

The Census Bureau Should Address Challenges from the 2020 Post-Enumeration Survey Ahead of the 2030 Census

FINAL REPORT NO. OIG-25-015-A

MARCH 25, 2025

The Census Bureau's Disclosure Review Board and Disclosure Avoidance Officers have reviewed this information product for unauthorized disclosure of confidential information and have approved the disclosure avoidance practices applied to this release. (CBDRB-FY24-0479)



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



March 25, 2025

MEMORANDUM FOR: Dr. Ron S. Jarmin
Acting Director
U.S. Census Bureau

FROM: Analee Striner-Brown
Acting Assistant Inspector General for Audit and Evaluation

SUBJECT: *The Census Bureau Should Address Challenges from the 2020 Post-Enumeration Survey Ahead of the 2030 Census*
Report No. OIG-25-015-A

Attached is the final report on our audit of the U.S. Census Bureau's 2020 Post-Enumeration Survey results as they relate to overcounts and undercounts. We will post the report on [our website](#) per the Inspector General Act of 1978, as amended (5 U.S.C. §§ 404, 420).

Within 60 calendar days, please provide an action plan addressing the report's recommendations, as required by Department Administrative Order 213-5.

Please also note that any nongovernmental organization or business entity specifically identified in this report can submit a written response to clarify or provide additional context on any specific reference (Pub. L. No. 117-263, § 5274). The response must be submitted to Amy Jones, Division Director, at ajones@oig.doc.gov and OAE_Projecttracking@oig.doc.gov within 30 days of the report's publication date. We will post the response on our website as well. If the response contains any classified or otherwise nonpublic information, the organization should identify the information and provide a legal basis for redacting it.

We appreciate your staff's cooperation and professionalism during this audit. If you have any questions or concerns about the report, please contact me at (202) 893-8759 or Amy Jones at (724) 343-6921.

Attachment

cc: Deborah M. Stempowski, Associate Director for Decennial Census Programs, Census Bureau
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Report in Brief

MARCH 25, 2025

Background

The U.S. Census Bureau carries out a decennial census of the U.S. population to reapportion the U.S. House of Representatives and determine the distribution of federal funding to the states, tribal governments, and local communities for services and infrastructure. The bureau also carries out a quality check of the decennial census, which in 2020 was called the Post-Enumeration Survey (PES). The PES's purpose is to independently survey a representative sample of households from the decennial census enumeration to measure coverage error and census accuracy.

The PES results are one of the most important quality measures of the decennial census. This is especially true for the 2020 Census, which experienced complications and delays largely due to the COVID-19 pandemic—particularly with the Person Interview (PI) operation. Because of a low response rate at the end of the original operation compared to 2010, the bureau decided to reopen PI to increase response rates. PES estimates found that 14 states had population undercounts or overcounts. In addition, some historically undercounted demographic groups were undercounted again, but to a higher degree, while others were overcounted.

Why We Did This Review

Our audit objective was to assess the validity of the 2020 PES results as they related to overcounts and undercounts. We assessed (1) whether the bureau's methodologies for carrying out the 2020 PES were consistent with relevant federal and agency statistical standards and (2) the effectiveness of 2020 PES operations to ensure that estimates were accurate and reliable.

U.S. CENSUS BUREAU

The Census Bureau Should Address Challenges from the 2020 Post-Enumeration Survey Ahead of the 2030 Census

OIG-25-015-A

WHAT WE FOUND

Overall, while the 2020 PES results were derived using methodologies that were consistent with federal and bureau statistical standards, we identified areas of concern that had an impact on the survey results, bringing into question the validity of the 2020 PES. Specifically, we found the following:

- I. Operational disruptions and mitigations in response to missing data increased uncertainty in PES estimates.
 - A. The 2020 PES experienced increased levels of missing data.
 - B. The bureau did not always quantify sources of non-sampling error.
- II. A smaller-than-anticipated sample size contributed to increased uncertainty in PES estimates.
- III. The bureau did not carry out quality control (QC) processes for PES operations as planned.
 - A. QC listers did not complete Independent Listing QC checks and rectification within the prescribed timelines.
 - B. The bureau did not conduct Person Interview Reinterview within recommended completion time frames.
 - C. The bureau reviewed fewer Basic Collection Units than planned during clerical matching and did not always review flagged cases.

The reliability of the PES depends on obtaining representative results through an operation that is carried out as designed. Public trust in both the PES and decennial enumeration results follows from a well-conducted survey. The bureau should execute timely QC processes as designed to ensure that the results of PES operations are accurate, consistent, and reliable.

WHAT WE RECOMMENDED

We recommended that the Director of the U.S. Census Bureau consider the following actions when implementing changes to the 2030 PES redesign:

- Advancing approaches to mitigate missing data and conducting research to better understand groups most likely to be impacted by missing data.
- Analyzing and quantifying major sources of non-sampling error, to include the cumulative effect of multiple sources of error, and ensuring the results are communicated to the public.
- Ensuring that sampling designs undergo appropriate analysis prior to production and are designed to support their intended uses.
- Establishing a detailed and effective strategy to ensure computer system relocations are completed on schedule to minimize operational disruptions.
- Ensuring changes to quality assurance processes are documented, approved, and widely communicated across all affected divisions and their operational components.
- Strengthening the bureau's quality assurance plan to ensure reinterviewers complete cases within prescribed time frames.
- Strengthening the clerical matching QC plan to adhere to applicable QC review thresholds.
- Establishing procedures to ensure analysts review flagged clerical matching cases and documentation of analyst reviews is maintained.
- Ensuring that the bureau's records retention schedule for 2030 Census records prescribes only fixed retention periods that also allow records to be available for a sufficient period following the end of operations for internal and external oversight activities.

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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.

Background

The U.S. Census Bureau serves as the nation's leading provider of quality data about its people and economy. Since 1790, the United States has carried out a decennial census of the U.S. population per the constitutional requirement to reapportion the U.S. House of Representatives every 10 years.¹ In addition to reapportionment, the results of the decennial census determine the distribution of federal funding to the states, tribal governments, and local communities for services and infrastructure, which the bureau estimated at more than \$1.5 trillion in fiscal year 2021.

Since 1950, the bureau has carried out a quality check of the decennial census, which in 2020 was called the Post-Enumeration Survey (PES). The PES's purpose is to independently survey a representative sample of households from the decennial census enumeration to measure coverage error and the accuracy of the census. The PES creates an independent estimate of the number of people living in the United States and Puerto Rico on April 1, 2020 (excluding people in group quarters, such as nursing homes or college dorms, and people in Remote Alaska areas), surveying a sample of the U.S. population and matching those responses to their records in the 2020 Census.

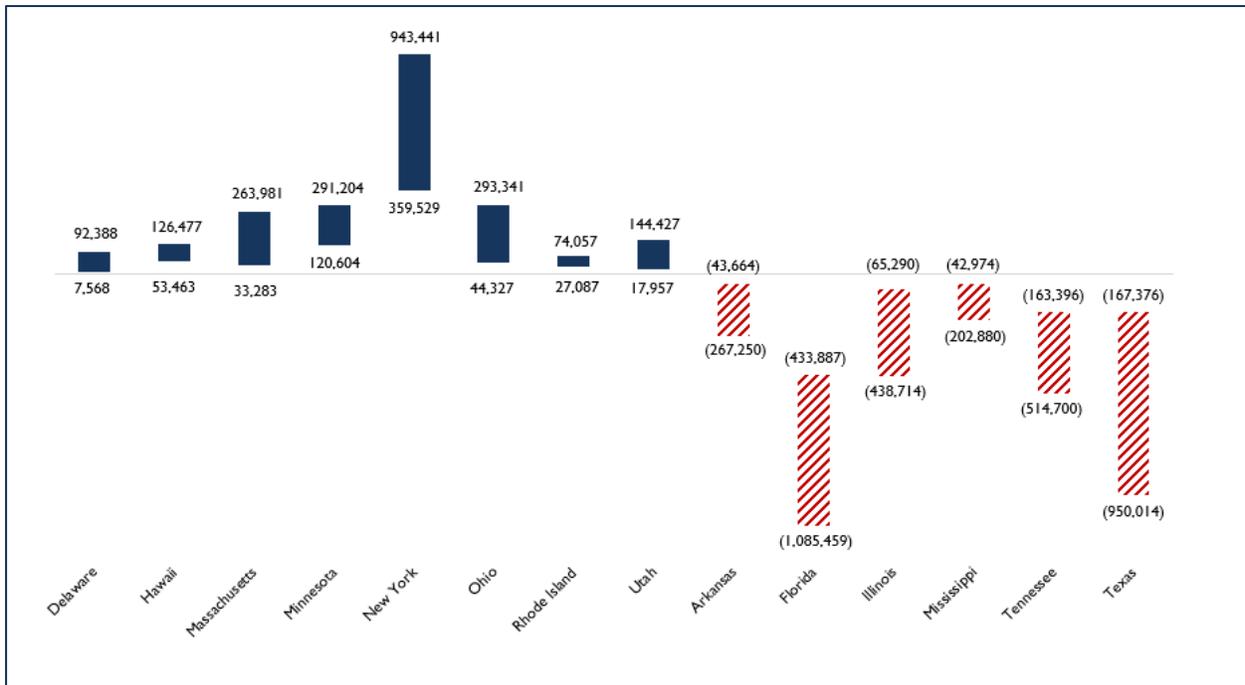
The results of the PES are one of the most important quality measures of the decennial census. This is especially true for the recently completed 2020 Census, which experienced complications and delays largely due to the COVID-19 pandemic—particularly with the Person Interview (PI) operation. The pandemic significantly impacted PES data collection efforts, contributing to extended time frames and operational challenges. Because of a low response rate at the end of the original operation compared to 2010, the bureau decided to reopen PI to increase response rates. While the PES overall population count was not significantly different from the 2020 Census, the March 2022 PES results showed statistically significant undercounts of Black or African American and Hispanic or Latino populations, whereas the results for non-Hispanic White and Asian populations showed statistically significant overcounts.

