD_High combinations and the Another Reason/CD_High combinations had a large number of cases with deleted people: 26,796 cases and 14,028 cases, respectively.

Table 53 provides a form-type distribution of the production-evaluation overlaps with a deleted person.

Table 53: Production-Evaluation Overlaps with a Deleted Person by Form Type

Form Type	Number of HUs Completed in CFU (Std. Error)	Number of HUs with Deleted People (Std. Error)	Percent of Completed HUs with Deleted People (Std. Error)	Number of Deleted People (Std. Error)
Respondent Completed	**555,424 (1,102.9)**	**127,868 (172.0)**	**23.0 (0.07)**	**175,771 (709.8)**
MO/MB – English	477,718 (1,102.0)	114,542 (90.0)	24.0 (0.07)	157,659 (683.0)
MO/MB – Bilingual	69,797 (21.0)	12,222 (140.0)	17.5 (0.20)	16,590 (192.0)
MO/MB – Fulfillment	1,289 (19.0)	124 (18.0)	9.6 (1.26)	167 (11.0)
MO/MB – Experimental	1,227 (5.0)	271 (17.0)	22.1 (1.30)	390 (16.0)
U/L – English Stateside	55 (5.0)	14 (6.0)	25.5 (8.62)	25 (1.0)
U/L – Puerto Rico	5,338 (34.0)	695 (35.0)	13.0 (0.57)	940 (8.0)
Enumerator Completed	**17,217 (146.0)**	**5,627 (136.2)**	**32.7 (0.52)**	**7,806 (112.0)**
TQA	88 (8.0)	19 (1.0)	21.6 (0.83)	25 (1.0)
NRFU	16,618 (142.0)	5,432 (136.0)	32.7 (0.54)	7,518 (110.0)
U/E	511 (8.0)	176 (8.0)	34.4 (0.66)	263 (21.0)
Questionnaire Total	**572,641 (1,112.5)**	**133,495 (219.4)**	**23.3 (0.07)**	**183,577 (718.6)**

Source: CFU Analysis Files

Respondent completed MO/MB English forms (24.0 percent) were significantly higher than the overall 23.3 percent of completed cases with a deleted person. Collectively, the overall enumerator completed percentage of completed cases was 32.7 percent, which was significantly higher than the overall 23.3 percent of completed cases with a deleted person. However, only two enumerator completed form types were significantly larger: NRFU forms at 32.7 percent and U/E forms at 34.4 percent.

5.1.6.2 Analysis of Evaluation-Evaluation Overlaps

The evaluation-evaluation case overlaps are cases with more than one evaluation case types. Cases with multiple undercount case types were not included in the earlier tables in Section 5.1.

Table 54 shows the distribution of evaluation-evaluation overlaps with added or deleted people that had at least 50 cases.

Table 54: Evaluation-Evaluation Overlaps with Added or Deleted People

Evaluation-Evaluation Overlap Case Types	Number of Cases Completed in CFU (Std. Error)	Number of Cases with Added or Deleted People (Std. Error)	Percent of Completed Cases with Added or Deleted People (Std. Error)	Number of Added or Deleted People (Std. Error)
Seasonal/Duplicate	439,496 (4,882.8)	155,838 (378.1)	35.5 (0.48)	247,558 (7,304.1)
Seasonal/ UC_Multiple	6,966 (634.8)	1,269 (507.2)	18.2 (5.64)	1,903 (378.7)
Seasonal/Duplicate/UC_Multiple	1,616 (439.0)	614 (103.4)	38.0 (4.03)	1,036 (243.0)
Child Custody/Duplicate	306,484 (3,633.8)	71,133 (31.3)	23.2 (0.27)	104,305 (702.0)
Child Custody/UC_Multiple	2,461 (532.6)	481 (53.5)	19.5 (2.10)	588 (53.5)
Child Custody/Duplicate/UC_Multiple	597 (58.5)	119 (23.8)	19.9 (2.04)	167 (119.1)
Another Reason/Duplicate	186,817 (582.8)	46,202 (1,729.7)	24.7 (1.00)	57,051 (578.9)
Another Reason/UC_Multiple	13,616 (769.7)	1,989 (153.9)	14.6 (0.31)	2,755 (611.7)
Another Reason/Duplicate/UC_Multiple	1,503 (450.2)	364 (151.1)	24.2 (2.89)	548 (33.0)
Yes Only/Duplicate	34,592 (367.8)	8,156 (505.0)	23.6 (1.71)	10,697 (141.3)
Yes Only/UC_Multiple	1 (0.0)	1 (0.0)	100.0 (**)	1 (1.0)
Yes Only/Duplicate/UC_Multiple	287 (27.7)	57 (17.3)	19.9 (7.97)	75 (1.2)
Overall Total	**994,436 (6,261.0)**	**286,223 (1,925.9)**	**28.8 (0.29)**	**426,684 (7,402.2)**

**Not enough sample to generate this standard error.

Source: CFU Analysis Files

The overall total number of cases with added or deleted people is 286,223. The overall percent of completed cases with added or deleted people was 28.8 percent. The combination with the largest percent of completed cases with added or deleted people was Seasonal/Duplicate/UC_Multiple at 38.0 percent, but it was not significantly different from the overall 28.8 percent because of its large standard error. The second largest percentage was the Seasonal/Duplicate combination at 35.5 percent (with 155,838 HUs with added or deleted people) and it was significantly different from the overall 28.8 percent of cases with an added or deleted person. The Seasonal/Duplicate and Child Custody/Duplicate combinations had the largest number of added people at 247,558 and 104,305, respectively. It appeared that being an unduplication case resulted in having a person added or deleted.

Table 55 shows the form type distribution of evaluation-evaluation overlaps with an added or deleted person.

Table 55: Evaluation-Evaluation Overlaps with an Added or Deleted Person by Form Type

Form Type	Number of HUs Completed in CFU (Std. Error)	Number of HUs with Added or Deleted People (Std. Error)	Percent of Completed Cases with Added or Deleted People (Std. Error)	Number of Added or Deleted People (Std. Error)
Respondent Completed	**975,077 (1,621.7)**	**279,686 (923.6)**	**28.7 (0.09)**	**416,167 (5,080.7)**
MO/MB – English	921,346 (1,504.4)	266,475 (95.8)	28.9 (0.04)	397,317 (5,075.6)
MO/MB -- Bilingual	51,635 (352.8)	12,616 (867.3)	24.4 (1.51)	18,028 (187.7)
MO/MB -- Fulfillment	170 (8.8)	57 (56.7)	33.5 (31.74)	57 (57.0)
MO/MB -- Experimental	1,809 (478.7)	461 (287.2)	25.5 (9.37)	611 (87.5)
U/L -- English Stateside	117 (114.0)	77 (76.8)	65.8 (2.14)	154 (76.9)
U/L -- Puerto Rico	0 (**)	0 (**)	0.0 (**)	0 (**)
Enumerator Completed	**19,359 (1,350.7)**	**6,537 (451.5)**	**33.8 (0.40)**	**10,518 (534.9)**
TQA	474 (148.4)	240 (115.3)	50.6 (8.81)	556 (153.7)
NRFU	16,713 (1,295.6)	5,450 (429.9)	32.6 (0.04)	8,749 (512.0)
U/E	2,172 (352.1)	847 (75.8)	39.0 (2.62)	1,213 (18.1)
Questionnaire Total	**994,436 (2,110.5)**	**286,223 (1,028.0)**	**28.8 (0.09)**	**426,685 (5,108.7)**

**Not enough sample to generate this standard error.

Source: CFU Analysis Files

The largest percent of completed cases with an added or deleted person was Update/Leave English stateside forms at 65.8 percent, which was significantly different from the overall completed total of 28.8 percent of cases with an added or deleted person, but it had a small sample size. The overall 33.8 percent of completed cases for the enumerator completed form types with an added or deleted person were significantly larger than the overall 28.8 percent of completed cases with an added or deleted person. In addition, all three enumerator completed form types (TQA at 50.6 percent, NRFU at 32.6 percent, and U/E at 39.0 percent) were significantly larger than the overall 28.8 percent of completed cases with an added or deleted person.

Table 56 provides the distribution of evaluation-evaluation overlaps with added people that had at least 50 cases.

Table 56: Evaluation-Evaluation Overlaps with Added People

Evaluation-Evaluation Overlap Case Types	Number of Cases Completed in CFU (Std. Error)	Number of Cases with Added People (Std. Error)	Percent of Completed Cases with Added People (Std. Error)	Number of Added People (Std. Error)
Seasonal/Duplicate	439,496 (4,882.8)	4,121 (704.8)	0.9 (0.15)	5,236 (177.5)
Seasonal/UC_Multiple	6,966 (634.8)	634 (125.6)	9.1 (0.98)	1,269 (1.0)
Seasonal/Duplicate/UC_Multiple	1,616 (439.0)	178 (129.1)	11.0 (5.13)	229 (26.1)
Child Custody/Duplicate	306,484 (3,633.8)	2,478 (40.0)	0.8 (0.02)	2,969 (106.6)
Child Custody/UC_Multiple	2,461 (532.6)	107 (106.9)	4.3 (3.47)	107 (106.9)
Child Custody/Duplicate/UC_Multiple	597 (58.5)	24 (23.8)	4.0 (4.39)	24 (23.8)
Another Reason/Duplicate	186,817 (582.8)	2,647 (79.9)	1.4 (0.04)	3,171 (331.2)
Another Reason/UC_Multiple	13,616 (769.7)	1,071 (458.8)	7.9 (3.82)	1,682 (458.8)
Another Reason/Duplicate/UC_Multiple	1,503 (450.2)	108 (71.1)	7.2 (2.67)	140 (37.1)
Yes Only/Duplicate	34,592 (367.8)	569 (145.4)	1.6 (0.44)	645 (356.5)
Yes Only/UC_Multiple	1 (0.0)	0 (**)	0.0 (**)	0 (**)
Yes Only/Duplicate/UC_Multiple	287 (27.7)	0 (**)	0.0 (**)	0 (**)
Overall Total	**994,436 (6,261.0)**	**11,937 (886.5)**	**1.2 (0.09)**	**15,472 (710.1)**

**Not enough sample to generate this standard error.

Source: CFU Analysis Files

The overall total of cases with added people was 11,937 with 1.2 percent of HUs with at least one added person. The Seasonal/Duplicate/UC_Multiple combination had the largest percent of completed cases with added people at 11.0 percent, but it was not significantly different from the overall percent of cases with an added person because of its large standard error. The only combination that was significantly different from the overall percent was the Seasonal/UC_Multiple combination at 9.1 percent.

Table 57 provides the form type analysis of evaluation-evaluation overlaps with an added person.

Table 57: Evaluation-Evaluation Overlaps with an Added Person by Form Type

Form Type	Number of HUs Completed in CFU (Std. Error)	Number of HUs with Added People (Std. Error)	Percent of Completed Cases with Added People (Std. Error)	Number of Added People (Std. Error)
Respondent Completed	**975,077 (1,621.7)**	**11,579 (1,870.6)**	**1.2 (0.19)**	**14,865 (462.5)**
MO/MB – English	921,346 (1504.4)	10,418 (1,845.0)	1.1 (0.20)	13,478 (446.0)
MO/MB – Bilingual	51,635 (352.8)	1,161 (308.3)	2.2 (0.58)	1,387 (122.4)
MO/MB – Fulfillment	170 (8.8)	0 (**)	0.0 (**)	0 (**)
MO/MB – Experimental	1,809 (478.7)	0 (**)	0.0 (**)	0 (**)
U/L – English Stateside	117 (114.0)	0 (**)	0.0 (**)	0 (**)
U/L – Puerto Rico	0 (**)	0 (**)	0.0 (**)	0 (**)
Enumerator Completed	**19,359 (1,350.7)**	**358 (176.5)**	**1.8 (0.76)**	**605 (204.7)**
TQA	474 (148.4)	0 (**)	0.0 (**)	0 (**)
NRFU	16,713 (1,295.6)	307 (168.9)	1.8 (0.87)	477 (177.1)
U/E	2,172 (352.1)	51 (51.3)	2.3 (1.83)	128 (102.5)
Questionnaire Total	**994,436 (2,110.5)**	**11,937 (1,878.9)**	**1.2 (0.19)**	**15,470 (505.7)**

**Not enough sample to generate this standard error.

Source: CFU Analysis Files

There were no significant percentages of completed cases among the different form types when compared to the overall 1.2 percent of completed cases with an added person.

Table 58 provides the distribution of evaluation-evaluation overlaps with at least one deleted person.

Table 58: Evaluation-Evaluation Overlaps with Deleted People

Evaluation-Evaluation Overlap Case Types	Number of Cases Completed in CFU (Std. Error)	Number of Cases with Deleted People (Std. Error)	Percent of Completed Cases with Deleted People (Std. Error)	Number of Deleted People (Std. Error)
Seasonal/Duplicate	439,496 (4,882.8)	152,950 (1,163.0)	34.8 (0.65)	242,322 (7,126.6)
Seasonal/UC_Multiple	6,966 (634.8)	635 (381.7)	9.1 (4.66)	635 (379.7)
Seasonal/Duplicate/UC_Multiple	1,616 (439.0)	513 (51.2)	31.7 (5.60)	807 (269.1)
Child Custody/Duplicate	306,484 (3,633.8)	69,092 (116.6)	22.5 (0.23)	101,337 (595.4)
Child Custody/UC_Multiple	2,461 (532.6)	374 (53.5)	15.2 (5.56)	481 (53.5)
Child Custody/Duplicate/UC_Multiple	597 (58.5)	95 (47.6)	15.9 (6.43)	143 (95.2)
Another Reason/Duplicate	186,817 (582.8)	44,078 (1,829.7)	23.6 (1.05)	53,880 (247.7)
Another Reason/UC_Multiple	13,616 (769.7)	1,072 (459.8)	7.9 (2.94)	1,073 (1,070.6)
Another Reason/Duplicate/UC_Multiple	1,503 (450.2)	295 (118.4)	19.6 (2.07)	408 (4.1)
Yes Only/Duplicate	34,592 (367.8)	7,755 (302.6)	22.4 (1.11)	10,053 (215.2)
Yes Only/UC_Multiple	1 (0.0)	1 (0.0)	100.0 (0.00)	1 (1.0)
Yes Only/Duplicate/UC_Multiple	287 (27.7)	57 (17.3)	19.9 (7.79)	75 (1.2)
Overall Total	**994,436 (6,261.0)**	**276,917 (2,276.9)**	**27.8 (0.34)**	**411,215 (7,254.4)**

Source: CFU Analysis Files

The overall total of HUs with deleted people was 276,917 (or 27.8 percent of completed HUs with a deleted person). The Seasonal/Duplicate combination has the largest percent of completed cases with a deleted person at 34.8 percent, which was significantly different from the overall percent of completed cases with a deleted person. The Seasonal/Duplicate/UC_Multiple combination came in second with 31.7 percent of completed cases with a deleted person, but it was not significantly different from the overall percent of completed cases with a deleted person. It appeared that having OC – Seasonal, OC – Child Custody, and unduplication case types contributed to the high percentages.

Table 59 has the form type distribution of evaluation-evaluation overlaps with a deleted person.

Table 59: Evaluation-Evaluation Overlaps with a Deleted Person by Form Type

Form Type	Number of HUs Completed in CFU (Std. Error)	Number of HUs with Deleted People (Std. Error)	Percent of Completed Cases with Deleted People (Std. Error)	Number of Deleted People (Std. Error)
Respondent Completed	**975,077 (1,621.7)**	**270,662 (1,500.0)**	**27.8 (0.19)**	**401,302 (4,631.8)**
MO/MB – English	921,346 (1,504.4)	258,377 (1,341.4)	28.0 (0.19)	383,839 (4,629.6)
MO/MB -- Bilingual	51,635 (352.8)	11,690 (599.2)	22.6 (1.01)	16,641 (65.2)
MO/MB -- Fulfillment	170 (8.8)	57 (57.0)	33.5 (31.74)	57 (57.0)
MO/MB -- Experimental	1,809 (478.7)	461 (287.2)	25.5 (9.37)	611 (82.5)
U/L -- English Stateside	117 (114.0)	77 (77.0)	65.8 (2.14)	154 (76.9)
U/L -- Puerto Rico	0 (**)	0 (**)	0.0 (**)	0 (**)
Enumerator Completed	**19,359 (1,350.7)**	**6,254 (302.5)**	**32.3 (0.85)**	**9,912 (378.0)**
TQA	474 (148.4)	240 (115.3)	50.6 (8.81)	556 (153.7)
NRFU	16,713 (1,295.6)	5,180 (272.4)	31.0 (0.77)	8,271 (334.8)
U/E	2,172 (352.1)	834 (63.0)	38.4 (3.08)	1,085 (84.4)
Questionnaire Total	**994,436 (2,110.5)**	**276,916 (1,530.2)**	**27.8 (0.19)**	**411,214 (4,647.2)**

**Not enough sample to generate this standard error.

Source: CFU Analysis Files

The largest percent of completed cases with a deleted person was U/L English stateside at 65.8 percent, and it was significantly different from the overall 27.8 percent of completes with a deleted person, but it has a small sample size. The overall 32.3 percent of completed cases with a deleted person for the enumerator completed form types were significantly larger than the overall percent of completed cases with a deleted person. In addition, all three enumerator-completed form types (TQA at 50.6 percent (but had a small sample size), NRFU at 31.0 percent, and U/E at 38.4 percent) were significantly larger than the overall percent of completed cases with a deleted person.

Taking the entire section into account, the three overcount evaluation cases were resolved in CFU less than around 20 percent of the time. It was confirmed at different places throughout this section that the overcount evaluation results were in line with the results of the mid-decade census tests as expected. The next section looks at the results of the experimental questions that attempted to resolve the cases that were not resolved in the original CFU interview. The next section also explored ways to enhance future CFU questions or probes.

5.2 CFU Experimental Coverage Questions (Mod Q)

At the end of the traditional CFU interview a sample of respondents were asked a series of experimental questions (Mod Q) if CFU was unable to resolve a coverage issue that was indicated on an initial questionnaire. These experimental questions attempted to capture information on complex living situations that the traditional interview could not solicit from the respondent. In the traditional CFU interview, the same questions were asked of each household and their members in order to capture missing demographic data, add undercounted people, and delete overcounted people from the household roster. The mention of the coverage issue identified on the initial 2010 Census return was left up to the respondent's discretion. DSSD wanted to explore the living situations of overcounted people as well as gain insight into why some CFU respondents do not mention missing people during the CFU interview. During the CFU Interview, if no changes were made to the household roster in regard to the marked overcount or undercount boxes on the 2010 Census form, then the CFU respondent was asked the Mod Q questions based on the marked overcount or undercount category to further probe why no changes were made. In Mod Q, the interviewer identified the coverage issue immediately, and the thought process of the respondent that identified the coverage issue was then probed (see Appendix A for the undercount and overcount Mod Q questions).

Mod Q was developed to explore why some CFU respondents do not mention missing people or people with complex living situations during the CFU interview that were mentioned when the respondent completed their initial 2010 Census questionnaire. The experimental questions in Mod Q probed the thought process of CFU respondents, with the objective of understanding why no changes were made to the roster. A sample of production and evaluation cases was asked the Mod Q questions if they met certain criteria.

