

2020 Census: Some Decennial Census Data Quality Assurance Methods Were Not Tested or Did Not Work as Intended During the 2018 End-to-End Census Test

FINAL REPORT NO. OIG-20-016-A

JANUARY 30, 2020



U.S. Department of Commerce
Office of Inspector General
Office of Audit and Evaluation



January 30, 2020

MEMORANDUM FOR: Dr. Steven D. Dillingham
Director
U.S. Census Bureau

A handwritten signature in black ink, reading "Mark H. Zabarsky".

FROM: Mark H. Zabarsky
Principal Assistant Inspector General for Audit and Evaluation

SUBJECT: *2020 Census: Some Decennial Census Data Quality Assurance
Methods Were Not Tested or Did Not Work as Intended During
the 2018 End-to-End Census Test*
Final Report No. OIG-20-016-A

Attached for your review is our final audit report on the U.S. Census Bureau's (the Bureau's) 2018 End-to-End Census Test, with specific attention paid to the testing of peak operations. Our objectives were to determine whether (1) the test included data quality components identified as success criteria in the test plan, (2) the Bureau designed the test to inform the 2020 Census, (3) nonresponse followup (NRFU) systems are included in the test and function as designed, and (4) the Bureau performed non-ID processing and unduplicated responses in a timely manner to reduce the NRFU operation's workload.

We found the following:

- I. The Bureau has not fully tested some activities designed to ensure the quality of 2020 Census respondent data.
- II. The Bureau's reengineered approach to NRFU closeout has not been adequately tested.
- III. Potentially unqualified field staff completed cases during NRFU.
- IV. Unresolved NRFU alerts may not help the Bureau maintain or improve the quality of decennial census data.

In addition, and noted in an "Other Matters" section of this report, we discuss how (1) NRFU quality assurance lacks segregation of duties and (2) the Bureau must still improve its training for NRFU operation proxy procedures.

On November 1, 2019, we received the Bureau's response to the draft report's findings and recommendations, which we include within the final report as appendix C. The Bureau concurred with all five report recommendations and provided context for our findings.

Pursuant to Department Administrative Order 213-5, please submit to us an action plan that addresses the recommendations in this report within 60 calendar days. This final report will be

posted on OIG's website pursuant to sections 4 and 8M of the Inspector General Act of 1978, as amended (5 U.S.C. App., §§ 4 & 8M).

We appreciate the cooperation and courtesies extended to us by your staff during our audit. If you have any questions or concerns about this report, please contact me at (202) 482-3884 or Terry Storms, Division Director, at (202) 482-0055.

Attachment

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Report in Brief

January 30, 2020

Background

This decade, the U.S. Census Bureau (the Bureau) reported major cost drivers of the decennial census and developed key innovations in order to control cost and maintain data quality. The Bureau conducted the 2018 End-to-End Census (2018 E2E) Test in order to ensure that these innovations will perform as intended when used together as part of the decennial census design. The 2018 E2E Test occurred in two phases. First, the Bureau conducted early operations—which included address canvassing—between March 10, 2017, and October 6, 2017, in Pierce County, Washington; Providence County, Rhode Island; and Bluefield-Beckley-Oak Hill, West Virginia. Second, the Bureau conducted peak operations, which included enumeration activities (group quarters, nonresponse followup [NRFU], and update leave) between August 31, 2017, and July 31, 2018, only in Providence County.

Why We Did This Review

Our objectives during this audit were to determine whether (1) the test included data quality components identified as success criteria in the test plan; (2) the Bureau designed the test to inform the 2020 Census; (3) NRFU systems are included in the test and function as designed; and (4) the Bureau performed non-ID processing and unduplicated responses in a timely manner to reduce the NRFU operation's workload.

U.S. CENSUS BUREAU

2020 Census: Some Decennial Census Data Quality Assurance Methods Were Not Tested or Did Not Work as Intended During the 2018 End-to-End Census Test

OIG-20-016-A

WHAT WE FOUND

We found the following:

1. The Bureau has not fully tested some activities designed to ensure the quality of 2020 Census respondent data.
2. The Bureau's reengineered approach to NRFU closeout has not been adequately tested.
3. Potentially unqualified field staff completed cases during NRFU.
4. Unresolved NRFU alerts may not help the Bureau maintain or improve the quality of decennial census data.

The Bureau cannot be certain of how some of its new decennial census innovations will function as part of the integrated 2020 Census design. This uncertainty increases the risk that the Bureau will not be able to control cost while maintaining data quality during decennial census operations.

With respect to our fourth objective, we learned that the Bureau performed non-ID processing (that is, real-time matching of responses without Census IDs, or non-ID responses) to the Bureau's existing address inventory in a timely manner in order to reduce the NRFU workload. Additionally, we learned that the Bureau does not unduplicate responses from the same household collected via various response modes until all data collection operations are complete. Therefore, the unduplication process does not reduce the NRFU workload.

In addition, and noted in an "Other Matters" section of this report, we discussed how (1) NRFU quality assurance lacks segregation of duties and (2) the Bureau must still improve its training for NRFU operation proxy procedures.

WHAT WE RECOMMEND

We recommend that the Director of the U.S. Census Bureau do the following:

1. Develop a strategy to immediately address quality assurance issues that may occur during the early stages of the self-response and NRFU operations.
2. Determine the optimal time during NRFU to begin closeout procedures and ensure that systems support those procedures prior to the 2020 Census.
3. Correct automated training system failures that occurred during the 2018 E2E Test and implement and monitor controls to ensure that field staff are qualified before working in the field.
4. Monitor the resolution of alerts at a national level to identify whether alerts are (a) resolved timely and (b) functioning correctly during the operation.
5. Develop a strategy to remedy alert issues and communicate appropriate procedures and instructions to field staff if monitoring efforts identify issues.

