

Characteristics of the 2010 Census Nonresponse Followup Operation

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Abstract

The U.S. Census Bureau conducted the 23rd decennial census of the country's population in 2010. A large percentage of the country's housing units received a census questionnaire in the mail or from a census enumerator and roughly two-thirds of those households returned their questionnaires by mail. The remaining households that didn't respond by mail received a personal visit by a census enumerator in order to capture their census information. This happens during the Nonresponse Followup (NRFU) operation. This paper will discuss what happened in the 2010 NRFU operation, including characteristics of the enumerators' attempted contacts with each address, characteristics of the housing units that were visited, and challenges and successes from the operation.

Key Words: nonresponse, 2010 census, Nonresponse Followup

1. Background

The U.S. Census Bureau conducted the 23rd decennial census of the country's population in 2010. A large percentage of the country's housing units received a census questionnaire either in the mail or from a census enumerator and roughly two-thirds of those households returned their questionnaires by mail as intended. The remaining households that did not respond by mail by a particular cut-off date received a personal visit by a census enumerator who was sent to capture their census information. These personal visits happened during the Nonresponse Followup (NRFU) operation.

The 2010 NRFU operation was the largest field data collection operation in the 2010 Census. Starting on May 1, 2010, enumerators visited each address that had not yet returned a census questionnaire. The enumerators were to complete a questionnaire for each housing unit and identify whether the housing unit was occupied, vacant, or did not exist as a housing unit on April 1, 2010. For housing units that were occupied, the questions asked of the occupants were similar to those found on the Census questionnaire that was mailed to the majority of addresses. If an enumerator discovered any housing units while working their assignment that were not on the assignment list, they added the address to their address list and enumerated it also.

Over 47 million addresses were visited and enumerated by the end of July during the NRFU operation. This work was conducted by more than 500,000 temporary enumerators who did the door-to-door fieldwork.

2. Limitations

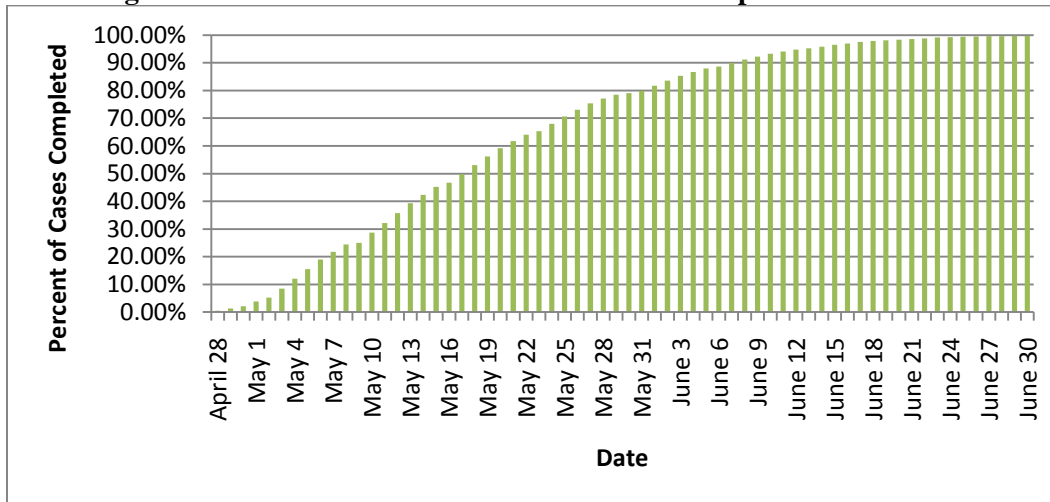
The data was collected on a paper questionnaire and the results discussed in this research paper are taken directly from what was captured off the questionnaire. As a result, the tables may show indications of missing or contradictory data. The data presented here are the raw results from the NRFU operation without consideration for the editing, imputation, or reinterview components that create the final census data.

3. Methods and Results

3.1 Interview Completion

May 1, 2010 was the official start of the NRFU enumeration work. Since enumerators were to capture the status of a housing unit as it existed on April 1, it was preferable for enumerators to visit their assigned housing units as soon as possible. Figure 1 shows the pace at which NRFU cases were completed.