Mod Q had two series of questions: Mod Q undercount questions and Mod Q overcount questions. The Mod Q undercount questions probed for potentially missing people (Mod Q undercount people), their relationships to the respondent, and their birthdates. They also asked if there was any other place the missing people stayed besides the census address in the last 12 months. If they stayed in more than one place, then the interviewer asked where they stayed most of the time in March and April and how much time they spent at each address in the last 12 months. The Mod Q overcount questions probed for the living situations of overcounted people. If the potentially overcounted people (Mod Q overcount people) stayed elsewhere other than the census address, then the interviewer probed for the alternative address, where they spent most of the time in March and April, and how much time they spent at each address in the last 12 months. Mod Q undercount and overcount people were excluded from consideration for the final 2010 Census response; they were not the same as people added or deleted during the normal production CFU interview.

Below in Table 60 are the counts of CFU returns that were sampled to be eligible for the experimental module (Mod Q). If the coverage issue was not resolved, the case was sent to Mod Q. The percent of totals were calculated. The rates at which the cases were sent to Mod Q as compared with being eligible to be sent to Mod Q (sent rate) are in Table 61. In Table 61, OC – College had one of the highest number of Mod Q eligible returns but a low sent rate; this was because OC – College coverage issue was most likely to be resolved in a CFU interview and not sent to Mod Q.

Table 60: Mod Q Eligible Cases That Were Asked the Experimental Questions (Sent to Mod Q) by Source of Coverage Issue

Source of Coverage Issue	Mod Q Eligible Returns	Percent of Total Mod Q Eligible	Sent to Mod Q	Percent of Total Sent to Mod Q
Undercount	**18,786**	**11.4**	**15,884**	**19.9**
Children	4,955	3.0	3,983	5.0
Relatives	4,510	2.7	3,793	4.8
Nonrelatives	4,714	2.9	4,015	5.0
Temporary	4,607	2.8	4,093	5.1
Overcount	**145,970**	**88.6**	**63,817**	**80.1**
College	33,907	20.6	3,900	4.9
Military	5,610	3.4	3,982	5.0
Jail/Prison	5,763	3.5	4,981	6.2
Nursing Home	5,372	3.3	4,253	5.3
Child Custody	36,890	22.4	11,851	14.9
Seasonal	34,994	21.2	14,475	18.2
Another Reason	23,434	14.2	20,375	25.6
Total	**164,756**	**100.0**	**79,701**	**100.0**

Source: CFU Analysis Files

Table 61: Mod Q Eligible Cases That Were Asked the Experimental Questions (Sent to Mod Q) Sent Rates by Source of Coverage Issue

Source of Coverage Issue	Mod Q Eligible Returns	Sent to Mod Q	Sent Rate (%)
Undercount	**18,786**	**15,884**	**84.6**
Children	4,955	3,983	80.4
Relatives	4,510	3,793	84.1
Nonrelatives	4,714	4,015	85.2
Temporary	4,607	4,093	88.8
Overcount	**145,970**	**63,817**	**43.7**
College	33,907	3,900	11.5
Military	5,610	3,982	71.0
Jail/Prison	5,763	4,981	86.4
Nursing Home	5,372	4,253	79.2
Child Custody	36,890	11,851	32.1
Seasonal	34,994	14,475	41.4
Another Reason	23,434	20,375	87.0
Total	**164,756**	**79,701**	**48.4**

Source: CFU Analysis Files

There were 164,756 cases eligible for Mod Q while 79,701 cases were actually sent to Mod Q and asked the experimental questions accounting for an overall sent rate of 48.4 percent that were not resolved in the normal production CFU interview. An estimated 51.6 percent were resolved in the normal CFU interview. On average, the highest sent rates came from the undercount categories sending a cumulative 84.6 percent of its sampled-eligible cases opposed to a cumulative 43.7 percent of the overcount categories. The CFU interview did not provide sufficient probes to gather information for potentially missing household roster members. "Temporary" had the highest sent rate of Mod Q undercount with 88.8 percent of sampled cases not being resolved in the CFU interview. A couple of overcount categories stood out as well. "Another Reason" sent 87.0 percent of its eligible cases while "Jail/Prison" had a sent rate of 86.4 percent. The category "Another Reason" was a catch-all for a wide variety of reasons for a potentially overcounted person. It was difficult to develop probes for so many reasons, thus it follows that a lot of these cases were not resolved in the traditional CFU interview.

Table 62 and Table 63 show the same universes as above (the returns that were eligible for Mod Q and the returns that were sent to Mod Q) categorized by the type of form (the initial 2010 Census return) that was sent to CFU.

Table 62: Mod Q Eligible Cases That Were Asked the Experimental Questions (Sent to Mod Q) by Form Type

Form Type	Mod Q Eligible Returns	Percent of Total Mod Q Eligible	Sent to Mod Q	Percent of Total Sent to Mod Q
Respondent Provided	**112,154**	**68.1**	**53,786**	**67.5**
MO/MB -- English	104,830	63.6	50,012	62.7
MO/MB -- Bilingual	5,956	3.6	3,172	4.0
MO/MB -- Fulfillment	42	0.0	10	0.0
MO/MB -- Experimental	1,177	0.7	591	0.7
U/L -- English Stateside	6	0.0	1	0.0
U/L -- Puerto Rico	143	0.1	0	0.0
Enumerator Provided	**52,602**	**31.9**	**25,915**	**32.5**
TQA	45	0.0	17	0.0
NRFU	51,614	31.3	25,513	32.0
U/E	943	0.6	385	0.5
Total	**164,756**	**100.0**	**79,701**	**100.0**

Source: CFU Analysis Files

An estimated 67.5 percent of all returns sent to Mod Q were comprised of respondent provided returns mostly from MO/MB English forms. An estimated 32.5 percent of all cases sent were from enumerator provided returns mostly from the NRFU operation. A higher proportion of enumerator cases were eligible for Mod Q than in the overall universe (there were 14.1 percent of production cases from enumerator returns (Govern et al, 2012) and 7.7 percent of evaluation cases from enumerator returns).

Table 63: Mod Q Eligible Cases That Were Asked the Experimental Questions (Sent to Mod Q) Sent Rates by Form Type

Form Type	Mod Q Eligible Returns	Sent to Mod Q	Sent Rate (%)
Respondent Provided	**112,154**	**53,786**	**48.0**
MO/MB -- English	104,830	50,012	47.7
MO/MB -- Bilingual	5,956	3,172	53.3
MO/MB -- Fulfillment	42	10	23.8
MO/MB -- Experimental	1,177	591	50.2
U/L -- English Stateside	6	1	16.7
U/L -- Puerto Rico	143	0	0.0
Enumerator Provided	**52,602**	**25,915**	**49.3**
TQA	45	17	37.8
NRFU	51,614	25,513	49.4
U/E	943	385	40.8
Total	**164,756**	**79,701**	**48.4**

Source: CFU Analysis Files

Table 63 shows 48.0 percent of respondent provided questionnaires were not resolved in the CFU interview and therefore were sent to Mod Q. Similarly, enumerator provided questionnaires were not resolved in the CFU interview 49.3 percent of the time.

Table 64 shows the counts of Mod Q Eligible cases that completed Mod Q and completion rates. A case was considered complete if all of the questions in the interview path were answered successfully leading to the exit module (Mod H). Depending on the coverage issue and the answers given to each question, the interview slightly differed in both content and length, respectively. Some of the interview paths were much shorter than others and may account for the high completion rates.

Table 64: Mod Q Eligible Cases Completed the Experimental Questions Completion Rates by Source of Coverage Issue

Source of Coverage Issue	Sent to Mod Q	Completed Mod Q	Completion Rate (%)
Undercount	**15,884**	**15,633**	**98.4**
Children	3,983	3,941	99.0
Relatives	3,793	3,737	98.5
Nonrelatives	4,015	3,945	98.3
Temporary	4,093	4,010	98.0
Overcount	**63,817**	**63,536**	**99.6**
College	3,900	3,880	99.5
Military	3,982	3,959	99.4
Jail/Prison	4,981	4,934	99.1
Nursing Home	4,253	4,215	99.1
Child Custody	11,851	11,810	99.7
Seasonal	14,475	14,421	99.6
Another Reason	20,375	20,317	99.7
Total	**79,701**	**79,169**	**99.3**

Source: CFU Analysis Files

There was little difference in completion rates amongst different sources of coverage issue. Mod Q overcount cases were completed 99.6 percent of the time while Mod Q undercount cases were completed for 98.4 percent of its sent workload. Because Mod Q undercount had a higher sent rate yet lower completion rate than that of Mod Q overcount suggests the increased difficulty in resolving cases with potentially missing people. Of Mod Q undercount, “Temporary” had the highest sent rate and lowest completion rate making it the hardest to resolve. Below in Table 65 are the same counts as above shown by form type.

Table 65: Mod Q Eligible Cases Completed the Experimental Questions Completion Rates by Form Type

Form Type	Sent to Mod Q	Completed Mod Q	Completion Rate (%)
Respondent Provided	**53,786**	**53,525**	**99.5**
MO/MB -- English	50,012	49,765	99.5
MO/MB -- Bilingual	3,172	3,161	99.7
MO/MB -- Fulfillment	10	10	100.0
MO/MB -- Experimental	591	588	99.5
U/L -- English Stateside	1	1	100.0
U/L -- Puerto Rico	0	0	0.0
Enumerator Provided	**25,915**	**25,644**	**99.0**
TQA	17	17	100.0
NRFU	25,513	25,249	99.0
U/E	385	378	98.2
Total	**79,701**	**79,169**	**99.3**

Source: CFU Analysis Files

Cases originating from NRFU and U/E had the lowest completion rates with 99.0 percent and 98.2 percent, respectively. The sampled enumerator provided cases were the most difficult to resolve with the overall completion rate of 99.0 percent.

Overall, Mod Q eligible cases that were asked the experimental questions completed 99.3 percent of its sent workload. There was very little difference in the completion rates of initial 2010 Census responses that were respondent provided as compared with enumerator provided, 99.5 percent and 99.0 percent, respectively.

5.2.1 Mod Q Undercount

If a respondent marked an undercount category on the initial 2010 Census return but then failed to identify the potentially missing person during the interview, then the case went to Mod Q.

Unlike CFU, the Mod Q probes were specific to the coverage issue that was selected on the initial 2010 Census return. For example, if a respondent indicated on their 2010 Census form that a newborn child is in the household and no other coverage issue, then the Mod Q interview focused on the potentially missing child. The Mod Q probes asked for the respondent's reason for marking the specific undercount category when the respondent did not mention the missing person. Mod Q directly asked the respondent the specific coverage issue marked on the 2010 Census form to solicit data regarding the potentially undercounted person. The questions asked in Mod Q helped determine where and how long a person stayed at a particular address to determine where the person should have been counted in the 2010 Census.

In Mod Q undercount, a series of questions were asked to the respondent to see if anyone was missing from the household roster and where the person was staying most of the time. These questions probed for both demographic data and information regarding when and how long one stayed at the census address. As shown in Figure 4, the respondent was asked for the name of the undercounted person and their relationship to them. In this assessment, the term "Mod Q undercount person" refers to a person listed during this first question. First and last name needed to be captured in order to be considered a Mod Q undercount person; relationship was not a requirement of the module to continue to the next screen and thus was not required to be a Mod Q undercount person.

Figure 4: Mod Q Undercount Introduction Screen (UC – Children)

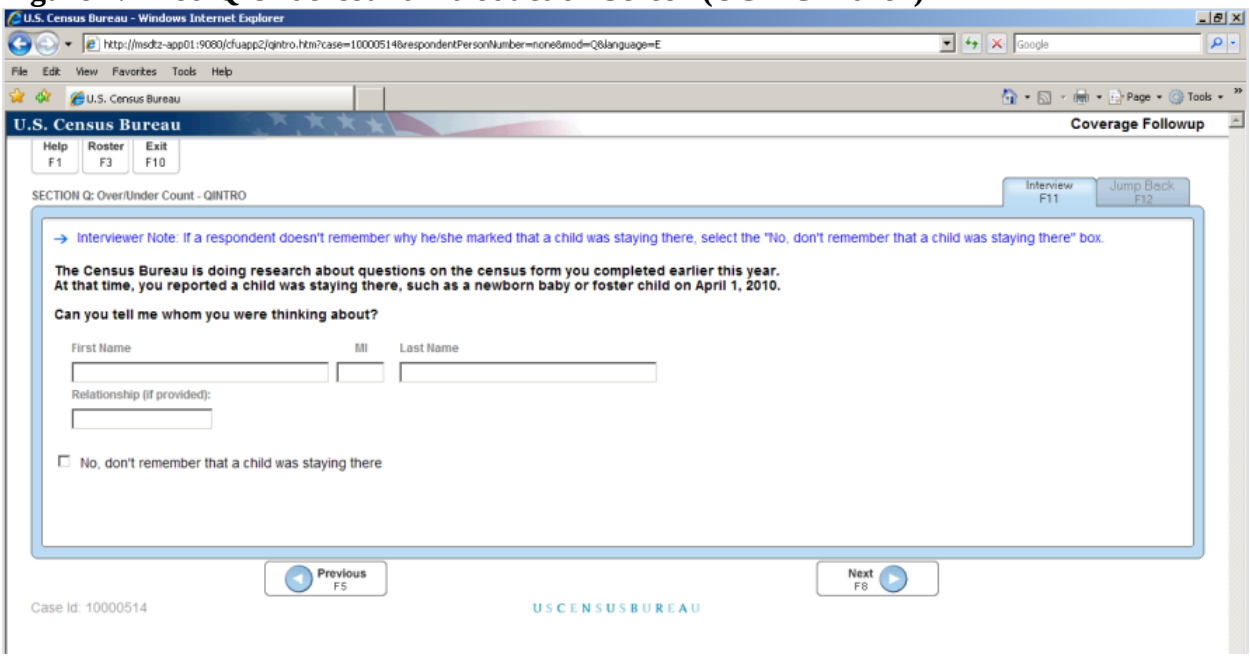


Table 66 shows how many cases entered Mod Q and completed at least the first question, as shown in Figure 4, with first and last name being recorded. The counts are shown by the coverage issues marked on the initial 2010 Census returns. Since Mod Q was conducted only on a sample of cases in CFU, the numbers in the following tables have been weighted. Weights were applied in Table 66, and subsequent tables, to represent what would have happened to the entire CFU universe if Mod Q were a part of the original CFU interview. More information on Mod Q weights can be found in section 3.4.2.

Table 66: Counts of Mod Q Undercount People by Source of Coverage Issue

Source of Coverage Issue	Households with Mod Q Undercount People (Std. Error)	Percent of Households with Mod Q Undercount People (Std. Error)	Mod Q Undercount People (Std. Error)	Percent of Mod Q Undercount People (Std. Error)
UC – Children	149,734 (5,519.61)	14.4 (0.48)	157,732 (1,555.10)	14.0 (0.17)
UC – Relatives	377,275 (11,107.80)	36.2 (0.57)	404,149 (8,191.14)	35.8 (0.56)
UC – Nonrelatives	137,128 (1,312.66)	13.1 (0.23)	146,000 (2,020.09)	12.9 (0.12)
UC – Temporary	379,294 (6,442.37)	36.4 (0.74)	420,531 (2,952.30)	37.3 (0.45)
Total*	**1,043,431** **(14,192.66)**	**100.0** **(0.00)**	**1,128,413** **(6,473.21)**	**100.0** **(0.00)**

* Weights may not sum to total due to rounding

Source: CFU Analysis Files

Nearly three-fourths of all Mod Q undercount people had UC – Relatives or UC – Temporary coverage issues that were not resolved during the original CFU interview. The people found in the UC – Relatives category made up 35.8 percent of the total Mod Q undercount universe. The traditional CFU interview listed each coverage issue giving the respondent the choice to decide whether it was best to mention the undercounted person. The Mod Q undercount questions took the choice away by specifically saying what category was marked and asking why the box was marked on the initial return. This was done in hopes of soliciting the name and demographic data for that missing person, and also later in the interview, how long that person stayed at that address.

Similar to UC – Relatives, people found in the UC – Temporary undercount category accounted for 37.3 percent of the total Mod Q undercount universe.

Table 67 shows the same counts of cases that entered Mod Q undercount as above. The following counts are shown by form type to see what types of initial 2010 Census returns were comprising the Mod Q undercount universe. Potentially, new coverage probes could be directed towards the 2010 Census operations that have the most cases of a coverage issue marked on the 2010 Census form, but not mentioned during the CFU interview.

Table 67: Mod Q Undercount People by Form Type

Form Type	Households with Mod Q Undercount People (Std. Error)	Percent of Households with Mod Q Undercount People (Std. Error)	Mod Q Undercount People (Std. Error)	Percent of Mod Q Undercount People (Std. Error)
Respondent Provided	**351,585 (14,152.79)**	**33.7 (0.90)**	**385,013 (2,839.58)**	**34.1 (0.24)**
MO/MB -- English	327,526 (14,053.89)	31.4 (0.93)	357,938 (2,681.39)	31.7 (0.23)
MO/MB – Experimental	1,570 (750.72)	0.2 (0.07)	1,989 (410.00)	0.2 (0.04)
MO/MB -- Bilingual	22,488 (1,492.04)	2.2 (0.14)	25,086 (839.80)	2.2 (0.07)
Enumerator Provided	**691,846 (1,063.02)**	**66.3 (0.90)**	**743,400 (5,817.14)**	**65.9 (0.24)**
TQA	60 (0.00)	0.0 (0.00)	60 (0.00)	0.0 (0.00)
NRFU	685,676 (482.55)	65.7 (0.89)	736,661 (5,817.14)	65.3 (0.24)
U/E	6,111 (947.19)	0.6 (0.09)	6,679 (8.27)	0.6 (0.00)
Total*	**1,043,431 (14,192.66)**	**100.0 (0.00)**	**1,128,413 (6,473.21)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding

Source: CFU Analysis Files

Above are the counts of Mod Q undercount people by form type. The form type coincides with the 2010 Census operation that solicited the initial 2010 Census return. U/L did not have any cases that entered Mod Q. This means there were no cases sampled from U/L English stateside or U/L Puerto Rico that mentioned a potentially undercounted person on the form and did not resolve the issue during the traditional CFU interview. NRFU accounted for 65.3 percent of all undercount people that entered Mod Q. NRFU cases were the most difficult in resolving undercount coverage issues. Of the undercount cases in CFU that were not resolved, a little under one-half as many cases entered Mod Q from the MO/MB English form than from NRFU. Combined, NRFU and MO/MB English made up 96 percent of the entire Mod Q Undercount universe. MO/MB English and NRFU are the largest of the 2010 Census enumeration operations so it is no surprise to see the dominance of these form types in Mod Q.

Another way to categorize the Mod Q undercount universe, other than coverage issue and form type as in Table 66 and Table 67 respectively, is to record that person's relationship

to the respondent (or Person 1 on the initial 2010 Census return). As seen in Figure 4, relationship was a write-in box. The answers captured from this field were then coded into 28 categories, including “Unknown”, “Don’t Know”, “Refuse”, and “Missing.” The unknown category was used when the information provided was not a relationship or a category could not be determined. Reviewing the relationship to the respondent gives us insight into who was missing and may inform future probes. Answers provided in the write-in were coded to reflect common answers. These responses should not be confused with the relationship question on the 2010 Census form which establishes the relationship to the householder and uses a pre-defined set of categories. Table 68 shows the counts of Mod Q undercount people by relationship to the CFU respondent.