On April 26, 2021, the bureau reported that the resident U.S. population as of April 1, 2020, was 331,449,281, an increase of 7.4 percent since the 2010 Census. For the 2020 Census, the PES found that the overall U.S. population showed no statistically significant net national coverage error. However, PES estimates found that 14 states had population overcounts or undercounts (see figure 1).²

¹ U.S. Constitution, Article I, Section 2.

² See appendix B for detailed information about under- and overcounts by state.

Figure I. Estimated Range of Overcounts and Undercounts by State (Upper and Lower Bounds)

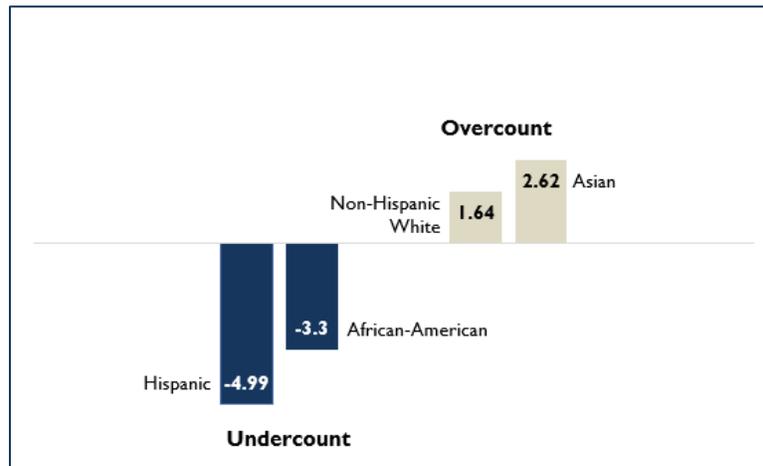


Source: OIG analysis of 2020 Census PES people estimates

Note: This chart displays states with statistically significant overcounts and undercounts. “Statistically significant” describes an estimate that was greater than the standard error using a 90 percent confidence interval. A positive number greater than the standard error indicates an overcount, while a negative number greater than the standard error indicates an undercount.

In addition, some historically undercounted demographic groups were undercounted again, but to a higher degree, while others were overcounted (see figure 2).

Figure 2. Undercounts and Overcounts by Select Demographic (Percentage)



Source: OIG analysis of 2020 Census PES people estimates

Note: This chart displays demographics with statistically significant undercounts and overcounts. “Statistically significant” describes an estimate that was greater than the standard error using a 90 percent confidence interval. A positive number greater than the standard error indicates an overcount, while a negative number greater than the standard error indicates an undercount.

The 2020 PES consisted of three high-level operations: (1) Coverage Measurement Design and Estimation Operation, (2) Coverage Measurement Matching Operation, and (3) Coverage Measurement Field Operation. These operations were further broken down into 25 operational activities (see appendix C), with field operations overseen by Regional Census Centers (RCCs) in six regions across the country.³ The PES lasted more than 3 years, starting on July 17, 2019, and ending on August 16, 2022 (see appendix D for PES operations reviewed).

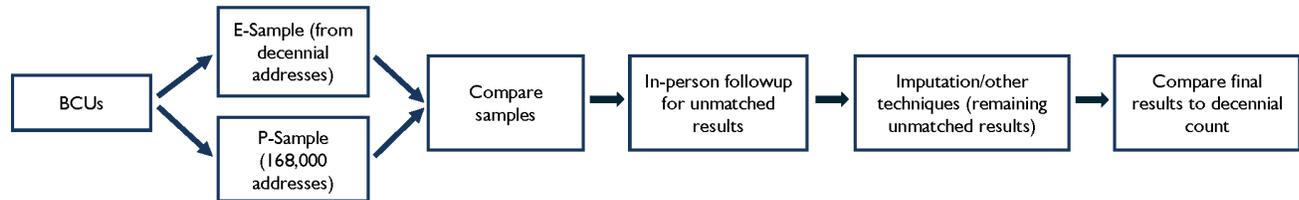
The bureau selected a sample of 10,000 Basic Collection Units (BCUs) in the U.S. and Puerto Rico. A field operation called Independent Listing (IL) was carried out that independently listed 532,000 housing units (HUs), which constituted the sampling frame. From that frame, the bureau selected a sample of 168,000 addresses (i.e., households) to create the P-sample. The bureau also pulled a separate sample of addresses from the same BCUs in the PES sampling frame to create the E-sample. It then enumerated the people in the P-sample and E-sample households in the PI operation.

Following these initial field operations, the bureau compared the results of the P-sample with those of the E-sample through both computer and clerical matching to determine which HUs and people matched. The bureau then conducted in-person follow-up interviews to attempt to resolve discrepancies, such as nonmatched addresses, possible matches, duplicate addresses, and unit status updates. The bureau used various techniques, including independent imputation of missing demographic characteristics, during estimation to fill in data gaps and provide estimates of the population for the P-sample. The bureau then compared this dual-system

³ The RCCs were in Atlanta, Chicago, Dallas, Los Angeles, New York, and Philadelphia.

estimate against the actual decennial census count to assess the accuracy of the decennial census (excluding group quarters and Remote Alaska areas) and determined how many people were missed or counted in error (see figure 3).

Figure 3. High-Level PES Overview



Source: OIG analysis of Census Bureau information

Despite reopening the PI operation, the bureau experienced lower response rates⁴ for the 2020 PES than in 2010—83.2 percent compared to 96.6 percent, respectively.⁵ This occurred because of a higher non-interview rate attributed to COVID-19 pandemic disruptions and declining survey response.

⁴ The response rates expressed in percentages exclude HUs that were either vacant or nonexistent.

⁵ Jost, M., Khubba, S., and Hill, C., August 7, 2022. *Nonresponse in the 2020 Post-Enumeration Survey (PES)*. Suitland, MD: Census Bureau, 2.

Objective, Findings, and Recommendation

The objective of our audit was to assess the validity⁶ of the 2020 PES results as they related to overcounts and undercounts. Specifically, we assessed (1) whether the bureau's methodologies for carrying out the 2020 PES were consistent with relevant federal and agency statistical standards and (2) the effectiveness of 2020 PES operations to ensure that estimates were accurate and reliable. We contracted with the Institute for Defense Analyses (IDA), an independent firm, to assess whether the bureau's methodologies for carrying out the 2020 PES were consistent with relevant federal and agency statistical standards. We assessed IDA's competence and professional qualifications and oversaw the progress of its work. Further, we used IDA's analysis in reaching the findings and conclusions presented in this report. See appendix A for a more detailed description of our scope and methodology.