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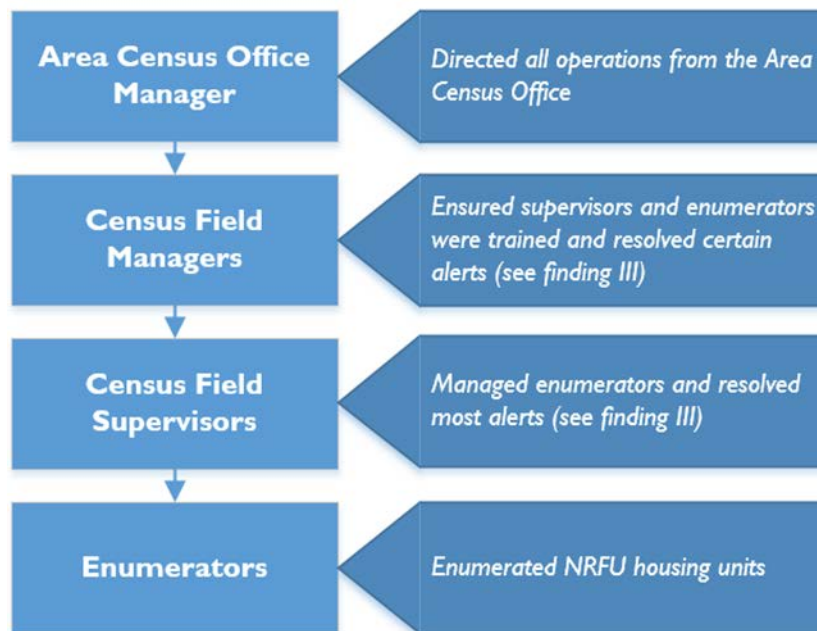
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Cover: Herbert C. Hoover Building main entrance at 14th Street Northwest in Washington, DC. Completed in 1932, the building is named after the former Secretary of Commerce and 31st President of the United States.

Introduction

This decade, the U.S. Census Bureau (the Bureau) reported major cost drivers of the decennial census and developed key innovations in order to control cost and maintain data quality.¹ The Bureau conducted the 2018 End-to-End Census (2018 E2E) Test in order to ensure that these innovations will perform as intended when used together as part of the decennial census design. The 2018 E2E Test occurred in two phases. First, the Bureau conducted early operations—which included address canvassing—between March 10, 2017, and October 6, 2017, in Pierce County, Washington; Providence County, Rhode Island; and Bluefield-Beckley-Oak Hill, West Virginia. Second, the Bureau conducted peak operations, which included enumeration activities (group quarters, nonresponse followup [NRFU], and update leave) between August 31, 2017, and July 31, 2018, only in Providence County (see figure 1 for a description of the key roles involved in executing the NRFU operation).

Figure 1. 2018 E2E Test NRFU Organizational Chart



Source: Analysis of U.S. Census Bureau documentation

Key innovations relevant to peak operations and our audit objectives are *optimizing self-response*, *reengineering field operations*, and *utilizing administrative records and third-party data*:

- For *optimizing self-response*, the Bureau intends to make it easier for people to respond to the 2020 Census by allowing household members to respond via the internet and telephone, as well as traditional paper questionnaires.

¹ The Bureau developed four key innovations for the 2020 Census: (1) reengineering address canvassing, (2) optimizing self-response, (3) using administrative records and third-party data, and (4) reengineering field operations.

- For *reengineering field operations*, the Bureau intends to improve the NRFU operation, during which temporary field staff (enumerators) determine housing unit status (vacant or occupied) of nonresponding households, and then enumerate occupied units.
- Through *utilizing administrative records and third-party data*, the Bureau plans to reduce the cost of NRFU by reducing the field workload, improving the productivity of field staff, and reducing the reinterview² workload.

Integrating these innovations into the decennial census design requires new procedures and technology not used in previous censuses. The task of integrating these new procedures and technology increases the risk to the Bureau's ability to count everyone once, only once, and in the right place.

The 2018 E2E Test was the Bureau's last opportunity to ensure that key 2020 Census operations, procedures, and systems, when integrated, will perform as expected. Going into the test, the Bureau recognized its importance—that is, if a system or operation could not be tested as planned and accepted as part of the test, then there might not be enough time to validate and successfully integrate it into the decennial census design prior to the start of 2020 Census field operations.³

The Bureau's objectives for the 2018 E2E Test were to (1) validate that operations included in the test are ready for the 2020 Census and (2) test and validate major operations, procedures, systems, and infrastructure to ensure that they can work together and conform to requirements.⁴ For another recent audit of the 2018 E2E Test, we reviewed early operations and issued a report with findings and recommendations.⁵ The NRFU operation is historically the largest and most expensive decennial census operation. Additionally, the Bureau reengineered many of its field activities to make the 2020 Census NRFU operation more efficient this decade to control cost. For these reasons, we limited the scope of this audit to peak operations with a particular focus on the NRFU operation.

² According to the *2020 Census Detailed Operational Plan for Nonresponse Followup Operation (NRFU)*, certain NRFU cases will be selected for a subsequent interview to verify that the enumerator conducted the interview and followed procedures. See U.S. Census Bureau, April 16, 2018. *2020 Census Detailed Operational Plan for Nonresponse Followup Operation (NRFU)*. Washington, DC: Census Bureau, 27.

³ Field operations for the decennial census have already started—specifically, in-field address canvassing activities began in August 2019. However, peak operations—which include enumeration activities such as NRFU—will not begin until early 2020.

⁴ Census Bureau, November 2017. *2018 End-to-End Census Test Plan Version 1*. Suitland, MD: Census Bureau.

⁵ U.S. Department of Commerce Office of Inspector General, February 6, 2019. *2020 Census: Issues Observed During the 2018 End-to-End Census Test's Address Canvassing Operation Indicate Risk to Address List Quality*, OIG-19-008-A. Washington, DC: DOC OIG.

Objectives, Findings, and Recommendations

Our objectives were to determine whether (1) the test included data quality components identified as success criteria in the test plan, (2) the Bureau designed the test to inform the 2020 Census, (3) NRFU systems are included in the test and function as designed, and (4) the Bureau performed non-ID processing and unduplicated⁶ responses in a timely manner to reduce the NRFU operation's workload.

Specifically, we found the following:

- I. ***The Bureau has not fully tested some activities designed to ensure the quality of 2020 Census respondent data.*** Regarding our first objective, we found that the Bureau did not test, as planned, certain quality assurance components identified as success criteria.
- II. ***The Bureau's reengineered approach to NRFU closeout has not been adequately tested.*** Related to our second objective, we identified multiple issues that may prevent the Bureau from using the results of the test to validate and refine 2020 Census operations.
- III. ***Potentially unqualified field staff completed cases during NRFU.*** Regarding our third objective, we determined that certain functions within the Bureau's training systems did not perform as designed during the test.
- IV. ***Unresolved NRFU alerts may not help the Bureau maintain or improve the quality of decennial census data.*** Also related to our third objective, we found that supervisors and managers did not resolve 15 percent of alerts (9,818 of 64,051) during the test.