Table 68: Mod Q Undercount People by Relationship to CFU Respondent

Relationship to the Householder	Mod Q Undercount People (Std. Error)	Percent (Std. Error)
Householder	1,662 (489.08)	0.1 (0.04)
Husband/Wife	8,971 (556.73)	0.8 (0.05)
Son/Daughter (Biological)	220,759 (11,426.68)	19.6 (0.93)
Son/Daughter (Adopted)	1,362 (220.14)	0.1 (0.02)
Brother/Sister	62,644 (2,492.91)	5.6 (0.20)
Father/Mother	56,343 (4,186.41)	5.0 (0.35)
Mother/Father In-Law	29,363 (1,962.32)	2.6 (0.16)
Son/Daughter In-Law	6,361 (1,196.25)	0.6 (0.11)
Siblings In-Law	20,453 (1,005.25)	1.8 (0.09)
Step Parents	1,126 (74.74)	0.1 (0.01)
Step Son/Daughter	19,741 (2,349.91)	1.7 (0.22)
Step Siblings	1,069 (185.61)	0.1 (0.02)
Foster Parent	471 (349.75)	0.0 (0.03)
Foster Child	12,372 (818.94)	1.1 (0.08)
Grandparent	4,433 (526.98)	0.4 (0.05)
Grandchild	64,039 (1,623.64)	5.7 (0.12)
Other Relative (Generic)	84,599 (3,816.36)	7.5 (0.34)
Non-Relative (Generic)	69,360 (584.62)	6.1 (0.06)
Non-Relative – Roomer/Boarder	29,105 (1,915.95)	2.6 (0.17)
Non-Relative – Housemate/Roommate	37,755 (2,499.77)	3.3 (0.24)
Non-Relative – Unmarried Partner	37,101 (1,851.87)	3.3 (0.17)
Non-Relative – Friend/ Friend of Family	104,552 (1,977.32)	9.3 (0.23)
Unknown	13,326 (1,158.10)	1.2 (0.10)
Don't Know	5,431 (1,156.24)	0.5 (0.10)
Refuse	151 (151.05)	0.0 (0.01)
Missing	235,866 (3,897.61)	20.9 (0.46)
Total*	**1,128,413 (6,473.21)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding

Source: CFU Analysis Files

The largest numbers of captured potentially undercounted people in Mod Q were from categories "Son/Daughter (Biological)" and "Missing". "Son/Daughter (Biological)" accounted for 19.6 percent of the total Mod Q undercount universe. Unlike name, the relationship of the potentially undercounted person did not need to be recorded in order to continue with the interview which could account for the high rate (20.9 percent) of

respondents that chose not to give the relationship of the potential undercounted person and proceeded with the rest of the interview. "Other Relative (Generic)" followed behind "Son/Daughter (Biological)" representing 7.5 percent of the total Mod Q Undercount universe.

After the name and, if given by the respondent, relationship of the potentially undercounted person was collected; the date of birth of that individual was captured. Date of birth can be used to calculate age and distinguish unique people on a roster if two or more members have the same name. These data can also be used to do post interview matching to see if and where a person is duplicated in the 2010 Census.

Table 69: Mod Q Undercount People by Collapsed Age

Age in Years	Mod Q Undercount People (Std. Error)	Percent (Std. Error)
Under 5 years	112,887 (2,076.22)	10.0 (0.24)
5 to 9 years	25,766 (2,933.21)	2.3 (0.25)
10 to 14 years	24,098 (2,361.51)	2.1 (0.20)
15 to 19 years	75,039 (1,945.66)	6.6 (0.18)
20 to 24 years	101,238 (4,346.11)	9.0 (0.34)
25 to 29 years	74,803 (1,333.93)	6.6 (0.16)
30 to 34 years	44,681 (1,271.31)	4.0 (0.10)
35 to 39 years	32,966 (1,331.20)	2.9 (0.11)
40 to 44 years	31,091 (1,012.90)	2.8 (0.09)
45 to 49 years	26,554 (672.09)	2.4 (0.05)
50 to 54 years	25,941 (804.15)	2.3 (0.08)
55 to 59 years	20,705 (2,065.41)	1.8 (0.19)
60 to 64 years	17,368 (1,147.24)	1.5 (0.10)
65 years and older	48,459 (2,500.03)	4.3 (0.21)
Missing	466,816 (4,675.58)	41.4 (0.51)
Total*	**1,128,413 (6,473.21)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding

Source: CFU Analysis Files

After the date of birth was captured, age was calculated. The ages were grouped in 5 year intervals as shown above in Table 69. The "Under 5 years" category included newborn babies and small children and represented 10.0 percent of the Mod Q undercount people. Past research has shown that the "20 to 24 years" category are highly mobile, they comprised 9.0 percent of the universe. The "Missing" category includes those where the respondent refused to disclose the age of the Mod Q undercount person, did not know the age of the person, or did not answer this question in the interview path (such as hanging up the phone before the interview was over). An estimated 41.4 percent of the Mod Q undercount people had age fields that were missing, thus limiting our conclusions. The high rate of a missing age may be due to the person's tenuous attachment to the HU.

In the Mod Q undercount interview path, the next probe was as follows: "In the last 12 months, was there any other place the undercounted person stayed besides the census address?" In order to determine where a person should be counted in the 2010 Census, one must find out where that person spent most of the time. The first step in making this determination is to ascertain whether or not that person has stayed in more than one address.

Below, Table 70 shows the results of the question by the coverage issue from the initial 2010 Census return that was not resolved in the CFU interview.

Table 70: Mod Q Undercount People If They Stayed at Another Place Besides the Census Address in the Last 12 Months by Source of Undercount Coverage Issue

Stayed at Another Place	Mod Q Undercount People (Undercount Coverage Issue)				
	UC – Child (Std. Error) N=157,732 (1,929.63)	UC – Relative (Std. Error) N=404,149 (4,497.10)	UC – Nonrelative (Std. Error) N=146,000 (1,618.66)	UC – Temporary (Std. Error) N=420,531 (3,839.24)	**Total* (Std. Error) N=1,128,413 (3,841.75)**
Yes	35.9 (1.14)	55.0 (0.43)	48.2 (0.94)	61.8 (0.68)	**54.0 (0.46)**
No	55.8 (1.14)	36.1 (1.29)	39.3 (0.75)	25.4 (0.39)	**35.3 (0.63)**
Don't Know	1.3 (0.14)	1.9 (0.21)	6.4 (0.63)	8.1 (0.45)	**4.7 (0.16)**
Refused	0.1 (0.05)	0.1 (0.05)	0.1 (0.04)	0.0 (0.00)	**0.0 (0.01)**
Missing	7.0 (0.26)	7.0 (1.14)	6.0 (0.36)	4.7 (0.19)	**6.0 (0.34)**
Total*	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding

Source: CFU Analysis Files

If a potentially undercounted person has not stayed in another address in the last 12 months then the person is considered a resident of the HU, according to the Census Bureau's residence rule. An estimated 35.3 percent of all Mod Q undercount people answered "No" and would be residents. An estimated 55.8 percent of the total 157,732 UC – Children would be residents.

In the Mod Q undercount interview path, if the respondents answered "Yes" to the question of whether or not the undercounted person stays at another address besides the census address, they were further probed on where the undercounted person spent most of the time in March and April 2010. The timeframe around March and April is significant because of Census Day (April 1, 2010) and the residence rule. According to the residence rule, a person was to be counted at their usual residence, which was where they lived and slept most of the time. If equal time was spent at multiple addresses then the person should be counted where they were on Census Day. Below, in Table 71, are the counts of where the undercounted people spent most of the time: at the census address, another address, both places equally, did not know, or refused to answer the question.

The total below reflects only the Mod Q undercount people probed as a result of answering 'yes' to the previous question.

Table 71: Mod Q Undercount People That Stayed At Another Address Where They Spent Most of the Time in March and April of this Year by Source of Coverage Issue

Where Spent Most of the Time	Mod Q Undercount People (Undercount Coverage Issue)				
	UC – Child (Std. Error) N=56,550 (2,229.58)	UC – Relative (Std. Error) N=222,282 (2,848.79)	UC – Nonrelative (Std. Error) N=70,321 (1,139.13)	UC – Temporary (Std. Error) N=259,811 (3,990.77)	**Total* (Std. Error) N=608,964 (3,713.93)**
Census Address	39.6 (2.74)	40.6 (0.88)	59.3 (0.77)	49.2 (2.51)	**46.3 (1.69)**
Other Place	32.1 (2.97)	42.3 (0.64)	23.2 (0.67)	32.3 (1.56)	**34.9 (1.24)**
Both Places Equally	27.2 (0.71)	15.3 (0.29)	14.5 (0.12)	15.2 (1.35)	**16.2 (0.66)**
Don't Know	0.6 (0.22)	1.5 (0.14)	2.7 (0.36)	3.1 (0.12)	**2.2 (0.05)**
Refuse	0.1 (0.14)	0.0 (0.00)	0.2 (0.12)	0.1 (0.12)	**0.1 (0.06)**
Missing	0.4 (0.31)	0.4 (0.13)	0.3 (0.09)	0.2 (0.06)	**0.3 (0.04)**
Total*	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding

Source: CFU Analysis Files

Respondents choosing census address accounted for 46.3 percent of the universe. If the residence rule was applied, those people would be added to the interviewed address becoming residents of that HU. Those people include 49.2 percent of the 259,811 UC – Temporary people and 59.3 percent of the total 70,321 UC – Nonrelative people.

During each Mod Q undercount interview, the telephone interviewer was asked to check the list of potentially undercounted people against the traditional CFU roster to see if the captured person was already on the roster. Table 72 shows the counts of Mod Q undercount people already on the CFU roster by coverage issue.

Table 72: Mod Q Undercount People Whether or not Already Listed on Household Roster by Source of Coverage Issue

Already on Roster	Mod Q Undercount People (Undercount Coverage Issue)				
	UC – Child (Std. Error) N=157,732 (1,929.63)	UC – Relative (Std. Error) N=404,149 (4,497.10)	UC – Nonrelative (Std. Error) N=146,000 (1,618.66)	UC – Temporary (Std. Error) N=420,531 (3,839.24)	**Total* (Std. Error) N=1,128,413 (3,841.75)**
Yes	77.0 (0.41)	70.7 (0.21)	77.8 (1.34)	65.8 (2.08)	**70.7 (0.86)**
No	16.0 (0.33)	22.8 (0.45)	16.3 (1.33)	29.4 (1.77)	**23.5 (0.88)**
Don't Know	0.3 (0.18)	0.2 (0.11)	0.2 (0.13)	0.4 (0.23)	**0.3 (0.10)**
Missing	6.7 (0.26)	6.3 (0.67)	5.7 (0.18)	4.4 (0.22)	**5.6 (0.17)**
Total*	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding

Source: CFU Analysis Files

An estimated 70.7 percent of the people captured in Mod Q undercount were determined to be already on the HU roster. This could occur one of two ways: after marking the undercount coverage question on the initial 2010 Census form the respondent included the person on the form or they were added during the CFU interview but from a probe different than expected (i.e. if someone marked the UC – Relative category but added a person based on the roommate probe). An estimated 23.5 percent were determined to be new potential additions to the HU. An estimated 29.4 percent of the total representative 420,531 UC – Temporary people were not already on the roster. Following close behind, 22.8 percent of the total 404,149 UC – Relative people were not a part of the original CFU interview. Below, in Table 73, are the same counts as above shown by form type.

Table 73: Mod Q Undercount People Whether or not Already Listed on Household Roster by Form Type

Already on Roster	Mod Q Undercount People (Form Type)						**Total*** **(Std. Error)** **N=1,128,413** **(3,841.75)**
	Respondent Provided			Enumerator Provided			
	MO/MB English (Std. Error) N=357,938 (543.41)	MO/MB Experimental (Std. Error) N=1,989 (684.52)	MO/MB Bilingual (Std. Error) N=25,086 (1,425.47)	TQA (Std. Error) N=60 (0.00)	NRFU (Std. Error) N=736,661 (2,956.79)	U/E (Std. Error) N=6,679 (1,794.61)	
Yes	55.0 (2.19)	67.2 (8.07)	52.8 (0.64)	0.0 (0.00)	78.8 (0.80)	83.3 (10.73)	**70.7 (0.86)**
No	41.3 (2.06)	25.2 (2.61)	44.8 (0.18)	100.0 (0.00)	14.2 (0.92)	7.2 (5.38)	**23.5 (0.88)**
Don't Know	0.4 (0.07)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.2 (0.14)	0.0 (0.00)	**0.3 (0.10)**
Missing	3.2 (0.05)	7.6 (10.67)	2.4 (0.82)	0.0 (0.00)	6.8 (0.26)	9.6 (85.35)	**5.6 (0.17)**
Total*	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding

Source: CFU Analysis Files

An estimated 41.3 percent of the total 357,938 people from MO/MB English forms and 78.8 percent of the total 736,661 people from the NRFU operation were already on the roster. During NRFU, the name of the potentially missed person was captured. During the CFU interview, this person was included on the HU roster. The coverage issue was not resolved since the missing person was listed on the roster, thus triggering Mod Q undercount. Hence, the people's names solicited during Mod Q undercount were already on the HU roster.

After information is gathered regarding the living situation of a potentially undercounted person, residence coding is performed to determine residency of the person in regards to the HU in followup. For Mod Q undercount, "Residents" refers to the people that would be added to the roster for the census address given our residence rule and residence coding if they were a part of the CFU production universe. "Non-Residents" refers to those that would not be added to the HU roster, by whether they were determined to be a resident of another address or if the residency could not be established with the gathered data. In Table 74 are the counts of Mod Q undercount people by whether an undercounted person was a resident of the HU as a result of the residence rule.

Table 74: Mod Q Undercount People by Whether Resident or Non-Resident as a Result of Residence Coding

Potential residence coding outcome	Mod Q Undercount People (Std. Error)	Percent (Std. Error)
Residents	680,109 (2,136.58)	60.3 (0.50)
Non-Residents	448,304 (8,423.84)	39.7 (0.50)
Total*	**1,128,413 (7,329.42)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding.
Source: CFU Analysis Files

An estimated 60.3 percent would have been considered residents of the HU while 39.7 percent would not have been added to the HU.

The people added from the Mod Q undercount question were matched with other 2010 Census returns to determine if there were other rosters with that undercounted person enumerated on them. After being matched, the Mod Q undercount people were then merged to the 2010 CUF to determine if that person was counted elsewhere in the 2010 Census. Below, in Table 75, are the counts of Mod Q undercount person by where they were enumerated shown by source of coverage issue.

Table 75: Mod Q Undercount People Where They Were Enumerated* by Source of Coverage Issue

Where Enumerated	Mod Q Undercount People (Undercount Coverage Issue)				
	UC – Child (Std. Error) N=157,732 (1,929.63)	UC – Relative (Std. Error) N=404,149 (4,497.10)	UC – Nonrelative (Std. Error) N=146,000 (1,618.66)	UC – Temporary (Std. Error) N=420,531 (3,839.24)	**Total** (Std. Error) N=1,128,413 (3,841.75)**
Residents	**70.0 (0.62)**	**58.4 (2.35)**	**67.8 (0.65)**	**55.8 (1.34)**	**60.3 (0.50)**
Census Address	60.6 (1.81)	49.9 (0.94)	59.3 (1.15)	43.1 (0.78)	**50.1 (0.39)**
Different MAFID	0.6 (0.05)	0.5 (0.11)	0.2 (0.00)	0.5 (0.04)	**0.5 (0.04)**
More Than One Place	1.4 (0.55)	0.8 (0.25)	0.4 (0.10)	0.8 (0.13)	**0.8 (0.17)**
Not at All	7.5 (0.43)	7.3 (0.33)	7.9 (0.38)	11.4 (0.59)	**8.9 (0.15)**
Non-Residents	**30.0 (0.62)**	**41.6 (2.35)**	**32.2 (0.65)**	**44.2 (1.34)**	**39.7 (0.50)**
Census Address	14.0 (1.30)	19.0 (0.88)	17.8 (0.30)	21.5 (0.44)	**19.1 (0.15)**
Different MAFID	2.1 (0.23)	2.5 (0.36)	0.5 (0.09)	1.4 (0.11)	**1.8 (0.10)**
More Than One Place	1.2 (0.08)	1.3 (0.08)	0.3 (0.04)	0.5 (0.16)	**0.9 (0.07)**
Not at All	12.7 (0.78)	18.9 (0.53)	13.7 (0.55)	20.8 (1.08)	**18.0 (0.65)**
Total**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**

*According to the 2010 Census Unedited File.
**Weights may not sum to total due to rounding.
Sources: CFU Analysis Files, Person Matching File, and 2010 CUF

Among the Mod Q undercount people, 50.1 percent were identified as residents of the census address according to the Mod Q probes and were found only at that census address. This means these people were counted correctly and production CFU was successful for these people. On the other hand, 8.9 percent of Mod Q undercount people were identified as residents of the census address according to the Mod Q probes but not counted elsewhere in the 2010 Census according to the 2010 CUF. These people were potentially missed from the 2010 Census and should have been added during the CFU

interview. Updating the probes in the future based on this research will hopefully help to identify these missed people.

An estimated 19.1 percent of the Mod Q undercount people would not have been added to the HU roster and were found at the census address. These people should not be counted in these HUs and should be moved to where they live and stay most of the time. If this address cannot be ascertained then it is best to keep people as residents of the census addresses. An estimated 18.0 percent of the Mod Q undercount people would not have been added to the HU roster but were not found on the 2010 CUF. These people should have been counted at another address. Updating probes in the future to solicit address information for other addresses the person stays could potentially lead to that person being added to another HU and a more accurate 2010 Census count.

Of the people matched both to the person-matching file and to the 2010 CUF, the most productive Mod Q undercount people appear to come from UC – Temporary. An estimated 11.4 percent of the total 420,531 people represented in the UC – Temporary category would have been residence coded as residents and were not enumerated anywhere in the 2010 Census. Shown below, in Table 76, are the same counts by form type.

Table 76: Mod Q Undercount People Where They Were Enumerated* by Form Type

Where	Mod Q Undercount People (Form Type)						
	Respondent Provided			Enumerator Provided			
	MO/MB English (Std. Error) N=357,938 (913.31)	MO/MB Experimental (Std. Error) N=1,989 (267.87)	MO/MB Bilingual (Std. Error) N=25,086 (2,090.07)	TQA (Std. Error) N=60 (0.00)	NRFU (Std. Error) N=736,661 (6,483.76)	U/E (Std. Error) N=6,679 (2,531.21)	**Total** (Std. Error) N=1,128,413 (7,329.42)**
Residents	**57.4 (0.05)**	**69.2 (11.83)**	**55.8 (1.70)**	**0.0 (0.00)**	**61.8 (0.77)**	**54.6 (6.44)**	**60.3 (0.50)**
Census Address	40.9 (0.97)	55.6 (6.02)	37.6 (3.54)	0.0 (0.00)	55.0 (0.39)	46.3 (7.19)	**50.1 (0.39)**
Different MAFID	0.9 (0.08)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.3 (0.04)	0.0 (0.00)	**0.5 (0.04)**
More Than One Place	0.9 (0.04)	0.0 (0.00)	0.2 (0.23)	0.0 (0.00)	0.8 (0.26)	4.3 (1.86)	**0.8 (0.17)**
Not at All	14.7 (0.14)	13.6 (9.49)	18.0 (0.87)	0.0 (0.00)	5.9 (0.19)	4.0 (3.96)	**8.9 (0.15)**
Non-Residents	**42.6 (0.05)**	**30.8 (11.83)**	**44.1 (1.70)**	**100.0 (0.00)**	**38.2 (0.77)**	**45.4 (6.44)**	**39.7 (0.50)**
Census Address	12.7 (0.32)	11.6 (10.12)	15.0 (3.94)	0.0 (0.00)	22.3 (0.09)	29.5 (7.62)	**19.1 (0.15)**
Different MAFID	3.4 (0.31)	0.0 (0.00)	2.4 (0.72)	0.0 (0.00)	1.0 (0.01)	2.3 (2.29)	**1.8 (0.10)**
More Than One Place	0.8 (0.13)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.9 (0.07)	3.1 (3.08)	**0.9 (0.07)**
Not at All	25.8 (1.29)	19.2 (6.65)	26.8 (1.76)	100.0 (0.00)	14.1 (0.81)	10.5 (7.03)	**18.0 (0.65)**
Total**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**

*According to the 2010 Census Unedited File.