Figure 1: Cumulative Percent of NRFU Cases Completed in the Field



Data Source: 2010 NRO Assessment

As shown in Figure 1, 43.0 percent of the addresses were enumerated in the first two weeks of May 2010. Over eighty percent of addresses were enumerated by the end of May.

3.2 Contacting a Housing Unit

Enumerators were to record information about each attempt they made to contact a housing unit. Figure 2 presents the area of the questionnaire where enumerators recorded this information. Specifically, they were to document:

- Whether the contact was made in person or by telephone
- The month and day
- The time, including morning or afternoon, and
- What happened as a result of that contact

Figure 2: Record of Contact Section of Questionnaire

RECORD OF CONTACT										
Type	Mo	Day	Time	Outcome	Type	Mo	Day	Time	Outcome	
<input checked="" type="checkbox"/> Personal	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<input type="text"/>	<input type="checkbox"/> Personal	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<input type="text"/>
<input type="checkbox"/> Personal	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<input type="checkbox"/> Telephone	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<input type="text"/>
<input type="checkbox"/> Personal	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<input type="checkbox"/> Personal	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<input type="text"/>
<input type="checkbox"/> Telephone	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<input type="checkbox"/> Telephone	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<input type="text"/>
<input type="checkbox"/> Personal	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<input type="checkbox"/> Personal	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<input type="text"/>
<input type="checkbox"/> Telephone	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<input type="checkbox"/> Telephone	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<input type="text"/>

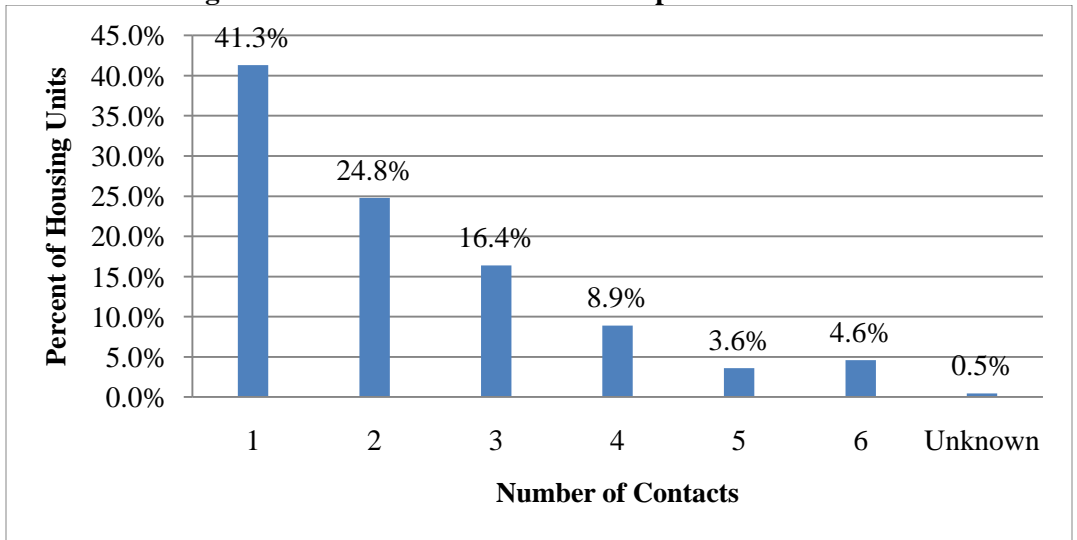
OUTCOME CODES: NV = Left Notice of visit NC = No contact RE = Refusal CI=Conducted Interview OT = Other

From these data fields, it was possible to count how many contacts were made to each housing unit. The form was intentionally designed to provide space for an enumerator to document up to six contacts. While enumerators are instructed not to visit an address more than six times and there was only space to record six visits, enumerators could have tried to contact a housing unit more than six times.