As a result of the issues raised by our findings, the Bureau cannot be certain of how some of its new decennial census innovations will function as part of the integrated 2020 Census design. This uncertainty increases the risk that the Bureau will not be able to control cost while maintaining data quality during decennial census operations.

With respect to our fourth objective, we learned that the Bureau performed non-ID processing (that is, real-time matching of responses without Census IDs, or non-ID responses) to the Bureau's existing address inventory in a timely manner in order to reduce the NRFU workload. Additionally, we learned that the Bureau does not unduplicate responses from the same household collected via various response modes (e.g., internet self-response and NRFU) until all data collection operations are complete. Therefore, the unduplication process does not reduce the NRFU workload.

In addition to our findings, the "Other Matters" section reports our additional concerns regarding NRFU quality assurance and training. Appendix A provides additional details regarding

⁶ When the Bureau collects multiple decennial census responses for the same person, it uses its "Primary Selection Algorithm" to select the response to use for the enumeration.

the objectives, scope, and methodology of our audit. Appendix B lists the alerts that supervisors and managers can receive during NRFU.

I. The Bureau Has Not Fully Tested Some Activities Designed to Ensure the Quality of 2020 Census Respondent Data

Because data quality is a primary concern for the Bureau, it designed the 2020 Census to include a number of quality assurance processes. During the 2018 E2E Test, the Bureau planned to test quality assurance processes⁷ for data collected via each of the self-response modes (paper questionnaire, internet, and telephone), as well as data collected in the field during NRFU. However, the Bureau did not test two of these processes: (a) self-response quality assurance (SRQA) and (b) NRFU reinterview.

A. *The Bureau has not tested SRQA*

SRQA will help ensure the quality of all decennial census data submitted by household members. The Bureau will deploy SRQA to detect potentially fraudulent self-responses, and then send enumerators to visit a selection of those housing units to re-collect the household data.

However, the Bureau reallocated SRQA test funding in December 2017, and the quality assurance process remains untested. In its current *2020 Census Operational Plan*,⁸ the Bureau states that ensuring data quality in real time through reengineered quality assurance such as SRQA will reduce the cost and improve the quality of the decennial census. Because the Bureau has not tested SRQA, the first time that it will deploy the system and process is during actual 2020 Census operations. This untested process presents risk to the quality of 2020 Census data. For example, the Bureau cannot anticipate the nature or number of suspicious responses that SRQA will identify; nor can it estimate the amount of time needed to resolve such responses.

B. *The Bureau has not fully tested NRFU reinterview*

NRFU quality assurance—conducted via reinterview—will detect and deter falsification of decennial census data collected by enumerators. This entails sending enumerators to a sample of previously enumerated households to catch field staff that falsified household data and violated established procedures.

The Bureau was unable to fully test planned NRFU reinterview procedures during the 2018 E2E Test because it lacked sufficient staff to develop one of the required quality assurance systems in time. As a result, the Bureau did not fully test NRFU reinterview

⁷ Quality assurance includes methods to identify potentially suspicious replies via self-response that require follow-up and NRFU reinterview activities designed to detect and deter falsification.

⁸ Census Bureau, December 2018. *2020 Census Operational Plan*, Version 4.0. Suitland, MD: Census Bureau, 130, 133–135. Available at <https://www2.census.gov/programs-surveys/decennial/2020/program-management/planning-docs/2020-oper-plan4.pdf> (accessed March 19, 2019).

during this most recent test, nor has it fully tested NRFU quality assurance during any prior tests this decade.

During the 2020 Census, the Bureau plans to conduct production and reinterview activities concurrently during the NRFU operation to detect and deter enumerator falsification and poor performance in a timely manner. If the 2018 E2E Test is an indicator, enumerators may complete about 64 percent of the work during the first 6 weeks of the operation. As a result, the Bureau will have limited time to identify and correct enumerator issues that could negatively impact data quality during the 2020 Census.

In addition, because the Bureau has not fully tested NRFU reinterview there is increased risk that unknown operational issues may occur during the 2020 Census. These issues could impede the Bureau's ability to (1) quickly detect and address poor enumerator performance or (2) identify falsification of household data while enumerators are in the field. If these issues occur and are not detected and fixed at the beginning of the operation, the quality of decennial census data may be at risk.

II. The Bureau's Reengineered Approach to NRFU Closeout Has Not Been Adequately Tested

During the 2010 Census, the Bureau failed to enumerate only 0.38 percent of NRFU housing units (referred to as "unresolved cases").⁹ However, during the 2014, 2015, and 2016 Census Tests, when the Bureau limited the number of contact attempts but did not employ strategies, such as paid advertising to increase the response rate, the percentage of unresolved cases was much higher (27.48 percent on average).¹⁰ The Bureau stated that those high unresolved rates were due to field operations not including procedures focused on closing out cases and noted that the 2018 E2E Test and the 2020 Census would include such procedures.

According to Bureau and OIG¹¹ reports, during the 2018 E2E Test, the NRFU unresolved rate decreased when compared to those earlier 2014, 2015, and 2016 tests. However, the Bureau is unable to attribute this reduced rate to its closeout procedures because of the following limitations that we observed during the test:¹²

- *The Bureau changed closeout requirements throughout the test.* The Bureau designed a closeout mode alert to inform managers when 70 percent of the cases in defined

⁹ That is, an unresolved NRFU case received the maximum number of contact attempts, and was therefore closed, before an enumerator could collect any information about the housing unit (e.g., housing unit status or number of people residing at the housing unit).

¹⁰ DOC OIG, March 16, 2017. *2020 Census: 2016 Census Test Indicates the Current Life-Cycle Cost Estimate Is Incomplete and Underestimates Nonresponse Followup Costs*, OIG-17-020-I. Washington, DC: DOC OIG, 5.

¹¹ *Ibid.*

¹² In addition to the limitations that we observed, the 2016 Census Test NRFU operation was conducted in Los Angeles and Houston, while the 2018 E2E Test NRFU operation was conducted in Providence. Therefore, test results cannot be reliably compared or generalized to the entire nation, or expected to be repeated during the 2020 Census.

geographical areas (known as *census tracts*) were completed, or reached four attempts. However, the Bureau changed closeout requirements a number of times during the test. For example, approximately 5 weeks into the NRFU operation, the Bureau decided to only count open cases—not completed cases as it did originally—when determining whether a tract was ready for closeout. At the same time, the Bureau also lowered the closeout threshold from 70 to 50 percent. Later in the operation, managers reported that the Bureau changed the threshold multiple times (to 90 percent, and finally to 95 percent) because tracts were becoming ready for closeout too quickly.