**Weights may not sum to total due to rounding.

Sources: CFU Analysis Files, Person Matching File, and 2010 CUF

When shown by form type, Mod Q would have added more residents without causing duplication in cases originally enumerated from respondent provided returns than from enumerator provided returns. An estimated 14.7 percent of the total 357,938 people from MO/MB English forms and 5.9 percent of the total 736,661 people from the NRFU operation would be new HU additions without causing duplication in the final 2010 Census counts.

5.2.2 Mod Q Overcount

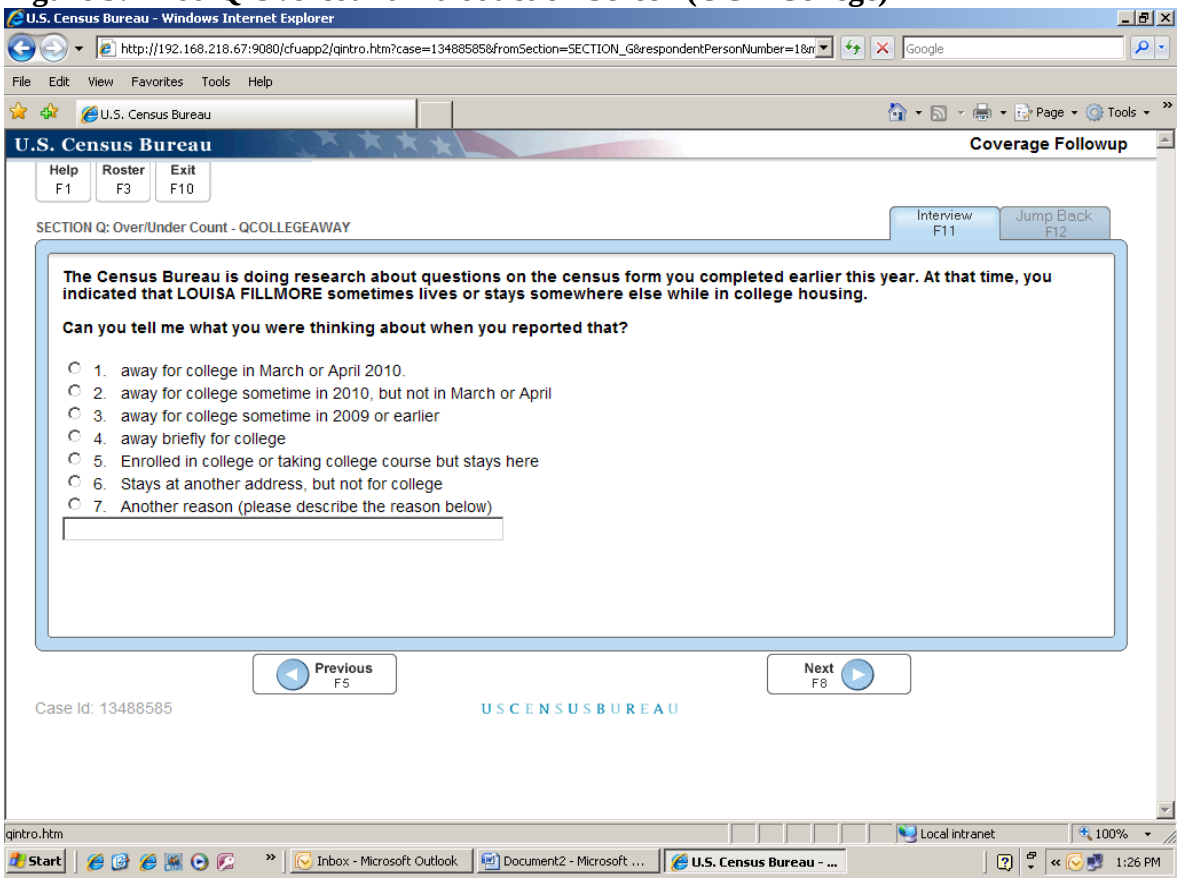
As mentioned before, the CFU interview was developed to capture missing roster members, to identify potentially erroneously enumerated roster members, and to capture missing demographic data for the roster members. Whether the household was flagged for potential undercounted or overcounted people, the CFU interview was the same. If a respondent marked an overcount category on the initial 2010 Census return but then failed to identify the potentially overcounted person during the interview, then the case went to Mod Q. In this experimental module, the respondents were probed as to why that particular person was not mentioned for their particular overcount reason. In Mod Q overcount, a series of questions was asked to the respondent to probe the thought process of the respondent when an overcount category was marked on the initial 2010 Census return but was not reported during the CFU interview. The overcount coverage issue types included in the CFU interview and eligible for Mod Q were:

- OC – College
- OC – Nursing Home
- OC – Jail/Prison
- OC – Military
- OC – Seasonal
- OC – Child Custody
- OC – Another Reason

The overcount probes in the traditional CFU interview were located in Module F, or Mod F. The questions in Mod F focused on all coverage issues, asking the respondent if there was anyone in the household that had those coverage issues. Conversely, Mod Q focused on the specific household member with the coverage issue, asking for the thought process leading to the overcount category being marked on the initial 2010 Census return.

First, the living situations of the suspected overcounted people were gathered. Knowing when and how long a person stayed at an address determined where that person should be counted. Below, in Figure 5, shows an example of the question and selectable answers for the first overcount question for the OC – College case type.

Figure 5: Mod Q Overcount Introduction Screen (OC – College)



Response category one through response category six focused on where the overcounted person was staying during or around the time of Census Day. The main goal of the response categories was to gather when the overcounted person stayed at the census address from the initial 2010 Census return, and when was the person away from the census address to see where they should be counted based on the Census Bureau's residence rule. Most of the questions in the traditional CFU interview focused on time being the catalyst to either delete the suspected overcounted person from the roster, or leave them enumerated at the census address. Time was not mentioned on the paper form (or initial 2010 Census return) but was referenced during the CFU interview. As a result, time was the one difference that could explain why a respondent would mention a coverage issue on the paper form but not identify the same coverage issue during the interview. Similarly, time was the original focal point of developing parallel probes in Mod Q. The seventh response category was an open-ended write-in field. This response was used to record a response that was not time-based, asking the reason for which the overcount category was selected for the roster member. Gathering responses about the reasons why the roster member was selected for potential deletion may lead to changes in the probe questions used in the CFU interview that determine if a person should be enumerated at the HU. Unfortunately, the purpose of the write-in field may not have been clear to the CFU interviewer. The majority of usable data acquired from the write-in fields were reiterations of the overcount coverage issue.

Below in Table 77, are the counts of people who were away in March or April 2010, away for a brief moment of time, away sometime in 2010 but not in March or April, stayed at another address, away in 2009 or earlier, stayed at the census address, another reason, did not know, or refused to answer the question. "Stays at the census address" was selected if the reason for overcount was accurate but the suspected overcounted person only stayed at the census address (for example, a person could be enrolled in college or took college courses but only stayed at the census address). "Another Reason" was selected if the respondent felt that none of the categories matched their living situation. Although mostly a reiteration of the coverage issue, a flag was set when the CFU interviewer felt that the respondents' answer did not match one of the categories available.

Table 77: Mod Q Overcount People Living Situations by Source of Coverage Issue

Living Situation	Mod Q Overcount People (Overcount Coverage Issue)							
	OC – College (Std. Error) N=125,942 (1,370.09)	OC – Military (Std. Error) N=406,448 (7,037.89)	OC – Jail (Std. Error) N=80,810 (946.47)	OC – Nursing Home (Std. Error) N=86,615 (1,867.79)	OC – Child Custody (Std. Error) N=551,752 (7,530.38)	OC – Seasonal (Std. Error) N=1,650,310 (13,657.27)	OC – Another Reason (Std. Error) N=1,913,878 (4,530.06)	**Total* (Std. Error) N=4,815,754 (30,808.47)**
Away in March or April 2010	9.7 (0.58)	4.1 (0.45)	24.3 (0.69)	18.0 (0.43)	12.7 (0.14)	5.0 (0.17)	2.7 (0.02)	**5.6 (0.07)**
Away briefly	3.0 (0.21)	7.9 (1.08)	5.0 (0.15)	6.6 (0.41)	19.6 (0.47)	7.2 (0.04)	9.6 (0.21)	**9.5 (0.15)**
Away sometime in 2010**	6.9 (0.17)	10.6 (1.07)	8.1 (0.87)	6.6 (0.57)	5.1 (0.09)	6.1 (0.05)	4.3 (0.16)	**5.7 (0.11)**
Stays at another address	2.3 (0.19)	0.9 (0.25)	1.4 (0.26)	2.2 (0.27)	1.5 (0.24)	8.8 (0.17)	9.7 (0.13)	**7.2 (0.04)**
Away in 2009 or earlier	17.1 (0.44)	18.5 (0.54)	11.1 (0.19)	10.4 (0.37)	1.8 (0.04)	2.5 (0.23)	2.8 (0.06)	**4.5 (0.11)**
Stays here	7.8 (0.33)	12.3 (0.67)	10.3 (0.27)	10.9 (0.60)	4.3 (0.13)	7.8 (0.20)	8.4 (0.09)	**8.1 (0.09)**
Another Reason	49.5 (0.43)	44.1 (0.74)	36.2 (0.53)	41.8 (0.64)	53.8 (0.50)	60.3 (0.48)	60.6 (0.18)	**57.3 (0.21)**
Don't Know	3.4 (0.16)	1.4 (0.46)	3.1 (0.40)	3.1 (0.30)	1.0 (0.06)	1.9 (0.06)	1.8 (0.04)	**1.8 (0.07)**
Refused	0.3 (0.12)	0.3 (0.06)	0.5 (0.11)	0.3 (0.05)	0.3 (0.01)	0.4 (0.07)	0.2 (0.05)	**0.3 (0.04)**
Total*	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding

Source: CFU Analysis Files

"Stays Here" was the most direct option in determining that a potentially overcounted person should remain a resident of the HU. An estimated 8.1 percent of the Mod Q overcount people reported "Stays Here." By identifying why they did not delete someone we either learn that the CFU followup on these cases was done correctly or that the respondents were thinking about a different time period than what was probed. An estimated 12.3 percent of the total 406,448 people from OC – Military reported "Stays Here." That was the highest percentage per overcount coverage issue thus being the least effective in identifying missed overcounted people. "Away in 2009 or earlier" also suggested that the potential overcounted person remain a resident and that the respondent was thinking about a different time period than what was probed. The highest percentage per coverage issue that marked this answer was that of OC – Military with 18.5 percent of the total 406,448 people remaining a resident of the HU. Updates to the overcount coverage probes on the initial questionnaire to include emphasis on the time period around Census Day would help in reducing the overcount workload to exclude potentially overcounted people that would not be removed from the HU in followup, according to the Census Bureau's residence rule.

"Away in March or April 2010" was the most specific of the possible answers for this coverage probe for potentially deleting a roster member. An estimated 24.3 percent of the total 80,810 people for OC – Jail were away from the census address in March or April 2010 and had the highest percentage per overcount coverage problem to select this. The lowest was that of the vague coverage issue, OC – Another Reason, with only 2.7 percent of the total 1,913,878 people away in March or April.

The highest percentage per overcount coverage issue that selected "Away Briefly" was that of OC – Child Custody with 19.6 percent of the total 551,752 people. "Away Sometime in 2010 but not March or April" was dominated by OC – Military with 10.6 percent of the total 406,448 people selecting this answer.

Respondents selected the open-ended write-in field answer "Another Reason" 57.3 percent of the time. Several factors could contribute to this. One is that the six selectable answers preceding "Another Reason" did not fit the overcounted roster member's living situation. Another factor was the lack of familiarity of the telephone enumerator with the experimental module. It was not often that an interviewer saw the probes of Mod Q and thus was not used to the dynamic of the questions being asked. During the traditional CFU interview, verbatim reading of the questions and direct, accurate selection of answers, without personal thought as to what answer "should be selected", was practiced, stressed, and graded. Mod Q probes required the CFU interviewer to think about the answers given by the respondent, and to match the closest selection to the answer even if the respondent did not say the exact words for the correct answer. The CFU interviewers were trained not to lead the respondent to an answer. The attempt was to solicit valuable information that could potentially lead to more productive

coverage probes in the future. Unfortunately, the majority of usable data within "Another Reason" living situation write-in fields were reiterations of the original coverage issues[19].

If a respondent reported that a household member was away in March or April 2010, away sometime in 2010 but not in March or April, away briefly, or stays at another address then, according to the Census Bureau's residence rule, the household member is potentially overcounted in the household and more information must be gathered. Information such as address information and where the potentially overcounted household member spent most of their time was collected in order to determine whether the person should be removed from the HU roster. Collection of the addresses allowed for person matching across households to track where that person was counted in the 2010 Census to prevent duplication. Once the addresses were collected, they were sent to GEO to attempt to match/geocode the addresses to the Master Address File/Topologically Integrated Geographic Encoding and Referencing database (MTdb) through automated address matching. A full address increased the likelihood of matching to an address on the MTdb. Below are counts of the people who gave a full address, partial address, did not know the address, or refused to give the address.

Full address and partial address was dependent upon the style of address captured. An address was categorized as a full address if the respondent gave a house number, street name, city name, state, and zip code for a city-style address. For rural addresses and P.O. Boxes, the street name, city name, state, and zip code were required to be considered a full address. An address was categorized as a partial address if one or more of the above mentioned address fields, but not all, were missing. For example, if a respondent gave the city name, state, and zip code of their summer home, this was considered a partial address. If all address fields are blank, then the address was categorized as "blank." If all fields were "Don't Know" or "Refused" then the address was categorized as "Don't Know" or "Refused", respectively. There were no instances of mixed address categories for a person. Table 78 below shows the counts of the potentially overcounted household members that the respondent gave full addresses, partial addresses, did not know the address, or refused to give the address to the enumerator.

Note: There were 183 cases in this analysis that did not have an address style (city-style, P.O. box, or rural route) flag set. Full and partial addresses were categorized by the presence of a street name, city name, state, and zip code, similar to a rural address or P.O. box. These cases included 10 full addresses, 13 partial addresses, 153 blank address fields, and 7 "don't know" responses to the address question. They are included in the tables below.

[19] The "Another Reason" living situation write-in fields were not coded as a result of time constraints and may be included in future analyses.

Table 78: Mod Q Overcount People Who Reported They Were Away by Other Address Answer Provided**

Provided Other Address	Mod Q Overcount People Who Reported they Were Away** (Std. Error)	Percent (Std. Error)
Full Address	513,397 (5,715.42)	38.1 (0.16)
Partial Address	713,900 (5,381.32)	52.9 (0.33)
Blank	7,528 (274.24)	0.6 (0.02)
Don't Know	103,195 (3,468.93)	7.6 (0.22)
Refused	11,065 (900.93)	0.8 (0.07)
Total Selected	**1,349,086 (11,728.84)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding
**Selection included those who reported being 'Away in March or April 2010', 'Away briefly', 'Away sometime in 2010 but not March or April', and 'Stays at another address' in the previous question[20].
Source: CFU Analysis Files

An estimated 38.1 percent of the selected Mod Q overcount people gave a full address that we could then attempt to match to a MAFID matched to an address in the MTdb. After the address information was collected, the respondent was further probed on where the potentially overcounted person spent most of the time in March and April 2010. According to the Census Bureau's residence rule, where a person was living most of the time on and around Census Day helped dictate where that person should be counted in the 2010 Census. In Table 79 are the counts of the select overcounted people that spent most of the time at the census address, another address, both places equally, don't know, or refused to answer the question. Also included below are counts of cases that were not asked the question and thus have missing values for the answer.

[20] The matching and geocoding of solicited addresses in Mod Q overcount were used to determine if these people were found on the 2010 CUF in those addresses. This analysis was included in Section 5.3.3 (Geocoding Results) in the 'Mod Q Overcount' rows.

Table 79: Select Mod Q Overcount People by Where They Spent Most of the Time by Source of Coverage Issue**

Where	Select** Mod Q Overcount							
	OC – College (Std. Error) N=27,575 (1,820.32)	OC – Military (Std. Error) N=95,433 (1,753.83)	OC – Jail (Std. Error) N=31,375 (847.44)	OC – Nursing Home (Std. Error) N=29,049 (927.73)	OC – Child Custody (Std. Error) N=214,702 (708.43)	OC – Seasonal (Std. Error) N=448,252 (3,788.80)	OC – Another Reason (Std. Error) N=502,699 (7,336.23)	**Total (Std. Error) N=1,349,086 (11,728.84)**
Census Address	48.1 (0.49)	85.9 (0.17)	44.5 (0.63)	42.7 (1.75)	81.9 (0.51)	69.0 (0.29)	63.1 (0.15)	**68.5 (0.14)**
Other Place	33.3 (1.20)	5.9 (0.90)	43.8 (1.50)	43.9 (1.51)	1.8 (0.09)	14.6 (0.22)	17.9 (0.14)	**14.9 (0.11)**
Both Places Equally	16.6 (1.29)	6.8 (0.86)	8.1 (0.51)	10.0 (0.30)	15.6 (0.41)	14.9 (0.44)	17.3 (0.11)	**15.1 (0.14)**
Don't Know	0.3 (0.25)	0.3 (0.09)	1.8 (0.17)	1.7 (0.36)	0.1 (0.00)	0.3 (0.05)	0.9 (0.08)	**0.6 (0.02)**
Refused	0.2 (0.15)	0.1 (0.10)	0.0 (0.00)	0.0 (0.00)	0.0 (0.02)	0.1 (0.04)	0.1 (0.03)	**0.1 (0.01)**
Missing	1.5 (0.15)	1.0 (0.18)	1.7 (0.52)	1.8 (0.35)	0.6 (0.06)	1.0 (0.11)	0.7 (0.17)	**0.9 (0.04)**
Total	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding

**Selection included 'Away in March or April 2010', 'Away briefly', 'Away sometime in 2010 but not March or April', and 'Stays at another address'.

Source: CFU Analysis Files

According to the Census Bureau's residence rule, in order to be removed from a HU a person must stay at another HU most of the time or in a GQ on April 1, 2010. The answer "Other Place" represents this scenario. The highest percentages per coverage issue that selected "Other Place" was that of OC – Nursing Home (with 43.9 percent of the total 29,049 OC – Nursing Home people) and OC – Jail (with 43.8 percent of the total 31,375 OC – Jail people). People selecting "Census Address" would remain on the HU roster thus not being a person to followup on for overcount. An estimated 85.9 percent of the total 95,433 OC – Military people and 81.9 percent of the total 214,702 OC – Child Custody people would be determined to be residents of the HUs and not removed from the HU rosters. Table 80 has the same counts as above shown by form type.