For a contact to be counted as valid for this analysis, a row in the Record of Contact section had to have a mark in one of five boxes: the Personal visit box, Telephone visit box, Outcome box, Day, or Month of contact. For the first Record of Contact row, the Personal visit box was already filled in so one of the other three key boxes had to be marked in that row in order for it to qualify as a contact.

The chart below shows the number of contacts necessary to complete an interview with each of the 47 million housing units.

Figure 3: Number of Contacts to Complete an Interview



Data Source: 2010 NRO Assessment

Of all the addresses in NRFU, 41.3 percent required only one visit to complete an interview. An additional 24.8 percent required two visits. More cases required six contacts (4.6 percent) than required five contacts (3.6 percent). Since we could not enforce the rule of making only six visits to an address, this category can be interpreted

as ‘six or more contacts’. Cases with an unknown number of contacts did not provide any information in the Record of Contact section.

The more contacts that are needed to complete an interview, the greater the cost of the operation, due to enumerator salary and mileage reimbursement.

As shown in Figure 2, the questionnaire had boxes to record whether a contact was made in person or on the telephone. Table 1 shows how often the last, concluding contact with a housing unit was done in person and how often it was on the telephone.

Table 1: Type of Final Contact to a Housing Unit

Type of Contact	Percent
Personal Visit	85.5%
Telephone	9.7%
Unknown	4.9%
Total	100.0%

Data Source: 2010 NRO Assessment

The vast majority of the cases (85.5 percent) were completed in person, but almost ten percent (9.7 percent) were completed on the telephone. An additional 4.9 percent were classified as unknown because the enumerator did not indicate the mode on the questionnaire. This reflects the limitation from the collection of the enumerator data on a paper questionnaire and the prevalence of missing data.

3.3 Language

Enumerators were to record the language in which the majority of an interview was conducted. Figure 4 shows the area of the questionnaire where enumerators recorded this information.

Figure 4: Language Section of Questionnaire

D. What language was the majority of the interview conducted in?

English

Spanish

Other – Specify language number from flashcard →

Checkboxes were provided for the two most common languages, English and Spanish. Additional languages were given numeric codes that were to be written into the boxes in the bottom right boxes of this picture. The numeric codes were listed on a ‘language flashcard,’ partially shown in Figure 5.

Figure 5: Language Flashcard

Hello, I'm from the U.S. Census Bureau. Is someone here now who speaks English and can help us? If not, please write your phone number and someone will contact you in English.	01. English
Buenos días (Buenas tardes), soy de la Oficina del Censo de los Estados Unidos. ¿Se encuentra alguien que hable inglés y pueda ayudarnos? Si no, por favor, anote su número de teléfono y alguien se comunicará con usted en español.	02. Español/ Spanish
Përshëndetje, unë vij nga Zyra e Regjistrimit të Popullsisë së Sh.B.A-së. A ndodhet dikush tani këtu që flet anglisht dhe mund të na ndihmojë? Nëse jo, ju lutemi shkruani numrin e telefonit tuaj dhe dikush do t'ju kontaktojë në gjuhën shqipe.	03. Shqip/ Albanian

The first box shows text in English, which is then translated into Spanish in the middle box. The bottom box is in Albanian, and 47 more translations followed on the actual flashcard. In total, there were 50 languages listed in this fashion on the flashcard from Figure 5. Enumerators could show the flashcard to respondents when there appeared to be a language barrier. A language barrier was one reason why housing units might not have returned the census questionnaire they received in the mail.

Table 2: Top Five Languages in which NRFU Interviews were Conducted

Language	Percent
English	92.5%
Spanish	4.2%
Chinese	0.1%
Russian	<0.1%
Korean	<0.1%
All other languages combined	0.1%
Multiple languages indicated	0.1%
Unknown	2.9%
Total Housing Units	100.0%

Data Source: 2010 NRO Assessment

92.5 percent of all interviews were conducted in English and an additional 4.2 percent of the interviews were conducted in Spanish. Notably, all 50 languages listed on the Language Flashcard were used at least once with the fewest recorded interviews in Dinka.