Although the Bureau adjusted closeout procedures to respond to conditions during the test, it did not plan for conditions that may have prompted adjustments during the test or plan to measure how each adjustment would impact the response rate. As a result, the Bureau cannot determine which approach was most effective.

- *Closeout assignment functions did not work as intended.* The Bureau planned to assign “high performing” enumerators (closeout enumerators) the ability to work cases that were attempted, but not completed, by other enumerators until completing them or making all remaining attempts. During the 2018 E2E Test, closeout enumerators were able to attempt these cases more than once in a day and visit cases out of order, as planned. However, managers stated that issues with the operational control system¹³ prevented closeout from working as planned, because Area Census Office staff were not able to use the batch assignment feature to assign closeout cases efficiently. Additionally, when headquarters staff intervened and made closeout assignments, some closeout cases were assigned to non-closeout enumerators and enumerators who were not available to work.

Historically, the decennial census NRFU operation requires significant resources to enumerate households that do not complete and submit a census form. An increased lack of trust in the government generally—which may make respondents reluctant to reply to the decennial census specifically—means that these types of cases may become more common during the 2020 Census.¹⁴ Therefore, the Bureau must employ effective closeout procedures to efficiently complete the NRFU operation and ensure a high-quality decennial census. The 2010 Census NRFU operation continued for 13 weeks, but the Bureau needed almost half of the operation to complete the final 4.4 percent (2.3 million cases) of the workload. The Bureau’s inability to effectively test its NRFU closeout procedures increases the risk that additional resources will be required to conduct a complete and accurate enumeration during the 2020 Census.

¹³ The Enterprise Census and Survey Enabling-Operational Control System manages the data collection universe for all enumeration operations, creates the initial universe, receives status updates and response data, and maintains operational workloads during data collection.

¹⁴ Census Bureau. *2020 Census Operational Plan*. Available at <https://www2.census.gov/programs-surveys/decennial/2020/program-management/planning-docs/2020-oper-plan4.pdf> (accessed March 19, 2019).

III. Potentially Unqualified Field Staff Completed Cases During NRFU

We found that 37 percent (89 of 238) of enumerators who failed the NRFU training final assessment and attempted to complete cases during the test were not observed—as they should have been—prior to working in the field. These enumerators made 32 percent of the NRFU contact attempts during the 2018 E2E Test. We observed training system and procedural internal control weaknesses that allowed many enumerators to work before the Bureau could ensure they were properly trained (see table I).

- First, the Bureau could not determine whether some enumerators passed or failed the final assessment because many scores were *not* recorded by the Learning Management System (LMS) (see table I). According to the Bureau, after the 2018 E2E Test's address canvassing operation, it made changes to LMS to prevent listers¹⁵ from taking the final assessment more than once but never tested the system to ensure that it would function correctly during peak operations.
- Second, some enumerators whose failing scores were recorded in LMS were allowed to work without an observation because supervisors had to observe many more enumerators than expected due to the previously mentioned LMS issues. According to the Bureau, there was not enough time to observe everyone.

The issues that we observed during the 2018 E2E Test prevented the Bureau from assessing the effectiveness and efficiency of its new automated training systems and processes. The Bureau must resolve these issues prior to actual decennial census operations in order to ensure that enumerators are adequately trained and prepared to collect accurate data efficiently during the 2020 Census.

Table I. Enumerators Who Failed the NRFU Final Assessment But Were Not Observed

Enumerators	Observed	Not Observed
Failed Final Assessment—Score Not Recorded	33	56
Failed Final Assessment—Score Recorded	116	33

Source: Analysis of U.S. Census Bureau information

IV. Unresolved NRFU Alerts May Not Help the Bureau Maintain or Improve the Quality of Decennial Census Data

During the NRFU operation, the operational control system will generate alerts¹⁶ that notify supervisors and managers in real-time of situations that require immediate attention. The Bureau's increased reliance on technology and automation—as well as the reduced number of offices, distributed workforce, and increased enumerator-to-supervisor ratio—requires

¹⁵ Listers are temporary employees who visit specific geographic areas to identify every place where people could live or stay. Listers compare what they see on the ground to the existing census address list and either verify or correct the address and location information on the list.

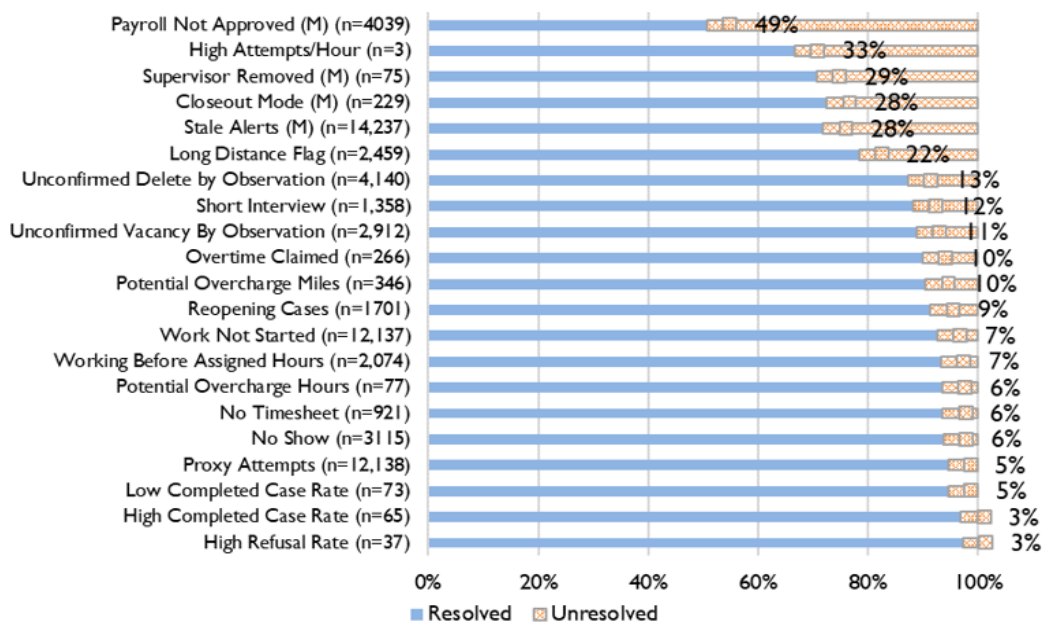
¹⁶ The alerts generated by the operational control system are a primary tool for ensuring progress and quality.

supervisors and managers to use these alerts to monitor, track, and report on enumerator progress and performance during NRFU. According to NRFU training, resolving alerts is a supervisor's most important duty; failing to do so immediately may result in disciplinary action.