Table 80: Select Mod Q Overcount People Form Types by Where They Spent Most of the Time**

Where Spent Most of the Time	Select** Mod Q Overcount							
	Respondent Provided				Enumerator Provided			
	MO/MB English (Std. Error) N=1,075,125 (10,714.26)	MO/MB Experimental (Std. Error) N=13,345 (1,415.91)	MO/MB Bilingual (Std. Error) N=67,020 (1,409.81)	MO/MB Fulfillment (Std. Error) N=124 (92.23)	TQA (Std. Error) N=390 (202.93)	NRFU (Std. Error) N=188,891 (4,324.59)	U/E (Std. Error) N=4,191 (161.61)	**Total* (Std. Error) N=1,349,086 (11,728.84)**
Census Address	68.4 (0.04)	77.9 (2.88)	66.1 (2.50)	87.3 (27.66)	24.0 (1.56)	69.4 (0.03)	60.8 (2.45)	**68.5 (0.14)**
Other Place	14.4 (0.12)	10.8 (0.78)	13.3 (0.36)	12.7 (27.46)	57.1 (11.64)	18.2 (0.34)	21.9 (1.77)	**14.9 (0.11)**
Both Places Equally	15.8 (0.03)	9.1 (3.42)	19.3 (2.28)	0.0 (0.00)	19.0 (10.08)	10.2 (0.49)	15.3 (1.88)	**15.1 (0.14)**
Don't Know	0.5 (0.00)	0.6 (0.50)	0.6 (0.34)	0.0 (0.00)	0.0 (0.00)	0.7 (0.02)	0.0 (0.00)	**0.6 (0.02)**
Refuse	0.1 (0.01)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.1 (0.02)	0.0 (0.00)	**0.1 (0.01)**
Missing	0.8 (0.04)	1.7 (0.73)	0.7 (0.20)	0.0 (0.00)	0.0 (0.00)	1.5 (0.09)	2.0 (1.20)	**0.9 (0.04)**
Total*	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding

**Selection included 'Away in March or April 2010', 'Away briefly', 'Away sometime in 2010 but not March or April', and 'Stays at another address'.

Source: CFU Analysis Files

The Mod Q overcount people were those that stayed in another address most of the time and would be deleted from the HU roster. An estimated 57.1 percent of the total 390 representative overcount people from TQA selected "Other Place". For "Other Place", the coverage issue with the next highest percent per coverage issue was U/E with 21.9 percent of the total 4,191 people that would be deleted from the HU roster. Mod Q overcount people that reported they stayed in the census address most of the time would remain on the HU roster. An estimated 87.3 percent of the total 124 overcount people from MO/MB Fulfillment selected "Census Address" and would remain on the HU roster. Overall, only 14.9 percent of the selected Mod Q overcount people would be deleted from the HU roster.

The Census Bureau's residence rule was applied to the Mod Q overcount universe to determine how many of the people would be removed from the HU. Below in Table 81, "Non-Residents" are the cases that would have been residence coded to be removed from the HU roster if Mod Q was a part of the CFU production universe. If residency could not be established, then the person would remain a resident of the HU.

Table 81: Mod Q Overcount People by Whether Resident or Non-Resident as a Result of Residence Coding

Potential Residence Coding Outcome	Mod Q Overcount People (Std. Error)	Percent (Std. Error)
Residents	4,396,469 (5,303.35)	91.3 (0.04)
Non-Residents	419,285 (1,785.84)	8.7 (0.04)
Total*	**4,815,754 (4,504.01)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding.
Source: CFU Analysis Files

The Mod Q overcount universe was matched against the rest of the 2010 Census returns using Duplicate People Identification (DPI) process to develop the 2010 Duplication File. The 2010 Duplication File consists of person records that were linked to other person records which have been determined to be the same person. They were not matched against other people within the same HU thus there are no within HU links on the 2010 Duplication File. After merging the Mod Q overcount people to the 2010 Duplication File, the returns were then merged to the 2010 CUF to determine if and where those roster members were counted in the 2010 Census. Please note that the 2010 Duplication File was created from 2010 Census returns that were eligible for CFU, thus the file was created prior to CFU and could not be used to match captured Mod Q undercount people found during CFU. A separate matching occurred for the Mod Q undercount. Table 82 shows the counts of where the Mod Q overcount people were enumerated by source of coverage issue.

Table 82: Mod Q Overcount People Where They Were Enumerated by Source of Coverage Issue**

Where They Were Enumerated	Mod Q Overcount People							
	OC – College (Std. Error) N=125,942 (2,452.59)	OC – Military (Std. Error) N=406,448 (6,343.83)	OC – Jail (Std. Error) N=80,810 (202.42)	OC – Nursing Home (Std. Error) N=86,615 (1,619.30)	OC – Child Custody (Std. Error) N=551,752 (5,004.85)	OC – Seasonal (Std. Error) N=1,650,310 (4,014.84)	OC – Another Reason (Std. Error) N=1,913,878 (13,015.86)	**Total* (Std. Error) N=4,815,754 (4,504.01)**
Residents	**75.6 (0.61)**	**80.1 (1.01)**	**71.9 (0.90)**	**74.9 (0.30)**	**97.5 (0.12)**	**93.6 (0.21)**	**92.5 (0.30)**	**91.3 (0.04)**
Census Address	62.5 (0.39)	75.0 (0.86)	57.9 (1.09)	48.4 (0.51)	63.7 (0.20)	63.5 (0.23)	51.7 (0.23)	**59.4 (0.09)**
Different MAFID	0.7 (0.14)	0.2 (0.02)	0.5 (0.04)	7.6 (0.25)	1.5 (0.04)	1.4 (0.08)	2.3 (0.06)	**1.7 (0.04)**
More Than One Place	10.4 (0.37)	3.5 (0.23)	12.1 (0.40)	9.5 (0.92)	27.6 (0.32)	25.8 (0.25)	35.1 (0.28)	**26.9 (0.09)**
Not at All	2.1 (0.08)	1.4 (0.16)	1.4 (0.06)	9.4 (0.21)	4.7 (0.26)	2.9 (0.13)	3.4 (0.14)	**3.2 (0.10)**
Non-Residents	**24.4 (0.61)**	**19.9 (1.01)**	**28.1 (0.90)**	**25.1 (0.30)**	**2.5 (0.12)**	**6.4 (0.21)**	**7.5 (0.30)**	**8.7 (0.04)**
Census Address	18.1 (0.92)	19.1 (0.98)	18.1 (0.42)	10.4 (0.33)	1.3 (0.04)	3.7 (0.19)	3.5 (0.20)	**5.4 (0.03)**
Different MAFID	0.4 (0.03)	0.0 (0.00)	0.5 (0.15)	6.3 (0.33)	0.1 (0.01)	0.1 (0.02)	0.3 (0.01)	**0.3 (0.01)**
More Than One Place	4.6 (0.24)	0.5 (0.17)	8.5 (0.40)	2.4 (0.15)	1.0 (0.07)	2.5 (0.02)	3.3 (0.04)	**2.6 (0.02)**
Not at All	1.4 (0.12)	0.2 (0.16)	1.0 (0.09)	6.0 (0.39)	0.1 (0.00)	0.1 (0.01)	0.3 (0.06)	**0.4 (0.03)**
Total*	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding
**According to the 2010 Census Unedited File.
Sources: CFU Analysis Files, Duplication File, and 2010 CUF

Among the Mod Q overcount people, 5.4 percent were identified as non-residents of the census address according to the Mod Q probes but were only found in the census address on the 2010 CUF. This means that had these people been removed during the production CFU interview they would not have been counted in the 2010 Census. On the other hand, 2.6 percent of Mod Q overcount people were identified as non-residents of the census address according to the Mod Q probes and counted in more than one place in the 2010 Census according to the 2010 CUF. These people were duplicated in the 2010 Census and would have been removed during the CFU interview thus resolving the duplication. Updating the probes in the future based on this research will hopefully help to identify these duplicated people. An estimated 0.3 percent of the Mod Q overcount people were identified as non-residents and were found in a different MAFID on the 2010 CUF. These people were enumerated in the correct HU. An estimated 0.4 percent of the Mod Q overcount people were identified as non-residents and were not found at all on the 2010 CUF. These people should have been added to the other HU that the person stayed.

An estimated 59.4 percent of the Mod Q overcount people would have remained residents of the HU roster and were found at the census address on the 2010 CUF. These people were counted where they should be and production CFU was successful for these people. An estimated 26.9 percent of the Mod Q overcount people would have remained residents of the HU roster but were found in more than one place on the 2010 CUF. These people should have been counted at another address and should have been removed from the other HUs. An estimated 3.2 percent of the Mod Q overcount people would have remained residents of the HU and were not found on the 2010 CUF. These people should be counted at the census address.

An estimated 8.5 percent of the total 80,810 people in OC – Jail would have been deleted from the HU roster and was counted in the 2010 Census at "More Than One Place." Adding the more direct Mod Q probes to the CFU interview would reduce the most duplication within the OC – Jail coverage issue. An estimated 35.1 percent of the total 1,913,878 OC – Another Reason people, 27.6 percent of the total 551,752 OC – Child Custody people, and 25.8 percent of the total 1,650,310 OC – Seasonal people were duplicated and should remain residents of the HU in CFU and removed from the other HU in the 2010 Census.

Table 83 shows the counts of where the Mod Q overcount people were enumerated by form type.

Table 83: Mod Q Overcount People Where They Were Enumerated by Form Type**

Where They Were Enumerated	Mod Q Overcount People								
	Respondent Provided					Enumerator Provided			
	MO/MB English (Std. Error) N=3,737,075 (4,156.44)	MO/MB Experimental (Std. Error) N=54,556 (1,448.73)	MO/MB Bilingual (Std. Error) N=237,802 (495.95)	MO/MB Fulfillment (Std. Error) N=823 (231.89)	U/L – English Stateside (Std. Error) N=34 (0.00)	TQA (Std. Error) N=1,329 (444.43)	NRFU (Std. Error) N=768,749 (321.49)	U/E (Std. Error) N=15,385 (557.45)	**Total* (Std. Error) N=4,815,754 (4,504.01)**
Residents	**92.5 (0.03)**	**94.3 (1.12)**	**92.6 (0.28)**	**98.2 (1.41)**	**100.0 (0.00)**	**83.3 (11.63)**	**84.7 (0.17)**	**90.1 (0.77)**	**91.3 (0.04)**
Census Address	57.0 (0.11)	70.7 (0.61)	56.6 (0.39)	80.9 (4.34)	100.0 (0.00)	59.5 (1.90)	71.0 (0.20)	69.5 (0.23)	**59.4 (0.09)**
Different MAFID	1.8 (0.05)	5.1 (0.74)	2.0 (0.20)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	1.1 (0.07)	0.7 (0.53)	**1.7 (0.04)**
More Than One Place	30.6 (0.09)	7.1 (1.00)	30.2 (1.00)	13.1 (8.80)	0.0 (0.00)	16.8 (0.04)	9.3 (0.05)	18.7 (2.02)	**26.9 (0.09)**
Not at All	3.1 (0.13)	11.3 (1.47)	3.8 (0.53)	4.1 (3.05)	0.0 (0.00)	7.0 (9.69)	3.3 (0.08)	1.2 (0.49)	**3.2 (0.10)**
Non-Residents	**7.5 (0.03)**	**5.7 (1.12)**	**7.4 (0.28)**	**1.9 (1.41)**	**0.0 (0.00)**	**16.8 (11.63)**	**15.3 (0.17)**	**9.9 (0.77)**	**8.7 (0.04)**
Census Address	4.1 (0.01)	3.6 (0.66)	4.2 (0.31)	0.0 (0.00)	0.0 (0.00)	5.6 (3.86)	12.3 (0.11)	6.8 (0.70)	**5.4 (0.03)**
Different MAFID	0.3 (0.01)	0.3 (0.33)	0.2 (0.02)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.4 (0.03)	1.2 (0.43)	**0.3 (0.01)**
More Than One Place	2.8 (0.00)	1.1 (0.02)	2.8 (0.10)	1.9 (1.41)	0.0 (0.00)	11.2 (7.77)	1.7 (0.10)	1.3 (0.55)	**2.6 (0.02)**
Not at All	0.3 (0.03)	0.7 (0.12)	0.2 (0.05)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.8 (0.02)	0.7 (0.50)	**0.4 (0.03)**
Total*	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**	**100.0 (0.00)**

*Weights may not sum to total due to rounding
**According to the 2010 Census Unedited File.
Sources: CFU Analysis Files, Duplication File, and 2010 CUF

If an overcount person was found in the 2010 Census at "More Than One Address", then they were duplicated. Reducing duplication is the primary focus of overcount probing. If a person can be found to be a "Non-Resident" in Mod Q overcount, this can reduce duplication. An estimated 11.2 percent of the total 1,329 Mod Q overcount people originally enumerated in the TQA operation (the highest of all of the considered form types) were found to be in multiple addresses. An estimated 30.6 percent of the total 3,737,075 Mod Q overcount people initially enumerated in MO/MB English and 30.2 percent of the total 237,802 MO/MB bilingual people were found in more than one address and should be removed from the other HU the people were found in the 2010 Census.

Overall, 8.7 percent of the total 4,815,754 Mod Q overcount people should have been deleted from their HUs. An estimated 2.6 percent of the total overcount universe were found in "More Than One Place" and would have been deleted from the census address as a result of the Mod Q overcount probes. An estimated 26.9 percent of the total overcount universe was found in "More Than One Place" and would have remained residents of the HU in CFU. The people were counted in another address in the 2010 Census and would be removed from that other address if production CFU included Mod Q overcount probing. This would help in reducing duplication in the 2010 Census.

5.3 Evaluation of CFU Added and Deleted People

CFU interviewed HUs with coverage issues in order to determine who should be added to a HU roster and who should be removed. Many situations can arise when changing the rosters of HUs. It was possible that a person was added to a HU that was already on another HU roster, thus causing duplication in the 2010 Census. It was also possible that a person was deleted from a HU but was not enumerated anywhere else, thus missing this person from the 2010 Census altogether. The following analysis looks at people added and deleted in production CFU to see where these people were actually found (location of enumeration) in the final 2010 Census count as a result of the CFU interview. The locations were determined by the matching file and whether that return was found on the 2010 CUF.

5.3.1 CFU Added People

In CFU, a HU is probed for all undercount and overcount reasons regardless of the coverage issue that made it eligible for CFU. During the course of these undercount and overcount probes, HU members are added to or deleted from HUs. The reason a roster member is added or deleted may or may not have been the reason the HU was eligible for followup. Table 84 shows where the CFU added people were found on the 2010 CUF by the "missing" probe that triggered the addition of the person to the HU roster. Some of the probe categories were irretrievable for some added people due to looping within the interview and have been categorized as "Unknown" below.

Table 84: CFU Added People's Locations of Enumeration by "Missing" Probe Category

Missing Probe	Census Address Only	Different MAFID Only	More Than One Place	Not At All	**Total CFU Added People**
Infants or newborns (N=34,177)	93.3	0.1	6.6	0.1	**100.0**
Foster children (N=10,364)	92.7	0.0	7.2	0.0	**100.0**
Nonrelated children (N=12,288)	93.4	0.0	6.4	0.1	**100.0**
Relative (N=197,298)	88.2	0.1	11.6	0.1	**100.0**
Roommates (N=54,328)	92.7	0.1	7.1	0.1	**100.0**
Stays Often (N=30,768)	83.3	0.0	16.6	0.1	**100.0**
Temporary (N=7,411)	92.8	0.0	7.1	0.1	**100.0**
Unknown* (N=4,267)	94.9	0.0	4.9	0.2	**100.0**
Total (N=350,901)	**89.5**	**0.1**	**10.4**	**0.1**	**100.0**

*Due to looping within the interview, the probe category was irretrievable for some added people.
Source: CFU Analysis Files, Person Matching File, and 2010 CUF

A total of 350,901 people were added to HU rosters during the 2010 CFU operation. The probe that added the most people to HUs in CFU came from the "Relative" undercount probe which captured missing relatives of the respondent that were not listed on the initial 2010 Census return. If a person was added to a HU roster in CFU and was only found in that census address and nowhere else in the 2010 Census, then that person was added without causing duplication in the overall 2010 Census count. These people would not have been counted in the 2010 Census without CFU. This occurred for just under 90 percent of the added people. If a person was added to a roster and was found in more than one address in the 2010 Census, then the CFU interview likely caused duplication in the 2010 Census. The highest rates of duplication amongst the missing probes were from the "Relative" probe and the "Stays Often" probe. An estimated 11.6 percent of the total 197,298 people added from the "Relative" probe and 16.6 percent of the total 30,768 people added from the "Stays Often" probe caused duplication.

Below, in Table 85, are the counts of CFU added people's locations of enumeration by the source of coverage issue for which the HU was eligible for CFU.

Table 85: CFU Added People's Locations of Enumeration by Source of Coverage Issue

Source of Coverage Issue	Census Address	Different MAFID	More Than One Place	Not At All	**Total CFU Added People**
LHH (N=65,259)	**93.2**	**0.0**	**6.7**	**0.1**	**100.0**
CD (N=171,682)	**91.9**	**0.1**	**7.9**	**0.1**	**100.0**
High CD (N=28,607)	83.1	0.2	16.6	0.1	**100.0**
Low CD (N=143,075)	93.7	0.1	6.1	0.1	**100.0**
Undercount (N=145,897)	**88.6**	**0.0**	**11.3**	**0.1**	**100.0**
Children (N=25,403)	88.8	0.0	11.1	0.1	**100.0**
Relatives (N=43,546)	85.8	0.0	14.1	0.1	**100.0**
Nonrelatives (N=14,946)	90.9	0.0	9.0	0.1	**100.0**
Temporary (N=54,774)	89.6	0.0	10.3	0.1	**100.0**
Multiple (N=7,228)	92.9	0.0	6.9	0.1	**100.0**
Overcount (N=74,881)	**85.8**	**0.0**	**14.1**	**0.1**	**100.0**
College (N=11,874)	86.0	0.1	13.9	0.1	**100.0**
Military (N=5,615)	88.1	0.0	11.8	0.1	**100.0**
Jail/Prison (N=2,385)	86.3	0.0	13.6	0.1	**100.0**
Nursing Home (N=1,179)	80.4	0.0	19.4	0.2	**100.0**
Child Custody (N=4,316)	85.5	0.0	14.5	0.0	**100.0**
Seasonal (N=13,490)	82.6	0.1	17.2	0.1	**100.0**
Another Reason (N=15,223)	86.5	0.0	13.4	0.1	**100.0**
Person Multiple (N=2,781)	83.0	0.0	16.8	0.1	**100.0**
Household Multiple (N=10,559)	85.7	0.0	14.2	0.1	**100.0**
Yes Only (N=7,459)	90.0	0.0	10.0	0.1	**100.0**
AR (N=28,219)	**85.7**	**0.0**	**14.2**	**0.0**	**100.0**
Unduplicated Total* (N=350,901)	**89.5**	**0.1**	**10.4**	**0.1**	**100.0**

*Because the source of coverage issue categories are not mutually exclusive, the number of added people and the percent of added people do not sum to the total line.

Sources: CFU Analysis Files, Person Matching File, and 2010 CUF

The largest coverage issue group in the CFU added people universe was low CD with 143,075 people added to HU rosters. Low CD added the most people without causing duplication. An estimated 93.7 percent of all low CD people were added to a HU roster without being duplicated in the 2010 Census. The coverage issue that caused the most duplication was that of OC – Nursing Home with 19.4 percent of its added people at CFU being counted in multiple addresses in the 2010 Census. Table 86 shows the counts of CFU added people's locations of enumeration by the form type or operation that originally enumerated the HU.