Overall, while the 2020 PES results were derived using methodologies that were consistent with federal and bureau statistical standards, we identified areas of concern that had an impact on the survey results, bringing into question the validity of the 2020 PES. The survey encountered significant delays due to the COVID-19 pandemic and ensuing disruptions to operations. We found that mitigations in response to missing data increased uncertainty in PES estimates, the PES sample size was smaller than anticipated, and quality control (QC) processes for certain operations were not carried out as planned. These deficiencies, in part, resulted in higher non-response rates, which required more statistical adjustments. Those adjustments, in turn, raise concerns about data quality. Specifically, we found the following:

- I. Operational disruptions and mitigations in response to missing data increased uncertainty in PES estimates.
 - A. The 2020 PES experienced increased levels of missing data.
 - B. The bureau did not always quantify sources of non-sampling error.
- II. A smaller-than-anticipated sample size contributed to increased uncertainty in PES estimates.
- III. The bureau did not carry out QC processes for PES operations as planned.
 - A. QC listers did not complete IL QC checks and rectification within the prescribed timelines.
 - B. The bureau did not conduct Person Interview Reinterview (PIRI) within recommended completion time frames.
 - C. The bureau reviewed fewer BCUs than planned during clerical matching and did not always review flagged cases.

As we discuss in appendix A, we could not complete testing on case samples from some field operations because the bureau destroyed that documentation in accordance with its records

⁶ Validity is the degree to which an estimate is likely to be true and free of statistical bias. See Office of Management and Budget, September 2006. *Standards and Guidelines for Statistical Surveys*. Washington, DC: OMB. Available online at www.whitehouse.gov/wp-content/uploads/2021/04/standards_stat_surveys.pdf (accessed October 11, 2024).

retention schedule. Accordingly, we were unable to determine whether the bureau carried out QC processes for those follow-up operations.

The bureau should execute timely QC processes as designed to ensure that the results of PES operations are accurate, consistent, and reliable. The Census Bureau uses the results of the PES to independently assess the accuracy of the decennial census—the results of which, as we previously mentioned, are used to apportion seats in the U.S. House of Representatives and determine the distribution of federal funding to state, local, and tribal governments. The reliability of the PES depends on obtaining representative results through an operation that is carried out as designed. Public trust in both the PES and decennial enumeration results follows from a well-conducted survey. Collectively, these findings highlight bureau challenges and potentially undermine the PES estimates for overcounts and undercounts.

I. Operational Disruptions and Mitigations in Response to Missing Data Increased Uncertainty in PES Estimates

Although the bureau complied with statistical standards and regulations, the 2020 PES was particularly complex. Operational disruptions from the COVID-19 pandemic and the statistical methods the bureau used to adjust for those disruptions increased uncertainty in PES estimates. Specifically, the 2020 PES experienced increased levels of missing data, and the bureau did not quantify the non-sampling errors stemming from the missing data.

A. *The 2020 PES experienced increased levels of missing data*

Despite efforts to increase PES responses, to include extending the data collection period and PES PI Reopen to give people more time to respond, the 2020 PES had a higher degree of both unit and item non-response⁷ compared to the 2010 post-enumeration survey (known as the Census Coverage Measurement, or CCM), resulting in higher levels of missing data in the following three areas:

- *Household-level non-interviews.* The household interview did not occur because the household could not be contacted, the household member refused to be interviewed, or not enough information was obtained to accurately match anyone in the household to the census data.
- *Unresolved statuses.*⁸ There was insufficient information about a person for the bureau to make a confident determination.
- *Missing demographic characteristics.* Person data was missing characteristic information, such as age, sex, relationship, tenure, race, or Hispanic origin.

⁷ Unit non-response is the failure of a member of the sample to respond to the survey at all. Item non-response is the failure of a respondent to answer one or more survey items.

⁸ The bureau used answers to the following questions to estimate coverage: (1) E-sample enumeration status: Was a person correctly or erroneously enumerated? (2) P-Sample inclusion status: Did a person meet the requirements for being in-scope for the PES? (3) P-sample mover status: Did a person move between April 1, 2020, and the PES interview? (4) P-sample match status: Was a person in the PES correctly counted in the 2020 Census?

Non-response, which was particularly challenging for the 2020 PES, is typically addressed through a complex set of mitigations, such as non-interview weighting adjustments, statistical imputations, and follow-up adjustments to the imputations, to compensate for the missing data. Collectively, these adjustments are not based on recorded responses from the households in question and contribute to additional uncertainty in final estimates. See appendix E for the levels of missing data in the 2020 PES compared to the 2010 CCM and a description of the various efforts the bureau applied to mitigate missing data.

The interview rate for the 2020 PES fell by 13.4 percent between decades to 83.2 percent, and item non-response for key matching variables has grown significantly since the 2010 CCM. Interviews that yielded insufficient data (i.e., not-sufficient interviews) grew from 2.1 percent in 2010 to 13.5 percent in 2020.⁹ As a result, the number of matches between the P-sample and E-sample decreased, which increased uncertainty in the PES estimates.

Some degree of non-response is to be expected in surveys; therefore, statistical methods exist to adjust estimates for non-response. The bureau can adjust for both item and unit non-response through survey weights and imputation.¹⁰ Bureau guidance has not set a threshold for the appropriateness of survey weights, but as non-response increases, so must the weights used to adjust for its effect. Survey weights applied to interviewed households increased by 17 percent between 2010 and 2020 to account for the higher non-response in the 2020 PES. Although survey weights are an accepted statistical technique to adjust for non-response, survey weights can be a source of additional variance that leads to less precise estimates.

The bureau attributes much of the rise in insufficient interviews to so-called break-off interviews, where respondents ended the interviews early and did not respond to all the questions. Given the low initial response rates, the bureau extended interviewing (through the PI Reopen operation) to lengthen the time for in-field data collection to improve response rates. PI Reopen increased the PES unit response rate from 71.9 percent to 83.2 percent.

Additionally, rising rates of whole-person imputation (WPI) in the decennial census increase the potential bias in PES estimates of the U.S. household population. Both the bureau and the National Research Council¹¹ analyzed the implications of excluding WPIs from dual-system estimation in 2001. At that time, there was concern over the number

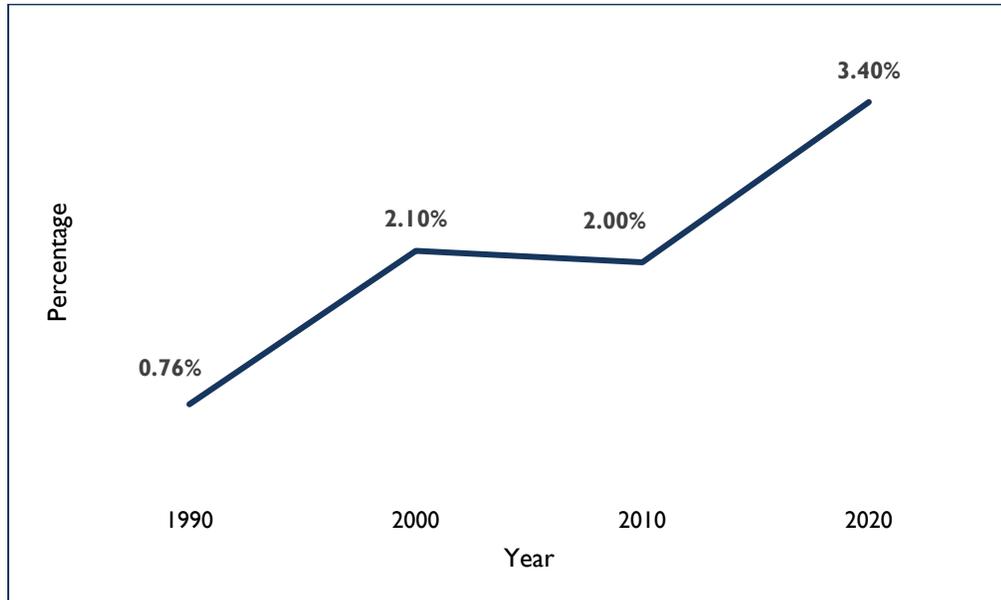
⁹ Person records with sufficient information for dual-system estimation had adequate information to uniquely identify an individual. For example, a first and last name are needed to uniquely identify a person and to accurately determine if someone in the PES matched to a census record. In contrast, person records with insufficient information for dual-system estimation did not meet the minimum threshold to uniquely identify a person.