However, we found that 15 percent (9,818 of 64,051) of NRFU alerts were never resolved during the 2018 E2E Test (see figure 2). Of particular importance is the "stale alert," which notifies a manager that a supervisor has not resolved an alert within 2 days. The Bureau designed this specific alert in response to our finding¹⁷ that during the 2016 Census Test, supervisors failed to resolve alerts 23 percent of the time. During the 2018 E2E Test, the stale alert was not resolved 28 percent of the time. See appendix B for descriptions of all alerts.

The Bureau reported that supervisors and managers concluded that some alerts were not indicative of a performance issue and that is why they did not document their resolution. Additionally, certain alerts were triggered in error—or were a byproduct of other alerts triggered in error—so the Bureau instructed supervisors and managers to ignore those alerts until the errors were fixed.¹⁸ According to Bureau personnel, as the operation continued, supervisors did not have time to go back and document the resolution of these alerts. Finally, some supervisors and managers violated procedure by assuming that some alerts were triggered in error and then choosing to ignore them.

Figure 2. NRFU Alerts: Unresolved Rates^a



^a This figure does not include alerts that were resolved 100 percent of the time (i.e., *Low Attempts Per Hour*, *High Population*, *High Partial Rate*, and *Look Ahead Availability*). It also does not include alerts that did not trigger during the operation (i.e., *Reinterview Failure*, *Refusal Conversions*, *Many Days No Work*, and *Happy Alerts*).

¹⁷ OIG-17-020-I, 8.

¹⁸ Specifically, the work not started; high attempts/hour; low attempts/hour; high completed cases rate; low completed cases rate; potential overcharge hours; and the potential overcharge miles alert were erroneously triggered until June 2018. Managers did not have time to resolve all of the stale alerts triggered because of these erroneous alerts.

We agree with the Bureau's expectations that these NRFU alerts will help improve the 2020 Census: they provide supervisors and managers opportunities to identify issues and take corrective action, early on, in situations that could adversely impact the quality or efficiency of operations. However, limitations to the Bureau's ability to implement and test these alerts during the 2018 E2E Test's peak operations,¹⁹ as well as previous decennial census tests,²⁰ could prevent the Bureau from identifying issues and providing corrective action early enough to maintain or improve the quality of data collected during the 2020 Census.

Recommendations

We recommend that the Director of the U.S. Census Bureau do the following:

1. Develop a strategy to immediately address quality assurance issues that may occur during the early stages of the self-response and NRFU operations.
2. Determine the optimal time during NRFU to begin closeout procedures and ensure that systems support those procedures prior to the 2020 Census.
3. Correct automated training system failures that occurred during the 2018 E2E Test and implement and monitor controls to ensure that field staff are qualified before working in the field.
4. Monitor the resolution of alerts at a national level to identify whether alerts are (a) resolved timely and (b) functioning correctly during the operation.
5. Develop a strategy to remedy alert issues and communicate appropriate procedures and instructions to field staff if monitoring efforts identify issues.

¹⁹ Peak operations covers the field enumeration operations of the 2018 E2E Test.

²⁰ (1) DOC OIG, June 7, 2016. *2020 Census: The Bureau Has Not Reported Test Results and Executed an Inadequately Designed 2015 Test*, OIG-16-032-A. Washington, DC: DOC OIG.

(2) DOC OIG, May 11, 2017. *2020 Census: The Address Canvassing Test Revealed Cost and Schedule Risks and May Not Inform Future Planning as Intended*, OIG-17-024-A. Washington, DC: DOC OIG.

(3) OIG-19-008-A.

Other Matters

NRFU Quality Assurance Lacks Segregation of Duties

Following the 2000 Census, we raised concerns over the fact that the same manager supervised both production and reinterview work.²¹ Specifically, we suggested that the pressure to complete both within a tight period, coupled with a lack of segregated duties, could result in shortcuts and reduced data quality. During the 2010 Census, the Bureau separated the operational and quality assurance duties by creating an Assistant Manager for Field Operations (production) and an Assistant Manager for Quality Assurance (reinterview). However, during the 2020 Census, the Bureau again plans to allow supervisors and enumerators to conduct both production and quality assurance work—again raising concerns related to segregation of duties that we previously identified and were subsequently addressed. If the Bureau does not reconsider its approach to NRFU quality assurance, the same manager overseeing both collection and verification of information could lead to shortcuts and reduced data quality.

During the 2018 E2E Test, some enumerators completed both production interviews and reinterviews. We tested and found that no enumerators reinterviewed cases that they originally interviewed. However, during the 2020 Census NRFU operation, there is a risk that—because of pressure to complete work in a short period of time—managers and supervisors may not be vigilant in their efforts to ensure data quality.

The Bureau Must Still Improve Its Training for NRFU Operation Proxy Procedures

In response to a prior audit finding of ours concerned with the 2016 Census Test,²² the Bureau developed a training module for enumerators to address the following:

- A *proxy* is a non-household member who is at least 15 years old and knowledgeable about the housing unit.
- When prompted to locate a proxy, an enumerator must always attempt to find one.
- An enumerator must document each proxy interview attempt by recording the proxy's contact information.
- Eligible proxies include neighbors, government office staff, real estate agents, utility workers, landlords or property managers, caregivers or health providers, people who recently moved to the residence, relatives of the household member, or enumerators with personal knowledge.

While in Providence County, we observed six enumerators attempt a proxy interview and three did not fully follow those procedures. Specifically, two enumerators did not ensure that

²¹ DOC OIG, March 11, 2002. *Improving Our Measure of America: What Census 2000 Can Teach Us in Planning for 2010*, OIG-14431. Washington, DC: DOC OIG, 16.

²² OIG-17-020-I.

the proxy had knowledge of household members before collecting a response. One enumerator used him- or herself as a proxy for some residences, stating they were using the experience gained as a lister during the address canvassing operation.

In 2010, enumerators completed about 24.4 million—or 51.8 percent—of NRFU interviews via proxy. Therefore, the Bureau must train enumerators to complete these types of cases properly and consistently in order to ensure the quality of decennial census data.