Table 86: CFU Added People's Locations of Enumeration by Form Type

Form Type	Census Address	Different MAFID	More Than One Place	Not at All	**Total Added People**
Respondent Provided (N=311,783)	**89.8**	**0.0**	**10.1**	**0.1**	**100.0**
MO/MB – English (N=259,880)	89.4	0.0	10.5	0.1	**100.0**
MO/MB – Bilingual (N=44,092)	91.9	0.0	8.0	0.0	**100.0**
MO/MB – Fulfillment (N=1,190)	96.0	0.0	4.0	0.0	**100.0**
MO/MB – Experimental (N=2,214)	91.2	0.0	8.7	0.1	**100.0**
U/L -- English Stateside (N=23)	82.6	0.0	17.4	0.0	**100.0**
U/L -- Puerto Rico (N=4,384)	89.1	0.1	10.6	0.2	**100.0**
Enumerator Provided (N=39,118)	**87.2**	**0.2**	**12.4**	**0.2**	**100.0**
TQA (N=48)	95.8	0.0	4.2	0.0	**100.0**
NRFU (N=37,963)	87.2	0.2	12.4	0.2	**100.0**
U/E (N=1,107)	87.4	0.0	12.5	0.1	**100.0**
Total (N= 350,901)	**89.5**	**0.1**	**10.4**	**0.1**	**100.0**

Sources: CFU Analysis Files, Person Matching File, and 2010 CUF

Of the CFU added people, HUs originally enumerated on a MO/MB English form added the most people in CFU. An estimated 89.8 percent of the total 311,783 people from respondent provided forms and 87.2 percent of the total 39,118 people from enumerator provided operations were added to HUs without duplication. The following tables show the CFU added people's locations of enumeration for various demographic groups. Table 87 shows CFU added people's locations of enumeration by answers given to the sex question in CFU.

Table 87: CFU Added People's Locations of Enumeration by Sex

Sex	Census Address	Different MAFID	More Than One Place	Not at All	**Total Added People**
Male (N=176,794)	89.5	0.1	10.4	0.1	**100.0**
Female (N=169,731)	89.3	0.1	10.6	0.1	**100.0**
Both (N=0)	0.0	0.0	0.0	0.0	**100.0**
Missing (N=4,376)	97.2	0.0	2.6	0.2	**100.0**
Total (N=350,901)	**89.5**	**0.1**	**10.4**	**0.1**	**100.0**

Sources: CFU Analysis Files, Person Matching File, and 2010 CUF

There were slightly more males than females added to HUs during the CFU interview. An estimated 89.5 percent of the total 176,794 males and 89.3 percent of the total 169,731 females were added to HU in CFU without causing duplication. Table 88 shows CFU added people's locations of enumeration by answers given to the Hispanic origin question in CFU.

Table 88: CFU Added People's Locations of Enumeration by Hispanic Origin

Hispanic Origin	Census Address	Different MAFID	More Than One Place	Not at All	**Total Added People**
Not Hispanic or Latino checkbox only (N=257,216)	88.4	0.1	11.5	0.1	**100.0**
Mexican checkbox only (N=46,393)	92.6	0.1	7.3	0.1	**100.0**
Puerto Rican checkbox only (N=9,522)	88.9	0.1	10.9	0.2	**100.0**
Cuban checkbox only (N=1,429)	88.7	0.3	10.8	0.1	**100.0**
Another Hispanic checkbox only (N=247)	97.2	0.0	2.8	0.0	**100.0**
Multiple checkboxes (N=380)	90.0	0.3	9.7	0.0	**100.0**
Both Checkbox and Write-in (N=19,309)	92.3	0.0	7.5	0.1	**100.0**
Write-in Only (N=1,701)	92.1	0.0	7.8	0.1	**100.0**
Missing (N=14,704)	95.0	0.1	4.8	0.2	**100.0**
Total (N=350,901)	**89.5**	**0.1**	**10.4**	**0.1**	**100.0**

Sources: CFU Analysis Files, Person Matching File, and 2010 CUF

The majority of people added in CFU selected the Not Hispanic or Latino checkbox for Hispanic origin. An estimated 88.4 percent of the total 257,216 non-Hispanic people were added to HUs in CFU without causing duplication.

Amongst the people reporting a Hispanic origin, the largest group marked the "Mexican checkbox only". People selecting the "Another Hispanic checkbox only" were the least likely to cause duplication of the added CFU people. An estimated 97.2 percent of the total 247 added CFU people only marking "Another Hispanic checkbox only" were counted in the census address and was not duplicated in the 2010 Census. In addition, 2.8 percent of the added CFU people only marking "Another Hispanic checkbox only" were duplicated at another address, which is the lowest of all the Hispanic origin options. The most duplication of people reporting a Hispanic origin occurred amongst those selecting the "Puerto Rican checkbox only" with 10.9 percent of its total 9,522 people enumerated in more than one place in the 2010 Census. In Table 89 are the counts of CFU added people's locations of enumeration by the answers given to the race question in CFU.

Table 89: CFU Added People's Locations of Enumeration by Race

Race	Census Address	Different MAFID	More Than One Place	Not at All	**Total Added People**
White checkbox alone (N=184,791)	87.5	0.1	12.3	0.1	**100.0**
Black or African American checkbox alone (N=63,216)	90.0	0.0	9.8	0.1	**100.0**
American Indian and Alaska Native checkbox alone (N=791)	93.4	0.0	6.3	0.3	**100.0**
Asian Indian checkbox alone (N=4,385)	94.2	0.0	5.7	0.1	**100.0**
Chinese checkbox alone (N=5,650)	92.3	0.0	7.7	0.0	**100.0**
Filipino checkbox alone (N=3,712)	91.7	0.2	8.1	0.1	**100.0**
Japanese checkbox alone (N=984)	90.1	0.0	9.9	0.0	**100.0**
Korean checkbox alone (N=2,145)	94.2	0.1	5.6	0.1	**100.0**
Vietnamese checkbox alone (N=2,488)	92.9	0.0	7.0	0.0	**100.0**
Native Hawaiian checkbox alone (N=6,330)	92.7	0.2	7.0	0.2	**100.0**
Guamanian or Chamorro checkbox alone (N=106)	97.2	0.0	2.8	0.0	**100.0**
Samoan checkbox alone (N=272)	96.7	0.0	3.3	0.0	**100.0**
Other Asian checkbox alone (N=41)	95.1	0.0	4.9	0.0	**100.0**
Other Pacific Islander checkbox alone (N=9)	88.9	0.0	11.1	0.0	**100.0**
Some Other Race checkbox alone (N=939)	94.5	0.0	5.3	0.2	**100.0**
Multiple checkboxes (N=5,221)	90.5	0.0	9.5	0.0	**100.0**
Both Checkbox and Write-in (N=55,802)	92.0	0.1	7.8	0.1	**100.0**
Write-in Only (N=2)	100.0	0.0	0.0	0.0	**100.0**
Missing (N=19,714)	94.7	0.0	5.1	0.2	**100.0**
Total (N=350,901)	**89.5**	**0.1**	**10.4**	**0.1**	**100.0**

Source: CFU Analysis Files, Person Matching File, and 2010 CUF

Of the 350,901 people added in CFU, the majority marked the "White checkbox alone" followed by the "Black or African American checkbox only". An estimated 90.0 percent of CFU added people reported "Black or African American checkbox alone" were added to HUs in CFU without causing duplication in the 2010 Census. Duplication occurred

the most in the largest group; 12.3 percent of the total 184,791 CFU added "White checkbox alone" people were duplicated in other addresses in the 2010 Census. Table 90 shows the counts of CFU added people's locations of enumeration by collapsed age. The ages where calculated from valid birthdates given during the CFU interview.

Table 90: CFU Added People's Locations of Enumeration by Collapsed Age

Age in Years	Census Address	Different MAFID	More Than One Place	Not at All	**Total Added People**
Under 5 years (N=54,695)	92.1	0.0	7.8	0.1	**100.0**
5 to 9 years (N=25,699)	88.6	0.1	11.2	0.1	**100.0**
10 to 14 years (N=22,301)	87.4	0.1	12.4	0.1	**100.0**
15 to 19 years (N=34,212)	88.6	0.0	11.3	0.1	**100.0**
20 to 24 years (N=38,125)	88.2	0.0	11.7	0.1	**100.0**
25 to 29 years (N=26,586)	88.6	0.1	11.2	0.1	**100.0**
30 to 34 years (N=17,479)	89.8	0.1	10.0	0.1	**100.0**
35 to 39 years (N=14,120)	89.7	0.1	10.2	0.1	**100.0**
40 to 44 years (N=13,729)	89.8	0.1	10.1	0.1	**100.0**
45 to 49 years (N=14,338)	89.6	0.1	10.2	0.1	**100.0**
50 to 54 years (N=14,624)	89.6	0.1	10.2	0.1	**100.0**
55 to 59 years (N=12,654)	88.4	0.1	11.4	0.1	**100.0**
60 to 64 years (N=11,546)	88.7	0.1	11.2	0.1	**100.0**
65 and over years (N=35,640)	87.8	0.1	12.0	0.1	**100.0**
Missing (N=15,153)	95.7	0.0	4.1	0.1	**100.0**
Total (N=350,901)	**89.5**	**0.1**	**10.4**	**0.1**	**100.0**

*Percentages may not sum to 100 percent due to rounding

Sources: CFU Analysis Files, Person Matching File, and 2010 CUF

Children under 5 years old were the largest age group in the CFU added universe. This age group caused the fewest duplicates amongst CFU added people that gave a valid birthdate. An estimated 92.1 percent of the total 54,695 CFU added people reported an age under 5 years old were counted in that HU without being duplicated in another address in the 2010 Census. The 10 to 14 years age group caused the most duplication. An estimated 12.4 percent of the total 22,301 CFU added people in age group 10 to 14 years were also found at other addresses in the 2010 Census.

As previously stated, if a person was added to a HU roster in CFU and was only found in that census address and nowhere else in the 2010 Census, then that person was added without causing duplication in the overall 2010 Census count. People from HUs with a Low CD coverage issue, enumerated on MO/MB fulfillment forms or in the TQA operation, reported "Another Hispanic" origin, Guamanian or Chamorro race category, or under 5 years old caused the least duplication of added people in CFU. Those people had the highest rates of being counted only in the address CFU added them to and did not create duplication in the 2010 Census. If a person was added to a HU roster and was found in more than one address in the 2010 Census, then the CFU interview caused

duplication in the 2010 Census. People from HUs with an OC – Nursing Home coverage issue, enumerated in the U/L and U/E operations, reported Puerto Rican for Hispanic origin, white race category, or between the ages of 10 to 14 caused the most duplication. These people had the highest rates of being counted in more than one place in the 2010 Census and were duplicated as a result of followup.

A total of 350,901 people were added to HU rosters during the 2010 CFU operation. An estimated 89.5 percent of the total added people in CFU were counted in the HU to which CFU added them and no other address in the 2010 Census. These people were not duplicated as a result of the operation and would not have been counted if CFU did not followup on the HU. An estimated 10.4 percent of total added people in CFU were counted in more than one address causing duplication in the 2010 census.

5.3.2 CFU Deleted People

As mentioned previously, in CFU, a HU is probed for all undercount and overcount reasons regardless of the coverage issue that made it eligible for CFU. During the course of these undercount and overcount probes, HU members are added to or deleted from HUs. The reason a roster member was deleted may or may not have been the reason the HU was eligible for followup. Table 91 shows CFU deleted people's locations of enumeration by roster review and the CFU living situation probe that triggered the deletion of the person from the HU roster. During the CFU interview, the enumerator reviewed the roster with the respondent to see if there were people in the HU the respondent did not know or were listed more than once. Unknown roster members and duplicated people were deleted from the HU roster. Also, the counts of the living situations that led to a roster member being deleted are listed below.

Table 91: CFU Deleted People's Locations of Enumeration by Roster Review and CFU "Living Situation" Probe

Living Situation Probe	Census Address	Different MAFID	More Than One Place	Not At All	**Total CFU Deleted People**
Roster Review (N=157,523)	**0.0**	**6.3**	**0.2**	**93.5**	**100.0**
Unknown person (N=128,426)	0.0	7.4	0.2	92.4	**100.0**
Duplicated person (N=29,097)	0.0	1.4	0.0	98.5	**100.0**
College (N=656,757)	**0.0**	**48.9**	**0.3**	**50.8**	**100.0**
Child Custody (N=94,798)	**0.0**	**43.6**	**0.9**	**55.6**	**100.0**
Military[21] (N=74,155)	**0.0**	**8.5**	**0.1**	**91.4**	**100.0**
Job (N=37,899)	**0.0**	**21.6**	**0.6**	**77.8**	**100.0**
Seasonal or Second Home(N=102,560)	**0.0**	**50.9**	**1.6**	**47.5**	**100.0**
Other Address (N=81,740)	**0.0**	**32.3**	**0.8**	**66.8**	**100.0**
Group Quarters (N=37,104)	**0.0**	**40.8**	**0.6**	**58.6**	**100.0**
Movers (N=36,985)	**0.0**	**21.2**	**0.5**	**78.3**	**100.0**
Nonoverlapping Total* (N=1,235,096)	**0.0**	**37.9**	**0.4**	**61.7**	**100.0**

*Because the probe categories are not mutually exclusive, the number of deleted people and the percent of deleted people do not sum to the total line.

Sources: CFU Analysis Files, Duplication File, and 2010 CUF

A total of 1,235,096 people were deleted from HU rosters during the 2010 Census CFU operation. The probe that deleted the most people from HUs in CFU came from the "College" probe which deleted people that stayed at another address most of the time as a result of attending a college or university. If a person was deleted from a HU roster in CFU and was only found at a different address and nowhere else in the 2010 Census, then that person was originally duplicated, and as a result of CFU, the duplication was fixed for the overall 2010 Census count. If a person was deleted from a HU roster and was not found in any address then the CFU interview caused this person not to be counted at all in the 2010 Census. The living situation probe that caused the highest number of people being removed from the 2010 Census completely was that of the "Military" probe. An estimated 91.4 percent of the total 74,155 people deleted for mostly staying in military quarters were deleted completely from the 2010 Census and were not counted at all. "Seasonal or Second Home" and "College" deleted the most people that were only counted in one other address. An estimated 50.9 percent of the total 102,560 people deleted for "Seasonal or Second Home" and 48.9 percent of the total 656,757 people deleted for "College" were not duplicated in the 2010 Census as a result of CFU. Below, in Table 92, are the counts of CFU deleted people's locations of enumeration by the source of coverage issue for which the HU was eligible for CFU.

[21] This is in reference to the CFU probe for which the person was deleted from the HU; does not include military personnel living overseas.

Table 92: CFU Deleted People's Locations of Enumeration by Source of Coverage Issue

Source of Coverage Issue	Census Address	Different MAFID	More Than One Place	Not At All	**Total CFU Deleted People**
LHH (N=121,477)	**0.0**	**25.8**	**0.4**	**73.7**	**100.0**
CD (N=348,465)	**0.0**	**33.9**	**0.6**	**65.5**	**100.0**
High CD (N=326,754)	0.0	34.8	0.6	64.6	**100.0**
Low CD (N=21,711)	0.0	20.3	0.6	79.0	**100.0**
Undercount (N=219,601)	**0.0**	**27.6**	**0.5**	**72.0**	**100.0**
Children (N=36,461)	0.0	36.5	0.5	63.0	**100.0**
Relatives (N=14,972)	0.0	24.1	0.5	75.4	**100.0**
Nonrelatives (N=17,325)	0.0	14.7	0.4	84.9	**100.0**
Temporary (N=96,338)	0.0	26.2	0.4	73.4	**100.0**
Multiple (N=54,505)	0.0	29.0	0.6	70.4	**100.0**
Overcount (N=1,046,895)	**0.0**	**43.0**	**0.5**	**56.6**	**100.0**
College housing (N=569,687)	0.0	49.7	0.3	50.0	**100.0**
Military (N=68,486)	0.0	8.3	0.1	91.6	**100.0**
Jail or prison (N=3,474)	0.0	23.9	0.2	75.9	**100.0**
Nursing home (N=24,884)	0.0	46.9	0.4	52.7	**100.0**
Child custody (N=37,628)	0.0	51.3	0.7	47.9	**100.0**
Seasonal (N=76,019)	0.0	47.6	1.5	50.9	**100.0**
Another reason (N=51,195)	0.0	27.5	0.7	71.8	**100.0**
Person multiple (N=25,248)	0.0	34.0	1.0	65.0	**100.0**
Household multiple (N=171,627)	0.0	38.3	0.7	61.0	**100.0**
Yes Only (N=18,647)	0.0	24.8	0.5	74.6	**100.0**
AR (N=19,766)	**0.0**	**19.1**	**0.2**	**80.7**	**100.0**
Unduplicated Total* (N=1,235,096)	**0.0**	**37.9**	**0.4**	**61.7**	**100.0**

*Because the source of coverage issue categories are not mutually exclusive, the number of deleted people and the percent of deleted people do not sum to the total line.

Sources: CFU Analysis Files, Duplication File, and 2010 CUF

OC – Child Custody and OC – College cases deleted the most people while removing duplication from the 2010 Census. An estimated 51.3 percent of the total 37,628 people deleted from HUs with OC – Child Custody coverage issues and 49.7 percent of the total 569,687 people deleted from OC – College HUs were only found at one other address in the 2010 Census after being deleted from the CFU HU. The most concerning coverage issue was of HUs that deleted the most people completely from the 2010 Census. An estimated 91.6 percent of the total 68,486 deleted OC – Military people were not found in any address in the 2010 Census after being deleted in CFU. Table 93 shows the counts of CFU deleted people's locations of enumeration by form type.

Table 93: CFU Deleted People's Locations of Enumeration by Form Type

Form Type	Census Address	Different MAFID	More Than One Place	Not at All	**Total Deleted People**
Respondent Provided (N=1,123,754)	**0.0**	**39.4**	**0.5**	**60.1**	**100.0**
MO/MB – English (N=1,012,851)	0.0	41.6	0.5	58.0	**100.0**
MO/MB – Bilingual (N=98,829)	0.0	19.8	0.3	79.9	**100.0**
MO/MB – Fulfillment (N=916)	0.0	18.8	0.0	81.2	**100.0**
MO/MB – Experimental (N=3,975)	0.0	29.0	0.2	70.8	**100.0**
U/L -- English Stateside (N=75)	0.0	42.7	0.0	57.3	**100.0**
U/L -- Puerto Rico (N=7,108)	0.0	11.6	0.6	87.7	**100.0**
Enumerator Provided (N=111,342)	**0.0**	**22.5**	**0.3**	**77.2**	**100.0**
TQA (N=139)	0.0	32.4	0.0	67.6	**100.0**
NRFU (N=107,227)	0.0	22.2	0.3	77.5	**100.0**
U/E (N=3,976)	0.0	29.8	0.4	69.8	**100.0**
Total (N=1,235,096)	**0.0**	**37.9**	**0.4**	**61.7**	**100.0**

Sources: CFU Analysis Files, Duplication File, and 2010 CUF

Of the CFU deleted people, the majority were deleted from HUs originally enumerated on a MO/MB English form. An estimated 41.6 percent of the total 1,012,851 people deleted from HUs originally enumerated on MO/MB English forms were deleted while removing duplication from the 2010 Census. However, 58.0 percent of the people from MO/MB English forms were removed and not counted anywhere in the 2010 Census. Table 94 shows CFU deleted people's locations of enumeration by sex.

Table 94: CFU Deleted People's Locations of Enumeration by Sex

Sex	Census Address	Different MAFID	More Than One Place	Not at All	**Total Deleted People**
Male (N=615,700)	0.0	36.4	0.5	63.1	**100.0**
Female (N=568,691)	0.0	42.8	0.5	56.8	**100.0**
Both (N=1,728)	0.0	1.0	0.1	99.0	**100.0**
Missing (N=48,977)	0.0	1.0	0.0	99.0	**100.0**
Total (N=1,235,096)	**0.0**	**37.9**	**0.4**	**61.7**	**100.0**

Sources: CFU Analysis Files, Duplication File, 2010 CUF

There were slightly more males than females deleted from HUs during the CFU interview. An estimated 36.4 percent of the total 615,700 males and 42.8 percent of the total 568,691 females were deleted from HUs in CFU while removing duplication. Table 95 shows CFU deleted people's locations of enumeration by answers given to the Hispanic origin question in CFU.