¹⁰ Unit non-response is typically adjusted through the use of survey weights, which is a statistical technique that assigns a number to a response to make it representative of the population. Item non-response may use imputation to predict missing characteristics.

¹¹ The National Research Council is the operating and principal programmatic arm of the National Academies of Sciences, Engineering, and Medicine.

of WPIs rising from 1.9 million in the 1990 Census to 5.8 million in the 2000 Census. For the 2020 Census, the comparable figure increased substantially to 10.85 million people. Figure 4 shows the percentage increase in WPIs since 1990.

Figure 4. Increase in WPIs Since 1990



Source: OIG analysis of decennial census data, 1990 through 2020

WPIs are census person records that have all demographic characteristics imputed and do not have enough information to determine whether they are correct or erroneous enumerations and match to people in the P-sample. Consequently, WPIs are excluded from the matching and estimation processes. There is a direct correlation between WPIs and missing data, which means more data is excluded from the PES dual-system estimation process. This may leave certain demographics underrepresented—especially those with higher non-response rates—and risks introducing potential bias into the dual-system estimates. The greater the number of WPIs, the greater the potential bias can be.¹²

B. The bureau did not always quantify sources of non-sampling error

The bureau acknowledged in a March 2022 report¹³ that errors affected the accuracy and precision of the estimates produced by the survey, but it did not always quantify the sources of non-sampling error. In contrast to sampling errors, there are many kinds of

¹² If some or all WPIs could have been resolved to valid census person records, there could be a greater increase in correct enumerations. In the extreme, all WPIs could represent new correct enumerations. The number of new matches could theoretically range from 0 percent of the new correct enumerations (resulting in the largest increase in the dual-system estimate) to 100 percent of the new correct enumerations (resulting in the largest decrease in the dual system estimate).

¹³ U.S. Census Bureau, March 2022. *Source and Accuracy of the 2020 Post-Enumeration Survey Person Estimates*. Suitland, MD: Census Bureau. Available online at www2.census.gov/programs-surveys/decennial/coverage-measurement/pes/2020-source-and-accuracy-pes-estimates.pdf (accessed May 2, 2023).

non-sampling errors, which are difficult to quantify. Recall bias¹⁴ is one example of a non-sampling error that can affect the accuracy of the data.

To ensure transparency, the bureau's *Statistical Quality Standards*¹⁵ require it to (1) disclose that information products are subject to potential sources of error and (2) compute measures of non-sampling error associated with each product (e.g., recall bias). The standards also recommend the bureau explain the sources of error.

The bureau did not conduct a study to investigate the existence, direction, and magnitude of recall bias in the 2020 PES, despite longer delays between Census Day (April 1, 2020) and PI and Person Followup (PFU) operations than in past decennials. Table I compares delays between Census Day and the PI and PFU operations for the PESs in 2000, 2010, and 2020.

Table I. Delays Between Census Day and PES PI and PFU Operations

PES Operations	PES Operation Start Date	PES Operation End Date	Delay Between Census Day (April 1) and Operation End in Days (Months)
2000 Accuracy and Coverage Evaluation (ACE) – PI (telephone and in-person)	4/24/2000	9/11/2000	163 (5.4)
2000 ACE – PFU	10/19/2000	11/21/2000	234 (7.7)
2010 CCM – PI	7/25/2010	10/14/2010	196 (6.5)
2010 CCM – PFU	1/28/2011	4/2/2011	366 (12.1)
2020 PES – PI (original and reopen))	9/14/2020	3/20/2021	353 (11.6)
2020 PES – PFU	6/1/2021	9/17/2021	534 (17.6)

Source: OIG analysis of U.S. Census Bureau operational assessments

The 2020 PES PI and PFU operation end dates were more than 5 months further past Census Day than they were in the 2010 CCM. The bureau conducted a recall bias study on the 2010 CCM¹⁶ to identify the potential for its existence but did not plan for one for 2020. Even though the length of time between Census Day and interview day was longer in 2020 than 2010, the bureau did not conduct a recall bias study because of the substantial planning and system development that would have been required to carry it out. However, the bureau did acknowledge that this expanded interval increased the potential for recall bias.

¹⁴ The farther the interview occurs from the target event, the less likely the respondent may be to remember specific details about the event.

¹⁵ Census Bureau, July 2013. *U.S. Census Bureau Statistical Quality Standards*. Suitland, MD: Census Bureau. Available online at www.census.gov/content/dam/Census/about/about-the-bureau/policies_and_notices/quality/statistical-quality-standards/Quality_Standards.pdf (accessed December 7, 2023).

¹⁶ Census Bureau, August 27, 2012. *The 2010 Census Coverage Measurement Recall Bias Study*. Suitland, MD: Census Bureau. Available online at www2.census.gov/programs-surveys/decennial/2010/program-management/5-review/cpex/2010-cpex-232.pdf (accessed October 3, 2023).

Prior to the COVID-19 pandemic, the bureau expected shorter delays between Census Day and the PES PI and PFU operations than in 2010 and therefore expected less recall bias. The bureau cited time and resources, as well as challenges with the 2010 recall bias study that had not been overcome,¹⁷ as the reasons for not formulating plans to conduct the recall bias study in 2020.

By simply identifying and discussing sources of error, as required by the bureau's *Statistical Quality Standards*, but not quantifying the effects of the error, the bureau makes it difficult for consumers of the PES results to determine how serious the impacts of the various errors may have been. The bureau should have conducted a recall bias study to evaluate error and the impact of recall bias on the 2020 PES, especially considering the longer-than-expected delays resulting from the COVID-19 pandemic. Increased delays between the census and PES mean respondents may be more likely to provide incorrect, vague, or incomplete information on the residence status of persons on Census Day, which impacts the quality of the estimates reported.

II. A Smaller-Than-Anticipated Sample Size Contributed to Increased Uncertainty in PES Estimates

The PES sampling design sets the stage for the work that is carried out during PES in-field and clerical operations. Therefore, obtaining a representative sample is key to helping the bureau ascertain the accuracy of the 2020 Census results. A non-representative sample will yield flawed results. The 2020 PES design was largely similar to the 2010 CCM operation, except for the changes we discuss below. We found the P-sample size was smaller than expected for several reasons. As a result, the PES itself might not be an accurate indicator of the quality of the 2020 Census.

The sampling design for the 2020 PES was largely the same as the one used in the prior decade's coverage measurement operation. The bureau selected a population sample (i.e., the P-sample) of several thousand household addresses from throughout the United States and Puerto Rico.¹⁸ The sample was divided into several categories of BCUs that corresponded to the size and type of the sampling unit.¹⁹ The bureau attempted to obtain a sample of HUs from small, medium, and large BCUs as well as BCUs within American Indian Reservations (AIRs).

However, the bureau designed the 2020 PES with three substantive changes from the 2010 CCM:

- I. a change in sampling units from block clusters to BCUs,

¹⁷ According to bureau officials, the 2010 CCM experienced challenges that limited the generalizability of the results, and they did not have time or resources to research ways to improve how they measured recall bias leading up to the 2020 PES.

¹⁸ Both the 2010 CCM and the 2020 PES excluded group quarters nationwide and households located in remote areas of Alaska (i.e., Remote Alaska).

¹⁹ The bureau created BCUs for the 2020 Census. In 2010, the bureau used block clusters.

2. no sample reduction of medium and large BCUs, and
3. changes in the HU thresholds for medium and large BCUs.²⁰

The bureau made these changes to improve efficiency and achieve statistical advantages by reducing clustering²¹ and overreliance on survey weights. BCUs contain fewer HUs on average but offer less clustering and less sampling variance. The bureau was aware that, for a given HU sample size (in this case, 180,000), it would need to sample more BCUs than if it had used block clusters.

The bureau published its PES sampling plan in 2018, prior to the beginning of the decennial enumeration and the PES. This plan outlined the approach and considerations given to creating the 2020 PES P-sample, especially the target number of BCUs (10,500 BCUs comprised of 7,800 medium and large BCUs, 2,200 small BCUs, and 500 AIR BCUs) and the estimated number of HUs (177,500 total) for the United States and Puerto Rico. However, the final sample size for the 2020 PES was 8,500 BCUs, containing only 168,000 HUs (see table 2).