Summary of Agency Response and OIG Comments

In its November 1, 2019, response to our draft report, the Bureau concurred with all five of our recommendations—and provided additional context for our findings, as well as described actions it has taken to address our concerns. The Bureau indicated that it successfully deployed and used its newly developed systems and applications in a real-world environment during the 2018 E2E Test. However,

- The Bureau did not test SRQA during the 2018 E2E Test. Additionally, the Bureau did not fully test NRFU reinterview during the test, nor has it fully tested reinterview during any prior tests this decade. Therefore, these systems and processes remain untested and the first time each will be fully deployed in a live enumeration environment will be during the 2020 Census (finding I).
- Issues with the operational control system prevented closeout procedures from functioning as planned (finding II).
- The Bureau could not determine whether some enumerators passed or failed the final assessment because many scores were not recorded by the LMS (finding III).
- Certain alerts were triggered in error or were a byproduct of other alerts triggered in error and this contributed to the number of unresolved alerts during the test (finding IV).

With respect to finding I, the Bureau indicated that it had tested components of SRQA recently by using (1) 2018 self-response data and (2) deliberately falsified data in an attempt to identify falsified responses while testing the recollection of response data for functionality. However, the field recollection of response data was not tested in a live enumeration environment prior to the 2020 Census, creating a risk to the quality of decennial census data. In addition, the Bureau stated that although NRFU reinterview was not fully tested as part of the 2018 E2E Test, the Bureau conducted an internal test of the remaining components and will implement necessary changes.

In response to finding II, first, the Bureau stated that it used 2018 E2E Test results to develop its 2020 Census NRFU closeout strategy, which it details in its *NRFU Detailed Operational Plan*. Second, the Bureau indicated that it resolved the technical issues that prevented staff from making batch assignments and it plans to test this functionality prior to the 2020 NRFU operation.

To address finding II, the Bureau needs to ensure that systems support closeout procedures prior to the 2020 Census. We also recommended that the Bureau determine the optimal time during NRFU to conduct closeout procedures. In its *Detailed Operational Plan* for NRFU, the Bureau indicated that when 85 percent of cases in a Census Field Supervisor (CFS) area are closed, regardless of the resolution status, the CFS area will be eligible for closeout. The Bureau added that Census Field Managers will be able to activate closeout for a CFS area

beginning June 23, 2020, and all CFS areas will be moved into closeout by July 10, 2020.²³ Therefore, we determined that the Bureau provided evidence to address this portion of the recommendation.

In response to finding III, the Bureau stated that it fixed the system defect in LMS that prevented the accurate capture and sharing of assessment scores. In response to finding IV, the Bureau stated that more than 90 percent of alerts were resolved during the 2018 E2E Test. However, according to alert data we received from the Bureau on August 20, 2018, only 85 percent of alerts were resolved by the end of the test. The Bureau also stated that it implemented modifications to NRFU alerts to address the findings in our report, which include updating parameters of alerts to achieve the alerts' intended purpose.

We have included the Bureau's formal response as appendix C of this report.

²³ Census Bureau. April 16, 2018. *2020 Census Detailed Operational Plan for: 18. Nonresponse Followup Operation (NRFU)*, Version 1.0. Washington, DC: Census Bureau, 22. Available at <https://www.census.gov/programs-surveys/decennial-census/2020-census/planning-management/planning-docs/NRFU-detailed-op-plan.html> (accessed December 6, 2019).

Appendix A: Objectives, Scope, and Methodology

Our objectives during this audit were to determine whether (1) the test included data quality components identified as success criteria in the test plan; (2) the Bureau designed the test to inform the 2020 Census; (3) NRFU systems are included in the test and function as designed; and (4) the Bureau performed non-ID processing and unduplicated responses in a timely manner to reduce the NRFU operation's workload.

The scope of our audit included the peak operations of the 2018 E2E Test conducted by the Bureau in Providence County. We conducted this performance audit from March 2018 to February 2019, in support of our oversight role to improve the programs and operations of the U.S. Department of Commerce.

To accomplish our objectives, we performed the following:

- Interviewed and obtained information from Bureau headquarters officials to gain an understanding of NRFU and non-ID Processing operations. Specifically, fraud detection, closeout procedures, training, alerts, and the Bureau's method of removing duplicate cases from the NRFU workload.
- Conducted observations and interviews at the following locations:
 - The Bureau's National Processing Center in Jeffersonville, Indiana, to gain an understanding of the non-ID processing operation.
 - The 2018 E2E Test site in Providence County, to gain an understanding of the NRFU operation and closeout procedures in the field.
 - Bureau headquarters in Suitland, Maryland, to gain an understanding of management and system controls relevant to our audit objectives and fraud detection.
- Reviewed the following prior audits and reports to Congressional Requesters and Committees:
 - DOC OIG, February 6, 2018. *2020 Census: Issues Observed During the 2018 End-to-End Census Test's Address Canvassing Operation Indicate Risk to Address List Quality*, OIG-19-008-A.
 - U.S. Government Accountability Office (GAO), November 7, 2012. *2020 Census: Initial Research Milestones Generally Met but Plans Needed to Mitigate Highest Risks Report to Congressional Requesters*, GAO-13-53.
 - GAO, February 15, 2017. *High Risk Series: Progress on Many High-Risk Areas, While Substantial Efforts, Report to Congressional Committees, Needed on Others*, GAO-17-317.
 - GAO, January 26, 2017. *2020 Census: Additional Actions Could Strengthen Field Data Collection Efforts*, Report to Congressional Requestors, GAO-17-191.

- Reviewed Bureau standards, plans, and other relevant information. Specifically:
 - 2020 Census operational plans, 2018 E2E Test criteria, NRFU operational details, and training documentation.
 - Reviewed non-ID quality control manuals, and documentation of procedures, processes, and training.

Additionally, we used computer-processed data to evaluate payroll, production, quality assurance (reinterview), and alerts. We did not use statistical sampling as part of our data analysis. To assess whether data were sufficiently reliable to conduct this analysis, we performed reasonableness tests, looking for missing data, calculation errors, data outside valid timeframes, data outside designated values, negative values in positive-only fields, and duplicate records. We did not identify any issues and consider the data reliable for our purposes.

We also reviewed internal controls significant to the audit objectives. Specifically, we obtained an understanding of and reviewed internal controls for information technology systems used to generate these data. We did not assess information technology system controls for LMS after becoming aware that the data reported were not reliable. We conducted additional testing, which confirmed that LMS did not accurately report final assessment scores and identified internal control weaknesses that hindered the Bureau's ability to ensure that enumerators were properly trained. We reported this weakness of internal control in finding III of this report. We also identified another internal control weakness over the Bureau's quality assurance procedures and reported this within the "Other Matters" section of this report.