Table 95: CFU Deleted People's Locations of Enumeration by Hispanic Origin

Hispanic Origin	Census Address	Different MAFID	More Than One Place	Not at All	**Total Deleted People**
Not Hispanic or Latino checkbox only (N=1,007,939)	0.0	42.9	0.5	56.6	**100.0**
Mexican checkbox only (N=58,872)	0.0	23.5	0.3	76.2	**100.0**
Puerto Rican checkbox only (N=20,891)	0.0	21.0	0.5	78.5	**100.0**
Cuban checkbox only (N=5,075)	0.0	26.4	0.5	73.1	**100.0**
Another Hispanic checkbox only (N=3,481)	0.0	21.2	0.3	78.5	**100.0**
Multiple checkboxes (N=2,589)	0.0	27.1	0.2	72.7	**100.0**
Both Checkbox and Write-in (N=40,655)	0.0	23.1	0.3	76.6	**100.0**
Write-in Only (N=11,317)	0.0	14.4	0.2	85.3	**100.0**
Missing (N=84,277)	0.0	3.8	0.1	96.2	**100.0**
Total (N=1,235,096)	**0.0**	**37.9**	**0.4**	**61.7**	**100.0**

Sources: CFU Analysis Files, Duplication File, and 2010 CUF

The majority of the CFU deleted universe reported "Not Hispanic or Latino checkbox only" for their response to the Hispanic origin question. Amongst the people reporting a Hispanic origin, the largest group marked the "Mexican checkbox only". People selecting the "Not Hispanic or Latino checkbox only" were least likely to be deleted from the 2010 Census. An estimated 42.9 percent of the total 1,007,939 deleted CFU people only marking the "Not Hispanic or Latino checkbox only" were counted only in one place after CFU thus removing duplication in the 2010 Census. An estimated 96.2 percent of the total 84,277 people that did not answer the Hispanic origin question in CFU were removed from the 2010 Census completely as a result of followup. Those reporting a Hispanic origin were more likely to not be counted at all in the 2010 Census as a result of the overcount probing of CFU. In Table 96 are the counts of CFU deleted people's locations of enumeration by the answers given to the race question in CFU.

Table 96: CFU Deleted People's Locations of Enumeration by Race

Race	Census Address	Different MAFID	More Than One Place	Not at All	**Total Deleted People**
White checkbox alone (N=835,996)	0.0	43.6	0.5	55.9	**100.0**
Black or African American checkbox alone(N=141,498)	0.0	30.6	0.4	69.0	**100.0**
American Indian and Alaska Native checkbox alone (N=1,748)	0.0	22.6	0.6	76.8	**100.0**
Asian Indian checkbox alone (N=13,896)	0.0	38.8	0.2	61.0	**100.0**
Chinese checkbox alone (N=18,186)	0.0	44.6	0.5	54.9	**100.0**
Filipino checkbox alone (N=9,353)	0.0	28.9	0.5	70.6	**100.0**
Japanese checkbox alone (N=1,971)	0.0	45.4	0.5	54.1	**100.0**
Korean checkbox alone (N=7,529)	0.0	39.2	0.3	60.5	**100.0**
Vietnamese checkbox alone (N=5,213)	0.0	35.3	0.3	64.4	**100.0**
Native Hawaiian checkbox alone (N=450)	0.0	27.6	0.0	72.4	**100.0**
Guamanian or Chamorro checkbox alone (N=245)	0.0	16.7	0.0	83.3	**100.0**
Samoan checkbox alone (N=281)	0.0	19.6	0.0	80.4	**100.0**
Other Asian checkbox alone (N=305)	0.0	29.5	0.0	70.5	**100.0**
Other Pacific Islander checkbox alone (N=57)	0.0	31.6	0.0	68.4	**100.0**
Some Other Race checkbox alone (N=768)	0.0	21.2	0.4	78.4	**100.0**
Multiple checkboxes (N=20,857)	0.0	35.5	0.4	64.1	**100.0**
Both Checkbox and Write-in (N=84,549)	0.0	28.9	0.3	70.8	**100.0**
Write-in Only (N=14,950)	0.0	17.0	0.2	82.8	**100.0**
Missing (N=77,244)	0.0	3.4	0.1	96.6	**100.0**
Total (N=1,235,096)	**0.0**	**37.9**	**0.4**	**61.7**	**100.0**

*Percentages may not sum to 100 percent due to rounding

Sources: CFU Analysis Files, Duplication File, and 2010 CUF

Of the 1,235,096 people deleted in CFU, the majority marked only the "White checkbox alone" followed by the "Black or African American checkbox alone." An estimated 69.0 percent of the total 141,498 people reported "Black or African American checkbox alone" and 55.9 percent of the total 835,996 people reported "White checkbox alone" were deleted from HUs in CFU and were completely removed from the 2010 Census.

An estimated 96.6 percent of the total 77,244 CFU deleted people that did not answer the Hispanic origin question in CFU were deleted completely from the 2010 Census and were not found in any other address. Table 97 shows the counts of CFU deleted people's locations of enumeration by collapsed age. The ages where calculated from valid birthdates given during the CFU interview.

Table 97: CFU Deleted People's Locations of Enumeration by Collapsed Age

Age in Years	Census Address	Different MAFID	More Than One Place	Not at All	**Total Deleted People**
Under 5 years (N=29,529)	0.0	23.6	0.6	75.8	**100.0**
05 to 09 years (N=35,526)	0.0	37.8	0.9	61.3	**100.0**
10 to 14 years (N=44,400)	0.0	41.0	0.8	58.2	**100.0**
15 to 19 years (N=301,021)	0.0	54.2	0.3	45.5	**100.0**
20 to 24 years (N=440,422)	0.0	40.8	0.3	58.9	**100.0**
25 to 29 years (N=50,254)	0.0	17.2	0.3	82.5	**100.0**
30 to 34 years (N=28,088)	0.0	12.5	0.2	87.3	**100.0**
35 to 39 years (N=25,103)	0.0	13.3	0.3	86.3	**100.0**
40 to 44 years (N=24,403)	0.0	16.5	0.4	83.1	**100.0**
45 to 49 years (N=26,629)	0.0	22.4	0.5	77.1	**100.0**
50 to 54 years (N=28,407)	0.0	27.4	0.8	71.7	**100.0**
55 to 59 years (N=26,985)	0.0	34.1	1.0	64.9	**100.0**
60 to 64 years (N=25,644)	0.0	40.0	1.3	58.7	**100.0**
65 and over years (N=93,957)	0.0	35.4	0.9	63.7	**100.0**
Missing (N=54,728)	0.0	1.0	0.0	99.0	**100.0**
Total (N=1,235,096)	**0.0**	**37.9**	**0.4**	**61.7**	**100.0**

Sources: CFU Analysis Files, Duplication File, and 2010 CUF

Ages 20 to 24 years old was the largest age group in the CFU deleted universe. The second largest group deleted in CFU were ages 15 to 19 years old and were the least likely to be removed from the 2010 Census of all the age groups. An estimated 54.2 percent of the total 301,021 CFU deleted people that reported ages 15 to 19 years old were not duplicated in the 2010 Census as a result of CFU. An estimated 99.0 percent of the total 54,728 people that did not give a valid birthdate in CFU were completely deleted from the 2010 Census.

As previously mentioned, if a person was deleted from a HU roster in CFU and was only found at a different address and nowhere else in the 2010 Census, then that person was originally duplicated, and as a result of CFU, the duplication was fixed for the overall 2010 Census count. People from HUs with an OC – College coverage issue, enumerated on MO/MB English forms, reported "Not Hispanic or Latino" for Hispanic origin, choosing the Japanese race category, or between the ages of 15 to 19 were least likely to be removed from the 2010 Census of all deleted people in CFU. Those people had the highest rates of being counted only in one other address after being deleted from the CFU HU thus resolving duplication in the 2010 Census. If a person was deleted from a HU

roster and was not found in any other address, then the CFU interview caused this person not to be counted at all in the 2010 Census.

People from HUs with an OC – Military coverage issue, enumerated in the U/L in Puerto Rico, or did not report a Hispanic origin, race, or age were the most likely to be duplicated of all people deleted in CFU. These people had the highest rates of not being counted in any other address after being deleted from the CFU HU and were not counted at all in the final 2010 Census counts as a result of followup.

A total of 1,235,096 people were deleted from HU rosters during the 2010 Census CFU operation. Of the total deleted people in CFU, 61.7 percent were not counted in the 2010 Census at all after being deleted in CFU. Also, 37.9 percent of the total deleted people in CFU were counted at only one other address in the 2010 Census and were not duplicated in the 2010 Census.

5.3.3 Geocoding/ Matching Results

In Section 5.3.1 and Section 5.3.2, the universes of CFU added and deleted people were merged to the 2010 CUF to find where an added or deleted person was found in the final counts of the 2010 Census. During the CFU interview, different probes asked for addresses of places where the undercounted or overcounted person could have been duplicated or should be counted. The CFU address information was sent to the Geography Division (GEO) for processing. If possible, the addresses were matched to the MTdb, geocoded, matched to an existing MAFID, and compiled into the Geocoding File. In this section, we use the geocoding file and the 2010 CUF to determine if the CFU added or deleted people were found to be residents of addresses collected during the CFU interview.

5.3.3.1 Geocoded/Matched CFU Added People

The people added in CFU were merged to the person matching file to determine who was duplicated in other addresses. They were then merged to the Geocoding File to determine if the addresses the CFU added people were duplicated in were the addresses solicited during the CFU interview. Lastly, they were merged to the 2010 CUF to determine if those duplicated people were counted in those addresses in the 2010 Census.

Of the 350,901 CFU added people, 205 added people were found in another address and 36,386 were found in multiple addresses. This accounted for 36,591 CFU added people found in other addresses besides the address CFU followed-up on and the matching results. Table 98 shows the counts of people added to HUs in CFU that were potentially found in another address by whether or not the respondent provided an alternative address that could be matched to a MAFID.

Table 98: CFU Added People Found in Another Address by Whether Provided An Alternative Address in CFU That Could Be Matched to a MAFID

Provided Address(es) that Matched to MAFIDs	CFU Added People Found at Another Address	Percent
Yes	4,206	11.5
No	32,385	88.5
Total	**36,591**	**100.0**

Sources: CFU Analysis Files, Person Matching File, Geocoding File, and 2010 CUF

A total of 4,206 CFU added people provided an alternative address in the CFU interview that could be matched to a MAFID. A check was performed to see if the CFU added people were counted at the address provided in the CFU interview. Table 99 shows the counts of CFU added people that provided an alternative matched address in CFU by where they were counted in the 2010 Census. The provided addresses are categorized by the CFU coverage probe that solicited the address information.

Table 99: CFU Added People Who Were Duplicated and Provided An Alternative Matched Address by Where Counted

Provided Address	CFU Added People					
	Counted at provided Address	Percent Counted	Not Counted at provided address	Percent Not Counted	Total	Percent Total
College	1	50.0	1	50.0	2	100.0
Child Custody	889	84.0	169	16.0	1,058	100.0
Military	1	25.0	3	75.0	4	100.0
Job	22	59.5	15	40.5	37	100.0
Seasonal	840	72.4	321	27.6	1,161	100.0
Other	305	79.0	81	21.0	386	100.0
Group Quarters	82	31.9	175	68.1	257	100.0
Unduplicated Total*	**2,957**	**70.3**	**1,249**	**29.7**	**4,206**	**100.0**

Sources: CFU Analysis Files, Person Matching File, Geocoding File, and 2010 CUF

An estimated 84.0 percent of the total 1,058 CFU added people that provided matched address information during the child custody probe in the CFU interview were counted at the provided address. Three of the total four CFU added people that provided matched military address information were not counted at the provided address. Overall, of the 4,206 CFU added people that provided matched alternative addresses, 70.3 percent were counted at the provided address while 29.7 percent were not.

5.3.3.2 Geocoded/Matched CFU Deleted People

The people removed in CFU were merged with the Duplication File to determine who was duplicated at other addresses. They were then merged with the Geocoding File to determine if the addresses of the CFU deleted people were duplicated and were the addresses solicited during the CFU interview. Lastly, they were compared to the 2010 CUF to determine if those duplicated people were counted at those addresses in the 2010 Census.

Of the 1,235,096 CFU deleted people, 467,844 deleted people were found at another address and 5,434 were found at multiple addresses. This accounted for 473,278 CFU deleted people potentially found at other addresses besides the address CFU followed-up on. Table 100 shows the counts of people deleted from HUs in CFU that were found at another address by whether or not the respondent provided an alternative address that could be geocoded.

Table 100: CFU Deleted People Found at Another Address by Whether or Not the Respondent Provided an Alternative Address in CFU that Could Be Matched to a MAFID

Provided Address(es) that matched to MAFIDs	CFU Deleted People	Percent
Yes	155,458	32.8
No	317,820	67.2
Total	**473,278**	**100.0**

Sources: CFU Analysis Files, Duplication File, Geocoding File, and 2010 CUF

A total of 155,458 CFU deleted people provided an alternative address in the CFU interview that could be matched to a MAFID. Similar to the CFU added people, a check was performed to see if the people counted at these other addresses were counted at the addresses provided in CFU. Table 101 shows the counts of CFU deleted people that provided an alternative matched address in CFU by where they were counted at the 2010 Census. The provided addresses are categorized by the CFU coverage probe that solicited the address information.

Table 101: CFU Deleted People that Were Counted at the Provided Alternative Address

Provided Address	CFU Deleted People					
	Counted at Provided Address	Percent Counted	Not Counted at Provided Address	Percent Not Counted	Total	Percent Total
College	26,784	36.4	46,895	63.6	73,679	100.0
Child	16,380	86.4	2,580	13.6	18,960	100.0
Military	260	37.0	443	63.0	703	100.0
Job	3,998	77.1	1,190	22.9	5,188	100.0
Seasonal	31,671	71.6	12,562	28.4	44,233	100.0
Other	11,848	77.1	3,518	22.9	15,366	100.0
Group Quarters	3,246	45.5	3,890	54.5	7,136	100.0
Mod Q Overcount	65	51.2	62	48.8	127	100.0
Move	0	0.0	1	100.0	1	100.0
Unduplicated Total*	**91,405**	**58.8**	**64,053**	**41.2**	**155,458**	**100.0**

Sources: CFU Analysis Files, Duplication File, Geocoding File, and 2010 CUF

An estimated 86.4 percent of the total 18,960 CFU deleted people that provided address information during the child custody probe in the CFU interview were counted at the provided address. Overall, of the 155,458 CFU deleted people that provided alternative addresses that were geocoded, 58.8 percent were counted at the provided address while 41.2 percent were not.

6. Related Evaluations, Experiments, and/or Assessments

The following studies are related to this evaluation.

- The 2010 Census Coverage Followup Assessment Report focused on the CFU operation's effectiveness at conducting interviews as well as the extent to which the CFU operation improved coverage.
- The 2010 Census Effectiveness of Unduplication Evaluation Report focused on capturing duplicated people at various geographical locations.

7. Lessons Learned, Conclusions, and Recommendations

In this section, DSSD compiled a list of conclusions and recommendations for future 2020 Census research. There were three major research areas for the CFU evaluation report, so all three are addressed here accordingly.

7.1 Evaluation of CFU Cases with one or more Evaluation Case Types

The desired 65 percent completion rate was successfully achieved for the three overcount evaluation case types (OC – Seasonal, OC – Child Custody, and OC – Another Reason). The sampling process in CFU Wave 8 and Wave 9 contributed to this success.

The form type proportions of the sampled overcount evaluation cases were similar to the sent proportions of the 2010 CFU Assessment case workload form types, but some NRFU forms were not processed in time for sampling.

Across all CFU cases with one or more evaluation case types containing the Overcount – Seasonal, Overcount – Child Custody, Overcount – Another Reason, and Overcount – Yes Only case types, the results were:

- Of 669,581 CFU cases with one or more evaluation case types, 572,641 cases were production CFU cases and 96,940 cases were sampled. The weighted estimated number of CFU completed HUs was 7,083,187.

- The estimated number of HUs with added or deleted people was 1,234,558, or 17.4 percent of the estimated number of CFU completed HUs. The overcount evaluation case types did not perform as well as or better than the production case types.
    - Four form types had significantly larger percentages of completed cases with added or deleted people than the overall completed 17.4 percent with added or deleted people: Fulfillment MO/MB forms at 19.8 percent, U/L English stateside forms at percent at 40.4 percent (but which had a small sample size), U/L Puerto Rico forms at 18.3 percent, and NRFU forms at 21.0 percent.
    - Enumerator completed form types altogether had a significantly larger percent of completed cases with added or deleted people than the overall completed 17.4 percent with added or deleted people at 20.8 percent, but not all enumerator completed form type categories were significantly different from the overall completed percent with added or deleted people.
    - The majority of people aged 60 and over were living in seasonal or second residence homes. The majority of people in the 10-14 age group were in child custody situations.
    - The majority of people living at a seasonal or second residence homes were householders and their spouses. The majority of people in child custody situations were biological sons or daughters.

- The estimated number of HUs with added people was 104,385, or 1.5 percent of the estimated number of completed CFU HUs. The overcount evaluation case types did not perform as well as or better than the production case types that usually resulted in adding a person to the roster.
    - Three respondent provided form types had significantly larger percentages of completed cases with added people than the overall completed total of

1.5 percent with added people: U/L Puerto Rico forms at 5.9 percent, MO/MB fulfillment forms at 2.7 percent, and MO/MB bilingual forms at 2.3 percent.
    - A large majority of the added people in age group 20-24 were temporarily living at homes as relatives, roommates, or people staying there often. A large majority of the added people in the "Under 5" age group were newborn babies or relatives.

- The estimated number of HUs with deleted people was 1,148,508, or 16.2 percent of the estimated number of CFU completed HUs. The overcount evaluation case types did not perform as well as or better than the production case types that usually resulted in deleting a person from the roster.
    - Two form types had significantly larger percentages of completed cases with deleted people than the overall completed 16.2 percent with deleted people: respondent completed U/L English stateside forms at 40.4 percent (but which had a small sample size) and enumerator completed NRFU forms at 19.5 percent.
    - The majority of people aged 60 and over were living in seasonal or second residence homes. The majority of people in the 10-14 age group were in child custody situations.
    - The majority of the householders and their spouses were because of the complex living situation of people living at a seasonal or second residence homes. The majority of people in child custody situations were biological sons or daughters.

From the analysis of CFU evaluation cases by unique sources of coverage issue, the results were:

- When compared to the 2010 Census CFU Assessment Report results, the unique evaluation overcount cases types did not perform as well as or better than the unique production case types.
- From the analysis of added or deleted people and the analysis of deleted people, the multiple sources of production-evaluation overlaps and evaluation-evaluation overlaps performed significantly better than the overcount evaluation case types that did not overlap with other case types.
- From the analysis of added people, the multiple sources of production-evaluation overlaps performed significantly better than the overcount evaluation case types that did not overlap with other case types.
- The 2010 Census CFU Assessment Report also reported that a case having more than one coverage issue generally gave a higher likelihood of having a roster change. The evaluation results were in line with the 2010 Census CFU Assessment Report results.