Table 2. Composition of the 2020 PES P-Sample, Targets Versus Actuals^{a, b}

HU Frame	Target Sample (BCUs)	Final Sample (BCUs)	Target P-Sample (HUs)	Actual P-Sample (HUs)
Small (0-2 HUs)	2,200	450	N/A	1,200
Medium (3-57 HUs) and Large (58 or more HUs)	7,800	7,200	159,500	153,000
AIRs	500	500	10,500	6,800
Puerto Rico	(included in numbers above)	350	7,500	7,100
Total	10,500	8,500	177,500	168,000

Source: 2020 PES data, U.S. Census Bureau

- ^a The bureau applied disclosure avoidance techniques to the BCU and HU figures presented in this table. Totals may not sum due to rounding.
- ^b Small and AIR BCUs are allocated differently than medium and large BCUs. The bureau anticipated 13,000 HUs across small and AIR BCUs. Puerto Rico had a predetermined HU sample size. The bureau planned for approximately 400 BCUs for Puerto Rico (280 medium and large BCUs and 120 small BCUs).

²⁰ For 2010, medium-sized block clusters had 3-79 HUs and large ones had 80 or more HUs. For 2020, medium-sized BCUs had 3-57 HUs and large ones had 58 or more HUs. For both decennials, small-sized block clusters and BCUs numbered 0-2 HUs.

²¹ Clustered data arise when data share similar characteristics. Examples of clustering with respect to geography include neighborhoods comprised solely of single-family homes or apartment buildings. Many modeling approaches assume independent and identically distributed data. Others require special handling of standard errors when clustering is suspected.

The number of BCUs and the number of HUs in the P-sample were both smaller than anticipated—by 19 percent and 5 percent, respectively. The bureau attributed the shortfall to (1) miscalculations in the number of HUs in small, medium, and large BCUs and (2) its practice of flow sampling, where a sample is selected in multiple waves as the frame is obtained.²² With respect to the shortfall, a large number of HUs from the IL were deemed out of scope, meaning that they were not included because the HU burned down or was not built yet or there was a geocoding error. In addition, the bureau made incorrect assumptions surrounding BCU HU density, especially for HUs in AIRs. The Master Address File, which the bureau used to estimate the number of HUs in BCUs, also included erroneous entries. These early missteps caused the bureau to overestimate the number of HUs in its BCU samples, which is referred to as over-coverage. A smaller sample size increases the likelihood of sampling error and higher variability (i.e., a larger margin of error). However, given the time constraints caused by the COVID-19 pandemic, correcting the smaller samples would have led to additional operational delays that could have worsened recall bias.

III. The Bureau Did Not Carry Out QC Processes for PES Operations as Planned

Our analysis of PES QC operations found that the bureau did not consistently ensure that its published QC measures were carried out as recommended for the IL, PI, and clerical matching operations. Given their interdependence, successfully carrying out QC of production operations is critical to ensuring sound program results. The overall PES QC process, as designed, ensures that results in an individual production operation are validated so every production operation that follows may accurately and reliably build upon those results to produce the final PES estimates. Human error during QC operations had an impact on the accuracy of the final PES production results. The risk of listers, interviewers, and technicians committing errors or fraud requires effective mitigation efforts to ensure production results are reliable. It is critical for the bureau to execute timely QC processes as designed to ensure that the results of PES operations are accurate, consistent, and reliable.

A. QC listers did not complete IL QC checks and rectification within the prescribed timelines

Our review of the IL QC process found more than one-third of all QC checks and the rectification required as a result were not completed within prescribed time frames. Delays in completing IL QC cases increase the risk that poorly performing production listers may make errors on additional cases without correction. Since IL was the first operation conducted in the PES, any errors involving IL cases that were undetected by QC could have an adverse cascading effect on the ensuing operations.

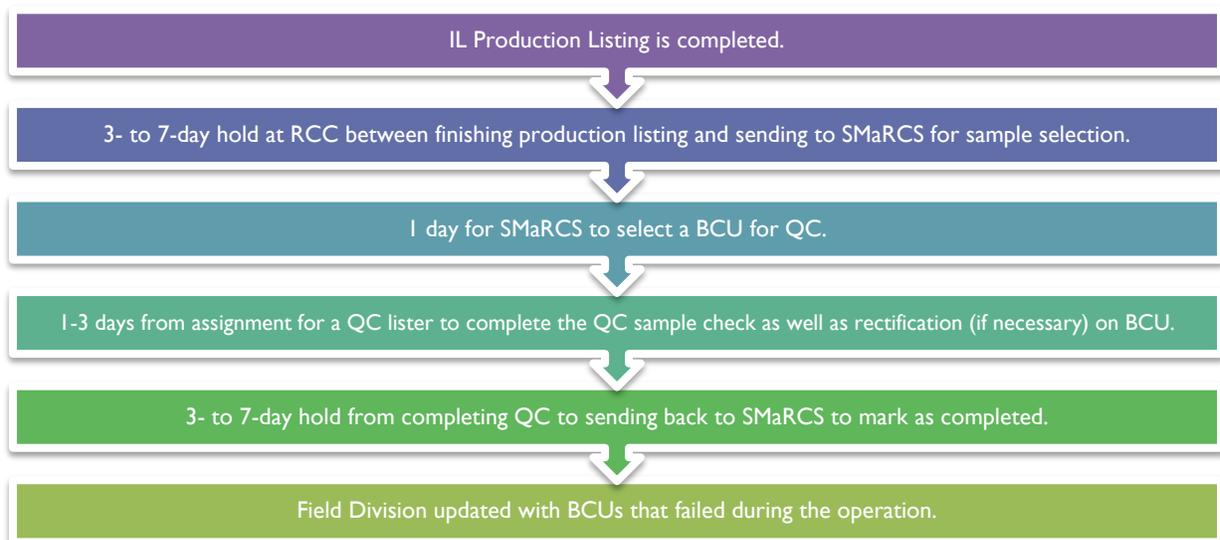
The bureau required that an IL QC check be carried out on a completed IL production case within 3 days after it was assigned to a QC lister. Our testing of a sample of 66 IL

²² The bureau determined its sampling rate based on the addresses obtained from IL, but in-scope HUs were subsampled after the initial matching and follow-up interviews cleaned up the address list. This caused uncertainty with respect to the final HU sample size by strata for a given BCU.

QC cases (of 2,200 cases)²³ found that 24 of those cases (36 percent) and the required rectification of the affected BCUs were not marked as completed within 3 days. The average completion time for those cases was 9 days, with one case taking 26 days to complete.

The long QC lag time occurred for two reasons. The first was that the sample selection system, the Sampling, Matching, Review and Coding System (SMaRCS),²⁴ was not ready at the start of the operation,²⁵ leading to slower assignment of the IL QC workload. Secondly, the bureau²⁶ implemented two separate administrative holds that together delayed cases between 6 and 14 days. These holds were intended to allow some RCCs time to review the work and reassign cases as needed but instead were applied to all RCCs. The holds delayed QC sampling and fieldwork, as well as the submission of completed QC listing data. Figure 5 provides a timeline of the IL operation.

Figure 5. Timeline of IL QC Incorporating Holds



Source: OIG analysis of PES operational data

Long QC lag time can (1) delay the bureau's discovery of errors by listers; (2) allow a lister to make an increased number of errors; and (3) increase the workload of the following PES operations.

²³ Per bureau guidance, disclosure avoidance techniques used to protect respondent confidentiality have been applied to these data.

²⁴ SMaRCS was used to select HUs and PI cases for RI.

²⁵ According to bureau officials, SMaRCS moved computer servers between decennial in-field address canvassing and PES IL, and the move was not completed before the start of PES IL.

²⁶ Bureau officials from the Decennial Statistical Studies Division, Associate Directorate for Demographic Programs, and Decennial Census Management Division approved the implementation of the holds. The Decennial Statistical Studies Division's Quality Assurance Branch, which was not part of the original decision, raised concerns and had the holds reduced from 3–7 days to 24 hours effective February 10, 2020.

B. The bureau did not conduct PIRI within recommended completion time frames

The bureau did not conduct PIRI (i.e., QC) within its own recommended completion time frames. While its QC policy outlines suggested timelines, we found the bureau did not track its own measure of timeliness or record the timeliness of PIRI case completion²⁷ (when a PIRI case was assigned or completed). While bureau officials requested cases be completed within 5 days, they did not analyze this time frame. The bureau measured timeliness by calculating the lag time (in calendar days) between the date a case was assigned and the date it was completed, but this data was no longer available by the time of our review.