We did not identify any specific laws or regulations relevant to our audit objectives for which we could perform specific tests. We did not identify any specific instances of fraud, significant violations, or abuse during our audit.

We conducted this audit under the authority of the Inspector General Act of 1978, as amended, and Department Organization Order 10-13, dated April 26, 2013, at the Department of Commerce, Office of Inspector General office in Washington, DC, metropolitan area and the on-site observations previously mentioned. We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix B: NRFU Alert Names and Descriptions

Alert Name	Description
Payroll Not Approved ^a	Supervisor has not approved payroll within 2 days of its submission
High Attempts per Hour	Enumerator has a high number of attempted cases per hour
Supervisor Removed ^a	Enumerator not yet assigned to a supervisor
Closeout Mode ^a	A census tract is eligible for closeout
Stale Alert ^a	Supervisor has not resolved an alert within 2 days
Long Distance Flag	Enumerator completed a case too far from the assignment location
Unconfirmed Delete by Observation	An enumerator deleted at least two cases based on observation; however, this deletion was not confirmed within the next two attempts
Short Interview	Enumerator completed an interview too quickly
Unconfirmed Vacancy by Observation	An enumerator determined at least two cases were vacant based on observation; however, vacant status was not confirmed within the next two attempts
Overtime Claimed	Enumerator claimed overtime hours
Potential Overcharge Miles	Enumerator claimed more miles than expected
Reopening Cases	An enumerator re-opened, but did not complete, at least two cases from the inactive case list in a day
Work Not Started	An enumerator did not attempt a case after a reasonable amount of time after the work assignment started
Working Before Assigned Hours	Enumerator worked before their assigned start time
Potential Overcharge Hours	Enumerator claimed more hours than expected
No Timesheet	Employee worked on a particular day but did not submit a time and expense record by midnight
No Show	Enumerator did not attempt any of their assigned work
Proxy Attempts	Enumerator did not enter any proxy attempts even though at least two cases were proxy eligible
Low Completed Case Rate	Enumerator has a high number of unresolved cases
High Completed Case Rate	Enumerator has a high number of complete, vacant, or deleted cases
High Refusal Case Rate	Enumerator has a high rate of attempts resulting in refusals
Low Attempts Per Hour	Enumerator has a low number of attempted cases per hour
High POP (population) I Rate	Enumerator has a high number of cases with a population count of one (i.e., too many single-person households)
High Partial Rate	Enumerator has a high rate of sufficient partial interviews




Alert Name	Description
Look Ahead Availability	The supervisor's team does not have enough enumerators with availability for the next 3 workdays although there is work that needs to be assigned
Reinterview Failure ^b	Two of an enumerator's production cases failed reinterview
Refusal Conversions ^b	Enumerator resolved two or more cases previously coded as refusals
Many Days No Work ^b	Enumerator has not attempted an assignment in 3 days
Happy Alert ^b	Enumerator has not triggered any negative alerts for 3 consecutive work days

Source: Analysis of U.S Census Bureau information

^a These alerts could only be resolved by managers and were often triggered by an event in the field or a supervisor's action/inaction to alerts triggered by enumerators.

^b The *Happy*, *Many Days No Work*, *Refusal Conversion*, and *Reinterview Failure* alerts did not trigger during the 2018 E2E Test NRFU operation.

Appendix C: Agency Response

	
UNITED STATES DEPARTMENT OF COMMERCE U.S. Census Bureau Office of the Director Washington, DC 20233-0001	
NOV 01 2019	
MEMORANDUM FOR:	Carol Rice Assistant Inspector General for Audit and Evaluation Office of the Inspector General
From:	Steven D. Dillingham Director U.S. Census Bureau 
Subject:	Response to Office of the Inspector General Draft Report: <i>2020 Census: Some Decennial Census Data Quality Assurance Methods Were Not Tested or Did Not Work as Intended during the 2018 End-to-End Census Test</i>
<p>The attached comments are in response to your October 4, 2019, draft report titled "<i>2020 Census: Some Decennial Census Data Quality Assurance Methods Were Not Tested or Did Not Work as Intended During the 2018 End-to-End Census Test.</i>"</p> <p>We concur in the recommendations and believe we have already addressed all of them. The U.S. Census Bureau appreciates the opportunity to review and provide comments and context on this draft report findings. We will prepare an action plan upon the final report's issuance.</p> <p>Attachment</p>	
	
<i>census.gov</i>	

**Census Bureau Comments on Office of Inspector General Draft Report:
"2020 Census: Some Decennial Census Data Quality Assurance Methods were not Tested
or Did not Work as Intended during the 2018 End-to-End Census Test"
October 2019**

The U.S. Census Bureau appreciates the opportunity to comment on this draft report. We agree with the tentative recommendations, and we are providing context for the findings on this draft report.

The Census Bureau designed the 2018 Census Test to assess the readiness and integration of planned 2020 Census operations, procedures, systems and field infrastructure. The Test started in 2017 with an [Address Canvassing Operation](#) in [Providence County, R.I.](#), [Beckley-Bluefield-Oak Hill, W.Va.](#), and Pierce County, Wash. In the Test, the Census Bureau demonstrated that it could successfully deploy and use our newly developed secure systems and applications in a real-world environment. It established that the Census Bureau was ready to transition from a paper-based census, to one where people could respond online, by telephone, or by using the traditional paper-response option. In the Providence portion of the test, the Census Bureau was able to test our modernized approach of managing enumerators. The Test demonstrated that the Census Bureau could use hand-held smartphones for all aspects of their work -- including receiving assignments, viewing the most efficient routing to visit each household, submitting their hours, and securely recording and transmitting each respondent's information in an encrypted format. Based on the 2018 test experience, the Census Bureau is comfortable continuing our work throughout the remainder of the decade to refine and scale our systems. We consider the 2018 Census Test to be a success.

Context for Finding I. The Bureau has not fully tested some activities designed to ensure the quality of 2020 Census respondent data.

The Census Bureau has not tested Self-Response Quality Assurance (SRQA).

The Census Bureau has tested components of SRQA over the past four years, including testing over the last year of the SRQA system that will be used in 2020. However, due to funding challenges in 2017, implementing the proposed 2020 SRQA solution during the self-response period of the 2018 Test was not feasible. These funding challenges did lead to delays in development and implementation of the proposed solution but are on track to implement the solution in December 2019.