Cases with a language identified in Table 2 as ‘Multiple languages indicated’ might have marked the checkboxes both for English and Spanish, or marked a checkbox and written in a number for a different language. Cases with an unknown language could have either left that question blank or had a number greater than 50 (numbers that were not assigned to a specific language) written into the data capture field.

3.4 Housing Unit Status on April 1

This next table shows the distribution of housing unit statuses for the approximately 47 million housing units in NRFU. This classification of housing units is essential to ensure the census did not miss counting any people.

Table 3: NRFU Housing Unit Status

Housing Unit Status	Percent
Occupied	60.9%
Vacant	30.0%
Marked for deletion	8.5%
Unresolved	0.5%
Total	100.0%

Data Source: 2010 NRO Assessment

The NRFU enumerators identified over 60 percent of the addresses to have been occupied on April 1. An additional 30.0 percent were identified as vacant. There were also some addresses that enumerators marked to be removed from the address list. These were addresses that were found to be under construction, demolished, nonresidential, or otherwise did not exist as a housing unit on April 1, 2010. Most units marked as vacant or for deletion were revisited later to confirm that status and ensure the census did not miss any people.

Table 4 shows the respondent distribution for interviews with occupied housing units. Household members are preferred respondents because they typically know more about the housing unit and the people in it, compared to a landlord, neighbor or other proxy respondent. If a respondent was a member of the household at the time of the interview but had not lived there on April 1, the respondent is considered to be an ‘in-mover’.

Table 4: Type of Respondent for Interviews with Occupied Housing Units

Respondent Type	Percent
Household Member	75.7%
Proxy	
In-mover	0.6%
Neighbor or other proxy	23.1%
Unknown type	<0.1%
Unknown Type	0.5%
Total Housing Units	100.0%

Data Source: 2010 NRO Assessment

Table 4 shows that 75.7 percent of the interviews with occupied housing units were completed with a household member.

Over 14 million housing units were found to be vacant. There are two primary types of vacant housing units. The first class of vacant units is called “usual home elsewhere” vacant, or UHEs. Vacant housing units classified as UHEs might be occupied only on weekends, seasonally or occasionally. The second class of vacant units are normally occupied year-round but were for sale, for rent, or otherwise uninhabited on April 1, 2010. These are called ‘regular’ vacant units. This distinction is important for

understanding the vacancy rates in the country. The distribution of vacant types is shown in Table 5.

Table 5: Types of Vacant Housing Units Found in NRFU

Vacant Type	Percent
Regular	75.6%
Usual Home Elsewhere (UHE)	24.3%
Unknown	0.1%
Total Vacant Housing Units	100.0%

Data Source: 2010 NRO Assessment

Vacant housing units identified as ‘unknown’ in Table 5 might have been marked by enumerators as being both regular and seasonally vacant, or the enumerator might not have provided a classification.

3.5 Discovered Housing Units

The enumerators had assignments containing lists of every address that was known to the Census Bureau in the blocks within the assignment. If a housing unit existed on April 1 and was not on their list, they were to enumerate it and add it to the master address list. These could have been basement or garage apartments or reflect houses that contained multiple apartments but looked like one house from the outside. These also could have been newly constructed houses that were just available to be lived in during early 2010. Over 660,000 such addresses were added and enumerated, which was about 1.5 percent of all addresses enumerated during the NRFU operation. Additional clarification and processing happened during the census to verify and confirm these addresses.