To ascertain the timeliness of cases completed, we used available data to formulate a proxy measure for timeliness using the dates when a PI case was selected for PIRI and when it was completed.²⁸ We then set a 7-day time frame for completing cases, which represented the length of time between the planned completion dates for PI and PIRI (both original and reopen).²⁹

We selected two samples of reinterviews (RIs) for testing: 67 PIRI Original cases (of 29,000 cases) and 66 PIRI Reopen cases (of 3,100 cases).³⁰ We found more than 40 percent of PIRI Original cases and half of the PIRI Reopen cases that we tested took longer than 7 days to complete. For RI cases that exceeded 7 days to complete, the average duration was 18 days for PIRI Original and 17 days for PIRI Reopen. However, at the extremes, one PIRI Original case took more than 2 months to complete, while a PIRI Reopen case took more than 1 month. Table 3 outlines the number of cases taking longer than 7 days.

Table 3. RI Cases Taking More than 7 Days from Selection to Completion

Phase	Total Cases Exceeding 7 Days	Percentage of Total Sampled Cases	Greatest Length of Time (Days)
PIRI Original (n=67)	28	42	75
PIRI Reopen (n=66)	33	50	31

Source: OIG analysis of 2020 PES data

According to the bureau's internal quality assurance plan, all RI cases should have been completed by reinterviewers within 5 days of being assigned. The Decennial Statistical Studies Division and Field Division monitored RI progress, and the Field Division

²⁷ PIRI involves coordination between multiple systems including the SMaRCS, the Regional Office Survey Control System, and the Master Control System. The Regional Office Survey Control System delivers BCUs for listers to work during IL and cases for interviewers to work during PI.

²⁸ According to bureau officials, RI cases were completed on the same date they were started.

²⁹ The COVID replan finish dates for PI and PIRI Original were December 11, 2020, and December 18, 2020, respectively; for PI and PIRI Reopen, the dates were March 13, 2021, and March 20, 2021, respectively.

³⁰ Disclosure avoidance techniques used to protect respondent confidentiality have been applied to these data per bureau guidance.

followed up with the RCCs on low response rates, low completion rates, and the status of incoming cases. However, ensuring that RIs were completed in a timely manner was not part of monitoring progress.

According to bureau officials, while cases are to be completed within 5 days, it was not required despite being noted in the quality assurance plan. As a result, the PIRI case data to support the completion time frames was not retained and disposed of on June 20, 2022. The Regional Office Survey Control System (ROSCO) maintained control and questionnaire data in the system for only 15 months after the end of operations.

The bureau's QA plan included time frames for RI completion, but the bureau did not enforce these time frames to hold staff accountable. As a result, tasks that should have taken 5 days took more than 2 months to complete. Not completing RIs in a timely manner can result in reinterviewers being unable to complete all assigned cases and identify rework where needed. The lack of enforcement also could have led to uncorrected errors by problematic interviewers that would impact the quality of the data collected during the PI operation and used in clerical matching, which ultimately feeds into the PES estimates reported.

C. The bureau reviewed fewer BCUs than planned during clerical matching and did not always review flagged cases

The 2020 PES matching operations included three sequential phases: computer matching, before followup (BFU) clerical matching, and after followup clerical matching. The bureau compared the HUs and persons enumerated during IL and PI to the HUs and persons that were enumerated during the 2020 Census via computer matching. The bureau compared the HUs and persons enumerated in the P-sample during IL and PI to the HUs and persons from the E-sample that were enumerated during the 2020 Census via computer matching. Those that could not be matched were then sent to clerical matching for further review.

During clerical matching, technicians and analysts at the National Processing Center³¹ compared data collected in the PES with 2020 Census data to identify matches and resolve non-matches between HUs and people. When cases could not be resolved, they were returned to the field to get additional information for resolution. Technicians conducted the initial review of these BFU cases, while analysts performed the QC on the technicians' work and reviewed cases referred by the technicians. In our review of the Initial Housing Unit (IHU) and Person clerical matching operations, we found that clerical matching QC procedures were not carried out as planned for the IHU BFU and Person BFU clerical matching operations. Specifically, (1) the bureau conducted QC reviews on a smaller percentage of BCUs than planned for IHU BFU clerical matching and (2) analysts did not always review cases when the technicians flagged them for review during Person BFU clerical matching.

³¹ This facility is in Jeffersonville, Indiana.

Analysts conducted QC reviews on a smaller percentage of BCUs than planned

The 2020 PES design³² prescribed that approximately 33 percent of BCUs that underwent IHU BFU clerical matching would be subject to QC review. We found that analysts conducted QC reviews on only 23 percent of BCUs (1,100 BCUs from a total of 4,800 BCUs) that required review.³³ Even though the PES design states about 33 percent of BCUs would receive QC reviews, bureau officials only considered this threshold to estimate their workload. Meeting QC review thresholds is important to the clerical matching operation to ensure HUs and people are correctly matched, cases are accurately resolved, and quality information feeds into the PES estimates.

The bureau's operational assessment report³⁴ on the IHU clerical matching operations³⁵ identified changes made to IHU BFU clerical matching because of COVID-19. In an attempt to adhere to its original schedule, the bureau requested to cut IHU BFU clerical matching completely from the 2020 PES. Cutting the entire operation, however, would have sent possible matched, non-matched, and possible duplicate records identified in the computer matching operation directly to the Initial Housing Unit Followup (IHUFU).³⁶ The bureau determined that sending all cases directly to IHUFU would have increased the IHUFU workload by 50 percent. The bureau proceeded with IHU BFU clerical matching, with analysts working³⁷ on as many cases as possible between May 28, 2020, and June 25, 2020, before transitioning to the next operation. IHU BFU ended on June 25, 2020, even though all cases were not completed. Consequently, only half of the 4,800 BCUs that needed to be clerically matched were worked during IHU BFU. These decisions contributed to the smaller number of BCUs that received an analyst QC review during IHU BFU clerical matching.

In addition to the smaller percentage of BCUs undergoing QC review, the actual review coverage was significantly limited. We found that for BCUs that underwent QC

³² Census Bureau, February 25, 2022. *The Design of the Post-Enumeration Survey for the 2020 Census*. Suitland, MD: Census Bureau. Available online at www2.census.gov/programs-surveys/decennial/2020/program-management/memo-series/2020-memo-2022_06.pdf (accessed July 9, 2023).

³³ Per bureau guidance, disclosure avoidance techniques used to protect respondent confidentiality have been applied to these data.

³⁴ Census Bureau operational assessments present planned versus actual variances related to budget, schedule, and workloads for individual operations or processes using data from production files and activities and information collected. They also document final volumes, rates, and costs. See Census Bureau. *Census Evaluations and Experiments*. Suitland, MD: Census Bureau. Available online at www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/evaluate/eae.html (accessed July 1, 2024).

³⁵ Census Bureau, March 11, 2024. *2020 Post-Enumeration Survey Initial Housing Unit Matching Operational Assessment*. Suitland, MD: Census Bureau. Available online at www2.census.gov/programs-surveys/decennial/2020/program-management/evaluate-docs/EAE-2020-PES-IHU-Matching-Assessment.pdf (accessed July 1, 2024).

³⁶ IHUFU is one of the three in-field follow-up operations, along with PFU and Final Housing Unit Followup. These operations were carried out after matching operations, which compared data on HUs and people from the P-sample with data from HUs and people from the E-sample and served to resolve any discrepancies between the two samples.

³⁷ Only analysts worked IHU BFU clerical matching as a result of changes made to the operation, which differed from the bureau's planned QC approach of having technicians review cases and analysts perform the QC review.

review—about 50 percent of the IL BCUs³⁸ and Census BCUs,³⁹ respectively—each had less than 10 percent of the addresses checked during QC reviews. For example, one of the IL BCUs had a total of 900 addresses, but less than 15 of these addresses (or less than 1.7 percent) were checked as part of the QC review. According to bureau officials, the outcome of the review is representative of the entire BCU. This could result in uncorrected errors in the areas that went unchecked. Combined with the smaller amount of BCUs undergoing QC reviews than planned, errors going unchecked during clerical matching can negatively impact the estimates produced.