For the CFU cases that had one or more evaluation case types and one or more production case types (production-evaluation overlaps), the results were:

- From the analysis of added or deleted people, the main causes of the high addition or deletion rates were the OC – Child Custody and high CD case types. Two

enumerator completed form types (NRFU and U/E forms) and respondent completed MO/MB English forms performed well.

- From the analysis of added people, the main cause of the high addition rates was low CD. Respondent completed MO/MB bilingual and U/L Puerto Rico forms performed well.
- From the analysis of deleted people, the main causes of the high delete rates were high CD and and OC – Child Custody. Two of the enumerator completed form types (NRFU and U/E forms) and respondent-completed MO/MB English forms performed well.

For the CFU cases that had multiple evaluation case types with no production case types (evaluation-evaluation overlaps), the results were:

- From the analysis of added or deleted people and from the analysis of deleted people, it appeared that any cases overlapping with an unduplication case type contributed to the high deletion rate. The enumerator completed form types (TQA, NRFU, and U/E forms) and respondent completed U/L English stateside forms performed well.
- From the analysis of added people, it appeared that cases with UC – Multiple case types could contribute to the high addition rate.
- From the analysis of deleted people, having both OC – Seasonal and unduplication case types contributed to the high deletion rate. The enumerator completed form types (TQA, NRFU, and U/E forms) and respondent completed U/L English stateside forms (but which had a small sample size) performed well.

In summary, the recommendations are:

- **If budget allows, send all OC – Seasonal and OC – Child Custody cases as part of CFU production because of a sizeable number of people that could have been deleted because they were either in a seasonal or second residence or in child custody situations.**
- **Send more unduplication cases to CFU because any cases overlapping with an unduplication case type contributed to the high deletion rate.**
- **More research is needed for OC – Another Reason and OC – Yes Only cases. It is desired to understand what the complex living situations of these overcount people were and how respondents could determine the residence status of these people.**
- **More research is needed for the UC – Multiple case types, which DSSD did not sample for evaluative purposes.**
- **In case the sampling process used for this evaluation is repeated in the future, the sampling process should be streamlined to avoid double sampling. (It was possible that a case with only more than one evaluation case type and no production case types could be sampled twice; once as part of the three overcount evaluation case types DSSD sampled and once as an unduplication case.)**
- **The CFU evaluation universes from which DSSD sampled in Wave 8 and Wave 9 should not include cases with production case types. Also, keep**

copies of these universes as the CFU eligible universe files were continually updated until the end of CFU operation.

7.2 CFU Experimental Questions (Mod Q)

There were 164,756 cases sampled to be eligible for the experimental questions of Mod Q. Of the eligible cases, 79,701 cases were sent to Mod Q and asked the experimental questions, as a result of not being resolved in the CFU interview, accounting for an overall sent rate of 48.4 percent. Undercount produced a sent rate of 84.6 percent, higher than overcount sent rate of 43.7 percent. Notably high overcount sent rates included OC – Jail/Prison with 86.4 percent, OC – Nursing Home with 79.2 percent, and OC – Another Reason with 87.0 percent of its eligible cases sent to Mod Q. Respondent provided and enumerator provided initial enumeration behaved similarly with sent rates of 48.0 percent and 49.3 percent, respectively. These cases that were asked the experimental questions were not resolved in CFU for the coverage issue reported on the initial 2010 Census return. The probes of Mod Q were needed to solicit the responses missed in the CFU interview.

There were 1,128,413 potentially undercounted people captured in Mod Q. Nearly three-fourths of all Mod Q undercount people had UC – Relatives or UC – Temporary coverage issues that were not resolved during the original CFU interview. The majority of the forms with Mod Q undercount people were MO/MB English forms with 31.7 percent and the NRFU operation with 65.3 percent. The largest relationship category of Mod Q undercount people was biological son/daughter, which was 19.6 percent of the total poeple captured. The highest age groups were ages 0 to 4 years with 10.0 percent and 20 to 24 years with 9.0 percent of the total Mod Q undercount people.

The first probe in Mod Q undercount was whether or not the person stayed at another address in the last 12 months. An estimated 55.8 percent of the total 157,732 UC – Children people answered 'No' and would have been residence coded as residents. An estimated 40.0 percent of the total 25,086 MO/MB bilingual people and 36.2 percent of the total 736,661 NRFU people would have been residence coded as residents. Overall, 35.3 percent of the total Mod Q undercount people would have been residents as a result of this probe. An estimated 54.0 percent of the total Mod Q undercount people reported staying somewhere else and required further probing.

The next probe in Mod Q undercount was where the person spent most of the time in March and April 2010 and was only asked to those that reported 'Yes' to staying in another address. An estimated 59.3 percent of the total 70,321 UC – Nonrelative people and 49.2 percent of the total 259,811 UC – Temporary people answered 'Census Address' and would have been residence coded as residents. Overall, 46.3 percent of the total Mod Q undercount people that stayed at another address would have also been residents as a result of this probe.

The CFU interviewers were asked to review the household roster to check for people matching those being captured in Mod Q undercount. An estimated 70.7 percent of the total Mod Q undercount people were declared to already be on the household roster by

the CFU interviewer. This could be in large part to how the NRFU operation and the MO/MB experimental questionnaire handled potentially undercounted people. Both not only flagged the HU for the undercount reason reported but also solicited the name of the undercounted person and added them to the HU roster. If these cases triggered the Mod Q undercount probes, the people added would already have been on the roster.

Preferably, a Mod Q undercount person would be captured, residence coded as resident, and found in no address at all in the 2010 Census (according to the 2010 CUF). All Mod Q undercount coverage probing performed well. The least likely to be duplicated was UC – Children with 68.0 percent of the total 157,732 people that would have been residence coded as residents and were not found in any address in the 2010 Census.

Overall, 60.3 percent of all Mod Q undercount people would have been residence coded as residents. An estimated 18.0 percent of Mod Q undercount people would have be considered residents and were not found anywhere in the 2010 Census. These people were missed completely from the 2010 Census as a result of not having Mod Q in the production CFU interview.

The first probe of Mod Q overcount ascertained the living situation of the potentially overcounted person that was not resolved in the CFU interview. This was a time-based question that probed the thought process of the respondent for marking an overcount coverage issue on the initial Census return. An estimated 57.3 percent of the total 4,815,754 Mod Q overcount people answered "Another Reason" for this probe. Another Reason was an open-ended answer that allowed the respondent to supply more information about the person's living situation other than when the person was living somewhere else. During programming, it was found that answers given in this write-in field were reiterations of the coverage issue being probed and did not supply any new information about the potentially overcounted person. It is recommended that if this is done in the future that the open-ended answer be put into its own probe. That way, valuable time-based information will not be missed for the 57.3 percent of the Mod Q overcount people choosing the open-ended answer. Respondents answering "Away in March or April 2010", "Away Briefly", "Away Sometime in 2010 but not in March or April", or "Stays at another address" were further probed to determine if the potentially overcounted people should remain a resident of the HU. An estimated 1,349,086 Mod Q overcount people required this additional probing.

The second probe of Mod Q overcount solicited address information for any other address where the Select Mod Q overcount people have been staying. An estimated 38.1 percent of the total 1,349,086 Select Mod Q overcount person gave a full address that could be matched and geocoded to a HUs MAFID.

The third probe of Mod Q overcount probed for which address the potentially overcounted person has spent the most time. Reporting "Other Place" would have the person removed from the HU if Mod Q was a part of production CFU. An estimated 43.8 percent of the 31,375 OC – Jail people and 43.9 percent of the 29,049 OC – Nursing Home people reported staying at another address most of the time and would have been

residence coded as nonresident of the household. Overall, 14.9 percent of the total Mod Q overcount people reported staying at another place most of the time and thus would have been deleted from the household roster in followup.

Nearly 9 percent of the 80,810 people that reported OC – Jail but did not resolve the coverage issue in CFU would have been residence coded as nonresidents and were found in more than one address in the 2010 Census. An estimated 11.2 percent of the total 1,329 people from TQA would have been non-residents and were duplicated in the 2010 Census.

Overall, 8.7 percent of all Mod Q overcount people would have been residence coded as nonresidents. An estimated 2.6 percent of Mod Q overcount people would have be considered residents and were not found anywhere in the 2010 Census. These people were duplicated in the 2010 Census and may have been resolved if Mod Q were a part of the production CFU interview.

If Mod Q was adopted into production CFU then, for undercount, after the undercounted person's name and date of birth are captured, the roster should be checked for the person. This would eliminate potential duplication as a result of Mod Q and reduce respondent burden. Also more interviewer training regarding the Mod Q probes are needed. Data were lost a result of the interviewer not being accustomed to the dynamic of the questions being asked.

7.3 Evaluation of CFU Added or Deleted People

CFU performed well with capturing undercounted people that were only found at the address to which CFU added them. Overall, 89.5 percent of the total 350,901 people added in CFU were counted only at the address in followup. These people would not have been counted if CFU was not performed. An estimated 10.4 percent of the total people added in CFU were counted in more than one place. These people were potentially duplicated as a result of CFU.

Overall, 37.9 percent of the total 1,235,096 CFU deleted people were counted only at another address. These people would have been duplicated without CFU. An estimated 61.7 percent of the total people deleted in CFU were not counted at all in the 2010 Census. These people were missed completely as a result of CFU.

For CFU added people, 36,591 people of 350,901 people were counted at addresses besides the address to which CFU added them. Of the added people found at other addresses, 4,206 provided address information for another address where they were staying that could be matched and geocoded. An estimated 70.3 percent of those 4,206 CFU added people were found, and potentially duplicated, in the household captured during the CFU interview. **It is recommended that a check be performed on the people added in CFU to the addresses solicited during the CFU interview to help reduce duplication.**

For CFU deleted people, 473,278 people of 1,235,096 people were counted at another address besides the address from which CFU deleted them. Of the deleted people found at other addresses, 155,458 provided address information for another address they were staying that could be matched and geocoded. An estimated 58.8 percent of those 473,278 CFU deleted people were found in the household captured during the CFU interview. **It is recommended that more analysis be done to help increase this rate. If a CFU deleted person is not counted anywhere else, it may be preferable not to delete this person at all.**

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Appendix – Mod Q Experimental Questions

Undercount Questions

1. **The Census Bureau is doing research about questions on the census form you completed earlier this year. At that time, you reported that (*fill 1st undercount category marked, i.e. a child was staying there, such as a newborn baby or foster child; a relative was staying there, such as an adult child, cousin, or in-law; a non-relative was staying there, such as a roommate or live-in baby sitter; somebody was staying there temporarily*) on April 1, 2010.**

   Can you tell me whom you were thinking about?
   [Interviewer Note: If a respondent doesn't remember why he/she marked that (*fill category – a child was staying there; a relative was staying there; a non-relative was staying; somebody was staying there temporarily*), select the "No, don't remember that (*fill category – a child was staying there; a relative was staying there; a non-relative was staying there; somebody was staying there temporarily*)" box.]

   [DK][R]_____ ____ [DK][R]_____
   First Name MI Last Name

   [DK][R] Relationship (if provided): _____

   [] No, don't remember that (*fill category – a child was staying there; a relative was staying there; a non-relative was staying there; somebody was staying there temporarily*)

   Navigation Rules

#	Navigation Rule	Go to
1	If First/Last Name was entered or 'DK/R' was selected for First/Last Name	Question 2
2	If "No, don't remember" was selected	End Mod

2. **What is NAME's date of birth?**

   _____ ____ _____
   Month Day Year

3. Interviewer Note: Is NAME, AGE (*AGE is calculated from question 2*) years old already listed on the Roster?
   ( ) Yes
   ( ) No

4. Was there anyone else that you were thinking about when you reported ***(fill 1st undercount category marked, i.e. a child was staying there, such as a newborn baby or foster child; a relative was staying there, such as an adult child, cousin, or in-law; a non-relative was staying there, for example a roommate or live-in baby sitter; somebody was staying there temporarily*)** on April 1, 2010?
( ) Yes
( ) No

Navigation Rules

#	Navigation Rule	Go to
1	If 'Yes' was selected	Screen Text Variation #2, 4, 6, or 8 in Question 1 (depending on the undercount category)
2	If 'No' or 'DK/R' was selected	Question 5

5. In the last 12 months, was there any other place NAME stayed besides this address?
( ) Yes
( ) No

Navigation Rules

#	Navigation Rule	Go to
1	If 'Yes' was selected	Question 6
2	If 'No' or 'DK/R' was selected and Question 5 was asked to all the Names collected in Question 1	End Mod
3	If 'No' or 'DK/R' was selected and Question 5 was not asked to all the Names collected in Question 1	Question 5 for next NAME collected in question 1

6. In March and April of this year, where did NAME spend most of the time?
( ) This address
( ) The other place
( ) Both places equally

7. Please tell me how much time NAME spent at each of the addresses in the last 12 months.

(open text)

Navigation Rules

#	Navigation Rule	Go to
1	Question 5 was asked to all the Names collected in Question 1	End Mod
2	Question 5 was not asked to all the Names collected in Question 1	Question 5 for next NAME collected in Question 1

Overcount Questions

1. **(NOTE: Use the "Screen Text Variations" script instead of this question) The Census Bureau is doing research about questions on the census form you completed earlier this year. At that time, you indicated that (NAME) sometimes lives or stays somewhere else (fill *while in college housing/while in the military/at a seasonal or second residence/for child custody/while in jail or prison/while in a nursing home/for some other reason)*. Can you tell me what you were thinking about when you reported that?**

   ( ) (fill a*way for college/away for military/away at a seasonal or second residence/away for child custody/away at a jail or prison/away at a nursing home/away)* in March or April 2010.
   ( ) (*fill* away for college/away for military/away at a seasonal or second residence/away for child custody/away at a jail or prison/away at a nursing home/away) *sometime in 2010, but not in March or April.*
   ( ) (fill away for college/away for military/away at a seasonal or second residence/away for child custody/away at a jail or prison/away at a nursing home/away) *in 2009 or earlier*
   ( ) away briefly (fill *for college/for the military/at a seasonal or second residence/for child custody/at a jail or prison/at a nursing home/<blank for some other reason>)*
   ( ) (fill *Enrolled in college or taking college course but stays here/Serving in the military/Owns a seasonal or second residence but stays here/Has a custody arrangement but NAME does not stay anywhere else/Only stays here<for Nursing Home, Jail, Some Other Reason>*)
   ( ) Stays at another address (fill *, but not for college/, but not for the military/, but not at a seasonal or second residence/, but not for child custody/, but not at a jail or prison/, but not at a nursing home/<blank for some other reason>)*
   ( ) Another reason (*please describe the reason below*)
   [*write in field (60 characters limit)*]
   [ ]

Screen Text Variations

#	Description	Screen Text
1	For college housing	**…sometimes lives or stays somewhere else *while in college housing*. Can you tell me what you were thinking about when you reported that?** ( ) a*way for college* in March or April 2010. ( ) away for college *sometime in 2010, but not in March or April.* ( ) away for college *in 2009 or earlier* ( ) away briefly *for college* ( ) *Enrolled in college or taking college course but stays here* ( ) Stays at another address, *but not for college* ( ) Another reason (*please describe the reason below*)

2	For in the military	**…sometimes lives or stays somewhere else *while in the military*. Can you tell me what you were thinking about when you reported that?** ( ) *away for military* in March or April 2010. ( ) *a*way for military *sometime in 2010, but not in March or April*. ( ) *a*way for military *in 2009 or earlier* ( ) away briefly *for the military* ( ) *Serving in the military* ( ) Stays at another address, *but not for the military* ( ) Another reason (*please describe the reason below*)
3	For at a seasonal or second residence	**…sometimes lives or stays somewhere else *at a seasonal or second residence*. Can you tell me what you were thinking about when you reported that?** ( ) *away at a seasonal or second residence* in March or April 2010. ( ) away at a seasonal or second residence *sometime in 2010, but not in March or April.* ( ) away at a seasonal or second residence *in 2009 or earlier* ( ) away briefly *at a seasonal or second residence* ( ) *Owns a seasonal or second residence but stays here* ( ) Stays at another address, *but not at a seasonal or second residence* ( ) Another reason (*please describe the reason below*)
4	For child custody	**…sometimes lives or stays somewhere else *for child custody*. Can you tell me what you were thinking about when you reported that?** ( ) *away for child custody* in March or April 2010. ( ) away for child custody *sometime in 2010, but not in March or April.* ( ) away for child custody *in 2009 or earlier* ( ) away briefly *for child custody* ( ) *Has a custody arrangement but NAME does not stay anywhere else* ( ) Stays at another address, *but not for child custody* ( ) Another reason (*please describe the reason below*)
5	For jail or prison	**…sometimes lives or stays somewhere else *while in jail or prison*. Can you tell me what you were thinking about when you reported that?** ( ) *away at a jail or prison* in March or April 2010. ( ) away at a jail or prison *sometime in 2010, but not in March or April.* ( ) away at a jail or prison *in 2009 or earlier* ( ) away briefly *at a jail or prison* ( ) *Only stays here* ( ) Stays at another address, *but not at a jail or prison* ( ) Another reason (*please describe the reason below*)
6	For a nursing home	**…sometimes lives or stays somewhere else *while in a nursing home*. Can you tell me what you were thinking about when you reported that?** ( ) *away at a nursing home* in March or April 2010. ( ) away at a nursing home *sometime in 2010, but not in March or April.* ( ) away at a nursing home *in 2009 or earlier* ( ) away briefly *at a nursing home* ( ) *Only stays here* ( ) Stays at another address, *but not at a nursing home* ( ) Another reason (*please describe the reason below*)
7	For some other reason	**…sometimes lives or stays somewhere else. Can you tell me what you were thinking about when you reported that?** ( ) *away* in March or April 2010. ( ) away *sometime in 2010, but not in March or April.* ( ) away *in 2009 or earlier* ( ) away briefly ( ) *Only stays here* ( ) Stays at another address ( ) Another reason (*please describe the reason below*)

Navigation Rules

#	Navigation Rule	Go to
1	If the following answers selected • (fill a*way for college/Away for military/away at a seasonal or second residence/away at a jail or prison/away at a nursing home/away for some other reason)* in March or April 2010. • away briefly (fill *for college/for the military/at a seasonal or second residence/for child custody/at a jail or prison/at a nursing home/for some other reason)* • (*fill* away for college/Away for military/away at a seasonal or second residence/away at a jail or prison/away at a nursing home/away for some other reason*) sometime in 2010, but not in March or April.* • Stays at another address (fill *, but not for college/, but not for the military/, but not at a seasonal or second residence/, but not for child custody/, but not at a jail or prison/, but not at a nursing home/<blank for some other reason>)*	Question 2
2	If the following answers selected • Yes, away for (fill away for college/Away for military/away at a seasonal or second residence/away at a jail or prison/away at a nursing home/away for some other reason) in 2009 or earlier	Question 4
3	If the following answers selected • Another reason • (fill *Enrolled in college or taking college course but stays here/Serving in the military/Owns a seasonal or second residence/Has a custody arrangement but NAME does not stay anywhere else, Only stays here*) • Selects DK/REF	End Mod

2. What is the address of that place?

Note: Same address fields used in other parts of CFU
Probe: house number, street name, city, state, and zip code?

_____ _____
House Number Street Name

_____ _____ _____
City State Zip

3. In March and April of this year, where did NAME spend most of the time?

( ) **This address**
( ) **The other place**
( ) **Both places equally**

4. Please tell me how much time NAME spent at each of the addresses in the last 12 months.

(open text)

Navigation Rules

#	Navigation Rule	Go to
1	If each person that fits the Overcount experiment criteria has not been asked Question 1	Question 1
2	If each person that fits the Overcount experiment criteria has been asked Question 1	End Mod