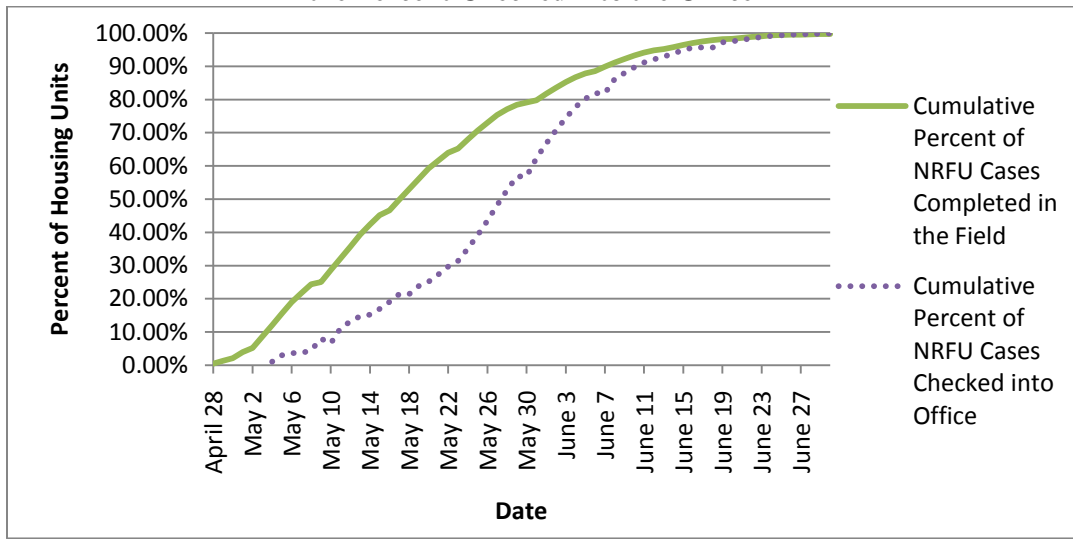
3.6 Challenges and Successes to the NRFU Operation

An operation of this magnitude had many challenges. One significant challenge to overseeing the progress of the operation was the result of using a paper questionnaire instead of an automated instrument. Questionnaires completed by enumerators were returned to their local census offices¹ and summary information was entered into tracking software. However, office staff and the software could not keep up with the number of questionnaires coming in so the data entered into the software was significantly behind what was happening in the field.

Figure 1 showed the rate at which cases were completed by enumerators in the field. This rate is shown again in Figure 6 as the solid line. In contrast, the dashed line in Figure 6 shows the rate at which completed cases were entered into the office software.

¹ 494 such offices existed around the country.

Figure 6: Cumulative Percent of NRFU Cases Completed in the Field Compared to the Percent Checked into the Office



Data Source: 2010 NRO Assessment

It was expected that there would be a lag between when the questionnaire was completed in the field and when it was brought to the local census office, since enumerators had to return each completed questionnaire to their supervisor for review and the supervisor then had to deliver the questionnaires to the office. The lag shown in Figure 6 was larger than expected however. For instance, on May 21, 2010, almost 62 percent of the total workload had been interviewed by enumerators. On May 21st, only about 27 percent of the total workload had been received in the local offices with summary information captured. It was not until early June that the office staff checked in 62 percent of the workload. This lag made it difficult to monitor the progress of the operation and feed the reinterview operation.

In addition to the challenges, there were also many elements of the NRFU operation that were successful. One success from a management perspective was the reduction in the initial number of addresses to be visited in NRFU. Some mail returns were returned after the universe for the NRFU operation had been established, but we were able to cull more than 11 million such addresses and not send an enumerator to visit those addresses. This saved valuable time and money.

In analyzing the paradata from this operation, there were two results from the enumerator's fieldwork that were notably positive results. One was the rate at which cases were completed, shown previously in Figure 1. The number of cases that were enumerated in the month of May was greater than had been expected. The second positive result was mentioned in Section 3.4; over 75 percent of the interviews with occupied housing units were done with a household member as the respondent.

4. Conclusion

The NRFU operation is an essential component of any census where residents are given an initial chance to respond to the census on their own, before receiving a personal visit. Over the coming years, the Census Bureau is planning to move ahead with researching and eventually conducting all followup visits on an automated instrument instead of the

paper instrument used in 2010. This should allow for more accurate data collected from respondents by eliminating the potential for illegible data entries and forcing consistent data responses. An automated instrument would also allow for more detailed paradata analysis. Timestamps could be automatically associated with interviews and eliminate the reliance on enumerators to provide complete data. An automated instrument would also provide a more accurate and efficient way to manage the progress of the operation.

Acknowledgements

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References

Winder, Susanna , Shelley Walker, Geoff Jackson and Sarah Heimel (2011), “2010 Census Nonresponse Followup Operations (NRO) Assessment,” to be released.