Analysts did not always review cases when flagged by technicians

The bureau's QC plan for Person clerical matching operations requires analysts to review records when technicians leave review notes, which they do when they are unsure of the correct code(s). While records with review notes are not included in QC counts, they are marked for analyst review. We found that analysts did not always review cases when the technicians flagged them for review during the Person BFU clerical matching operation. Specifically, our testing of statistically representative samples of 75 Person BFU P-Sample cases (out of 11,000 cases) and 75 Person BFU E-Sample cases (out of 10,500 cases) found that for 5 cases and 10 cases, respectively, there was no evidence of analyst review during the BFU analyst stage. After weighting our results, we estimate that approximately 198 P-Sample cases and 189 E-Sample cases were not reviewed.⁴⁰

Bureau officials stated these cases should have gone to the BFU analyst stage but did not due to a system error. They also explained that some BCUs that skipped the BFU analyst stage of the Person BFU clerical matching operation when technicians were performing at an acceptable quality level were placed in 'sample QC.' This resulted in only a sample of the BCUs the technicians worked moving to the BFU analyst stage. Even though the technicians performed high-quality work, analysts should have reviewed situations where technicians left review notes on challenging cases.

Technicians' review notes indicate these cases may be more complex. If analysts do not review the cases, they may be unresolved. This can lead to additional work in subsequent operations, requiring further efforts to resolve the cases or cases continuing forward through the PES operations and ultimately affecting the accuracy of PES estimates with unreliable or incomplete data. Conducting QC reviews on PES data, especially on flagged cases, is crucial to ensuring accurate and reliable data is used to produce PES estimates.

Conclusion

The bureau carries out the PES to provide an independent evaluation of the decennial census, measuring the coverage of HUs and people and providing data to improve future censuses. The results of the PES are one of the most important quality measures of the decennial census.

³⁸ The BCUs associated with the IL addresses.

³⁹ The BCUs associated with the Census addresses.

⁴⁰ Estimates were calculated with a 90 percent confidence level and +/- 0.0 percent margin of error.

Overall, while the 2020 PES results were derived using methodologies that were consistent with federal and bureau statistical standards, we identified areas of concern that had an impact on the survey results, bringing into question the validity of the 2020 PES estimates for overcounts and undercounts. Therefore, it is critical that the bureau improves the transparency of results for its stakeholders, ensures appropriate methodologies are used, and conducts timely QC processes as designed to ensure the results of the PES are accurate, consistent, and reliable.

We initiated this audit on June 14, 2023. On December 12, 2023, we were informed that the bureau was redesigning the PES and researching ways to improve its operation for the 2030 Census. At that time, this information was not publicly released. On June 18, 2024, at the conclusion of fieldwork, we received confirmation from bureau officials that the PES redesign was publicly announced. As the 2030 PES design undergoes substantial changes, the bureau should consider the corrective actions below to inform its PES redesign. Addressing these issues during the redesign will help ensure that opportunities for improvement are maximized, promoting overall operational improvements to the PES.

We believe the bureau could improve the transparency and accuracy of PES results by considering the actions presented below when finalizing its plan for the 2030 PES:

- Advancing approaches to mitigate missing data and conducting research to better understand groups most likely to be impacted by missing data.
- Analyzing and quantifying major sources of non-sampling error, to include the cumulative effect of multiple sources of error, and ensuring the results are communicated to the public.
- Ensuring that sampling designs undergo appropriate analysis prior to production and are designed to support their intended uses.
- Establishing a detailed and effective strategy to ensure computer system relocations are completed on schedule to minimize operational disruptions.
- Ensuring changes to quality assurance processes are documented, approved, and widely communicated across all affected divisions and their operational components.
- Strengthening the bureau's quality assurance plan to ensure reinterviewers complete cases within prescribed time frames.
- Strengthening the clerical matching QC plan to adhere to applicable QC review thresholds.
- Establishing procedures to ensure analysts review flagged clerical matching cases and documentation of analyst reviews is maintained.
- Ensuring that the bureau's records retention schedule for 2030 Census records prescribes only fixed retention periods that also allow records to be available for a sufficient period following the end of operations for internal and external oversight activities.

Recommendation

We recommend that the Director of the U.S. Census Bureau consider the actions in the conclusion section of this report when implementing changes to the 2030 PES redesign.

Summary of Agency Response and OIG Comments

On December 26, 2024, we received the bureau's response to our draft report. In response to our draft report, the bureau concurred with our recommendation and described actions it will take to address it. The bureau also provided technical comments. We considered those comments and revised the final report where appropriate.

Our responses to selected bureau comments are below.

General

Bureau comments: The bureau stated that, despite the challenges posed by the COVID-19 pandemic, the 2020 PES was successfully planned and executed to achieve its goal of estimating national-level census coverage by demographic groups and state-level counts. The bureau acknowledged that there are opportunities to strengthen future surveys.

OIG response: We do not agree with the bureau's assertion that the PES was successfully executed due to data limitations and the other findings in this report. The bureau's failure to retain documentation for follow-up operations compromises traceability and prevents us from verifying whether the process was executed as planned or if QC procedures were effective to ensure the quality of PES results. Furthermore, it is important to recognize that while the overall national coverage error was low and not statistically significant, there were significant undercounts and overcounts at the state level. We highlight areas in the report where the PES methodology and processes could be enhanced to improve coverage estimates. In addition, we suggest that the bureau consider retaining 2030 Census documents for a fixed period following the operation to allow sufficient time for internal and external oversight.

Finding III.A

Bureau comments: The bureau acknowledged that it did not complete QC checks and rectifications on time but noted that 64 percent were completed within the 3-day time frame and remaining cases were completed by the end of the IL operation.

OIG response: The issue of timeliness remains a significant concern. The bureau's figure of 64 percent of cases completed within the 3-day time frame does not consider the administrative holds placed on cases. As noted in the finding, 36 percent of cases were not completed within 3 days. Instead, completion times ranged between 4 to 26 days, averaging 9 days—three times longer than the target time frame. While bureau officials emphasized that the goal was to complete BCUs quickly during QC to limit errors, we concluded that the holds in place during the QC process contributed to additional delays, impacting both the timeliness and effectiveness of the checks. Not completing IL QC checks within 3 days could have delayed error detection, allowed more errors to accumulate, and increased the workload for subsequent PES operations.

Finding III.B

Bureau comments: The bureau acknowledged that some PIRI cases were not completed within recommended time frames but noted that (1) the QA plan did not require all cases to be completed within 5 days and (2) the proportion of cases that exceeded the 5-day window was beyond what was intended.

OIG response: While the bureau's QC policy outlines suggested timelines, it did not enforce or track its own measure of timeliness. As we noted in our finding, 40 percent of PIRI Original cases and half of PIRI Reopen cases had average completion times of 17 and 18 days, respectively. Without enforcement, there is no accountability for ensuring that quality checks are conducted timely. It is particularly important for the bureau to establish and enforce clear time frames to prevent delays and ensure consistency in the timing of quality checks. Doing so will help prevent similar delays in the future and maintain the overall quality of the operation. Timely completion of PIRI cases is essential for identifying rework and minimizing errors, which ultimately supports the integrity and effectiveness of the data collected during the PI operation.

Finding III.C

Bureau comments: The bureau acknowledged that analysts did not always review cases when technicians flagged them but asserted that our analysis of matching operations was not representative of the normal QC process (which the bureau considered to be effective and successful in verifying the PES results). The bureau also stated the QC of IHU BFU clerical matching should not be compared with other matching operations since only analysts worked IHU BFU clerical matching.

OIG Response: We do not agree with the bureau's assertion that the QC process was effective and successful in verifying the PES results. As we noted in finding III.A and III.B, the bureau's QC plan was insufficient, particularly because it lacked formal procedures to actively monitor and conduct timely QC reviews. Finding III.C was similar with regard to the clerical matching operations. The bureau reviewed fewer BCUs than planned, and not all flagged cases received the required analyst review. The issues identified, along with data limitations and other findings in this report, lead us to disagree with the bureau's statement that the QC processes are as effective as suggested. We clarify that our finding on analysts not always reviewing cases flagged by technicians applies only to Person BFU clerical matching, which was reported separately from IHU BFU clerical matching. We updated our report to acknowledge that only analysts worked on IHU BFU clerical matching due to COVID-19-related changes.

Additionally, our focus on matching operations and QC reviews highlights the need to follow planned review processes. Timely and thorough QC reviews can reduce errors and ensure the accuracy of data used for PES estimates.