Over the last two years Census Bureau staff and developers have focused on planning, designing, building, and testing a comprehensive system in preparation for 2020, building on earlier work conducted in the 2015, 2016, and 2017 Census Tests. We have used 2018 self-response data, as well as deliberately falsified data, to test the 2020 system's ability to identify falsified responses consistently. The SRQA team recently presented results of the initial "red

team” testing the system to the 2020 Decennial Research Objectives and Methods group. We have also tested functionality and procedures for field recollection of response data and conducted automated processing that informed the current system design.

The Census Bureau’s SRQA procedures mandate multiple layers of checks against the incoming response data, whether the response is through the traditional census-ID path or through the newly introduced non-ID path. For example, the system matches every response record against administrative records to determine confidence levels. In addition, all self-response records are processed using statistical models that examine each response individually, as well as part of trend analysis. Finally, data analysts review the result of the statistical modeling. Response records deemed suspicious are field verified.

Following the conclusion of the 2018 End-to-End Census Test, all self-response records from that test were compared against administrative records, the master address file, and the SRQA statistical models in a series of staggered testing efforts. This work has helped us assess the effectiveness of each step of our automated approach, and lessons learned are helping us improve the models in the SRQA system prior to 2020 implementation. This work has also allowed us to assemble an experienced staff who will be the core of a larger operations team of experienced data scientists. That team will analyze the SRQA systems outputs and discern which responses to refer to field verification.

In the weeks ahead, we will conduct further testing of the enhanced models. At the same time, the Information Technology staff will complete the integration testing of the SRQA system to ensure data integrity, along with conducting scalability and performance tests. We plan to complete all of this system testing in time for the Production Readiness Review scheduled on December 13, 2019, several months in advance of the March 2020 implementation.

The Census Bureau Has Not Fully Tested Non-Response Followup (NRFU) Reinterview

The Census Bureau is confident that the 2020 NRFU reinterview systems and processes will identify and mitigate enumerator issues that could negatively impact data quality during the 2020 Census. While NRFU reinterview was not fully tested as part of the 2018 End-to-End Census Test, the Census Bureau conducted an internal test of the remaining components from September 17, 2019, to October 4, 2019. The Census Bureau is analyzing results from the test and plans to implement changes needed to ensure the successful execution of NRFU reinterview.

Context for Finding II. The Bureau’s reengineered approach to NRFU closeout has not been adequately tested.

During the 2018 End-to-End Census Test the Census Bureau tested closeout procedures for the 2020 NRFU operation. While the planned closeout procedures did not resolve all NRFU cases, this test was instrumental in the development of the enhanced 2020 NRFU contact strategy outlined in the Detailed Operational Plan for the Nonresponse Followup Operation.

The experience of the 2018 End-to-End Census Test directly impacted various innovations within the 2020 NRFU contact strategy including:

(a) The Phased Approach

The Census Bureau's analysis of the 2018 data showed that the enumerator was the single largest contributor to the resolution of cases. Despite the characteristics of a household or the results of prior attempts, high performing enumerators found a way to complete difficult cases. We built Phase 2 of the 2020 NRFU contact strategy around that finding. During Phase 1, cases will be put on hold after a number of attempts. These difficult cases then will be assigned to high performing enumerators identified at the beginning of Phase 2. Instead of routing cases to the next available enumerator each day, high performing enumerators will work the same cases for multiple attempts. During the 2018 Test, enumerators that received the same households each day were able to utilize knowledge from their previous attempts to efficiently resolve cases. For example, returning enumerators would know which proxies previously were contacted and the time of day of prior contacts. Additionally, enumerators will have more flexibility to attempt to complete cases in an order other than in the sequence presented by the MOJO optimizer. This flexibility allows enumerators to capitalize on their local knowledge and account for anomalies that can happen in the field.

(b) The Geography of Contact Procedures

The 2020 NRFU contact strategy uses the Census Field Supervisor (CFS) Area geography. The Census Bureau learned from the 2018 Test that the tract level was too low of a geographic level to manage closeout procedures, because of the amount of variation between tracts. The CFS area provides a larger geography with less variation, rendering progress and phase triggers more effective.

(c) The Use of Administrative Records during Closeout

As noted in this report, the time needed to close the final 4.4 percent of unresolved cases in 2010 was nearly equal to the time needed to complete the other 95.6 percent of the NRFU workload. The 2018 Test revealed the importance of trying to resolve these lingering cases using all tools available. As a result, the 2020 NRFU contact strategy uses administrative records to resolve cases that would otherwise require additional attempts during the closeout phase.

In addition to these updates, the Census Bureau has resolved the technical issues impeding the ability to make batch assignments. That functionality will be thoroughly tested in the months leading up to the NRFU operation to ensure readiness.

Context for Finding III. Potentially unqualified field staff completed cases during NRFU.

The Census Bureau has mitigated this finding. We have fixed the system defect in the Learning Management System (LMS) that prevented the accurate capture and sharing of assessment scores. The LMS functioned as intended in the 2020 Address Canvassing operation.

Context for Finding IV. Unresolved NRFU alerts may not help the Bureau maintain or improve the quality of decennial census data.

The Census Bureau implemented modifications to NRFU alerts to account for the observations made in this report. At the beginning of the 2018 NRFU operation, there was an alert that erroneously flagged at significantly high rates. We have updated the parameters of that alert and other alerts to better achieve the intended purpose. These updates and the removal of non-helpful alerts will minimize the number of false-positive alerts that inundated supervisors and led to the reduced alert resolution and elevated instances of the "stale alert."

Context for 'Other Matters' section:**(1) NRFU quality assurance lacks segregation of duties**

The automation of case assignments for the NRFU operation has increased anonymity between the original enumerator and the reinterview enumerator. The Census Bureau is confident that this automation increases efficiency for the NRFU quality control program, while also ensuring the quality of data collected during the NRFU operation. System controls are clear throughout the case assignment process to ensure that an enumerator is never assigned a reinterview case that they originally interviewed.

(2) The Bureau must still improve its training for NRFU operation proxy procedures.

As a result of the Census Bureau's assessment from the 2018 Test, training for these procedures has been updated to improve the success of proxy interviews by enumerators.

Context for 'OIG Summary' section:

Census Bureau data show that over 90 percent of NRFU alerts were resolved in the 2018 End-to-End Test.

General Comments:

The Census Bureau will continuously assess responses from the various modes (e.g., paper, Census Questionnaire Assistance, internet self-response, and Non-ID) and remove households that have self-responded from the NRFU workload based on Census ID matching or address matching in the case of Non-ID. The Census Bureau will unduplicate responses for persons or households after all responses have been collected. By design, this final unduplication activity would have no impact on the NRFU workload.