Appendix F contains the full text of the bureau's response. We look forward to reviewing the bureau's action plan for implementing our recommendation.

Glossary of Terms

Basic collection unit (BCU) – A geographic unit created for the 2020 Census containing census blocks, which is similar to a collection block used in prior decennial censuses.

Block – A statistical area defined by both visible boundaries, such as streets and streams, and invisible boundaries, such as city and county borders, that is the smallest geographic unit used to tabulate decennial census data.

Block cluster – A group of census blocks.

Census Coverage Measurement (CCM) – The 2010 version of the coverage measurement survey used to measure net undercounts and overcounts in the census.

Clerical matching – The process by which matching staff (technicians and analysts) compare data collected in the PES with 2020 Census data to identify matches and resolve non-matches between HUs and people.

E-sample – Set of person enumerations and HU enumerations in the census within the PES sample BCUs. The E-sample provided information about correct and incorrect enumerations from the census.

Frame – For the PES, consists of one or more lists of HUs that comprise the universe from which a sample is selected.

Independent Listing (IL) – The process by which field staff independently visited and listed all HUs and potential HUs in each PES sample BCU without using any previously collected address information.

Non-interview – There are two types of non-interviews. The first is where no interview was conducted for the HU. In the second category, an interviewer made contact with either a household member or a proxy respondent and an interview took place. However, the information the respondent provided was not complete enough for survey processing, so the Census Bureau converted these interviews into non-interviews.

Non-sampling error – A type of error that is caused by factors other than sampling. It includes measurement errors due to interviews, respondents, instruments (the devices used to collect the data, such as questionnaires or data entry software), and mode (paper versus electronic data collection).

P-sample – Independent enumerations in sample areas across the country during the PES. The P-sample comprises the list of households contained within BCUs that were selected for the PES and counted independently of the decennial census. Listers located each address in the sample and enumerators counted the people living in (HUs) at those addresses.

Person Interview (PI) – A field data collection operation where in-person interviews were conducted with respondents at selected households.

Post-Enumeration Survey (PES) – An independent evaluation of the 2020 Census. PES was the 2020 version of the coverage measurement survey used to measure net overcounts and undercounts in the census.

Rectification – A process where a QC lister validates the remaining IL cases worked by a production lister whose cases did not pass QC.

Reinterview (RI) – The quality assurance process to detect and deter interviewer errors and data falsification during data collection. In the PES, PIRI was the quality assurance process for the PI operation.

Sampling error – The error that occurs because all members of the frame population are not measured. It is associated with the variation in samples drawn from the same frame population.

Whole-person imputation (WPI) – A statistical technique to create a valid person record by filling in missing information for some census records that did not include enough characteristics. WPis are non-data-defined census person records (that could be included in the E-sample) where demographic characteristics—relationship to householder, sex, age/date of birth, Hispanic origin, and race—were imputed.

Appendix A: Objective, Scope, and Methodology

The objective of our audit was to assess the validity of the 2020 PES results as they related to overcounts and undercounts. Specifically, we assessed (1) whether the bureau's methodologies for carrying out the 2020 PES were consistent with relevant federal and agency statistical standards and (2) the effectiveness of 2020 PES operations to ensure that estimates were accurate and reliable. Based on our risk assessment, we scoped our audit to focus on 10 of the 25 activities across all three operations:

1. Coverage Measurement Design and Estimation operation—Sample Selection of PES Basic Collection Units
2. Coverage Measurement Matching operation
 - a. Initial Housing Unit (IHU) Computer Matching
 - b. IHU Before Followup (BFU) Clerical Matching
 - c. IHU After Followup (AFU) Clerical Matching
 - d. Person Before Followup Clerical Matching
3. Coverage Measurement Field Operations
 - a. Independent Listing (IL) and Quality Control (QC)
 - b. Initial Housing Unit Followup (IHUFU) and QC
 - c. Person Interview (PI) and Reinterview (RI)
 - d. Person Followup and Reinterview
 - e. Final Housing Unit Followup (FHUFU) and QC

To accomplish our objective, we performed the following actions:

- Interviewed key personnel to obtain an understanding of how the bureau carried out the PES:
 - Managers and staff from the office of the Associate Director for Decennial Census Programs, Decennial Information Technology Division, Decennial Census Management Division, and Decennial Statistical Studies Division.
 - Managers and staff from the Field Operations Directorate and Field Division.
- Reviewed relevant laws, regulations, standards, policies, operational plans and assessments, and guidance, including:
 - U.S. Office of Management and Budget, *Standards and Guidelines for Statistical Surveys*, dated September 2006

- Federal Register, Volume 79, No. 231, U.S. Office of Management and Budget (OMB), *Statistical Policy Directive No. 1: Fundamental Responsibilities of Federal Agencies and Recognized Statistical Units*, dated December 2, 2014
- U.S. Census Bureau, *Statistical Quality Standards*, reissued July 2013
- U.S. Census Bureau, *Statistical Quality Standards*, revised April 19, 2023
- U.S. Census Bureau, *2020 Census Detailed Operational Plan for Post-Enumeration Survey (PES) Operations*, issued April 16, 2020
- U.S. Census Bureau, *2020 Post-Enumeration Survey Estimation Design, DSSD 2020 Post-Enumeration Survey Memorandum Series #2020-J-03*, dated November 29, 2022
- U.S. Census Bureau, *2020 Post-Enumeration Survey Independent Listing Operational Assessment*, dated January 20, 2023
- U.S. Census Bureau, *2020 Census Operational Assessment Report, 2020 Post-Enumeration Survey Initial Housing Unit Matching Operational Assessment*, dated December 2, 2022
- U.S. Census Bureau, *2020 Census Operational Assessment Report, 2020 Post-Enumeration Survey Initial Housing Unit Followup Operational Assessment*, dated January 19, 2023
- U.S. Census Bureau, *2020 Census Operational Assessment Report, 2020 Post-Enumeration Survey Final Housing Unit Followup Operation*, dated June 21, 2023
- U.S. Census Bureau, *2020 Census Operational Assessment Report, 2020 Post-Enumeration Survey Person Interview Operational Assessment*, dated July 31, 2023
- U.S. Census Bureau, *2020 Census Operational Assessment Report, 2020 Post-Enumeration Survey Person Matching Operational Assessment*, dated August 18, 2023
- U.S. Census Bureau, *2020 Census Operational Assessment Report, 2020 Post-Enumeration Survey Person Followup Operational Assessment*, dated September 26, 2023
- U.S. Census Bureau, *2020 Post-Enumeration Survey Coverage Measurement Design and Estimation Operational Assessment Report*, dated July 26, 2023
- U.S. Census Bureau, *2020 Post-Enumeration Survey (PES) Person Followup (PFU) Interviewer Manual*, dated May 13, 2020
- U.S. Census Bureau, *2020 Post-Enumeration Survey (PES) Initial Housing Unit Follow-up (IHUFU) Lister Manual*, dated November 27, 2019
- U.S. Census Bureau, *2020 Post-Enumeration Survey (PES) Final Housing Unit Follow-up (FHUFU) Lister Manual*, dated October 8, 2021
- U.S. Census Bureau, *2020 Post-Enumeration Survey (PES) Independent Listing (IL) Quality Control (QC) Lister Manual*, dated October 3, 2019
- U.S. Census Bureau, *2020 Post-Enumeration Survey (PES) Person Followup Reinterviewer Manual (PFU RI)*, dated September 1, 2020

- U.S. Census Bureau, *2020 Post-Enumeration Survey (PES) 2020 Census Initial Housing Unit Followup (IHUFU) Quality Control (QC) Lister Manual*, dated January 17, 2020
- U.S. Census Bureau, *2020 Post-Enumeration Survey (PES) Final Housing Unit (FHUFU) Quality Control (QC) Lister Manual*, dated September 27, 2021
- U.S. Census Bureau, *IHU BFU Clerical Matching Reference Manual*
- U.S. Census Bureau, *2020 Initial Housing Unit After Followup Clerical Matching Reference Manual*
- U.S. Census Bureau, *Introduction to Person BFU Clerical Matching*
- U.S. Census Bureau, *2020 Post-Enumeration Survey Specification Person Clerical Matching Quality Control*, DSSD 2020 Census Post-Enumeration Survey Memorandum Series #2020-K-23, DSSD 2020 Decennial Census Memorandum Series #Q-26, dated May 2, 2023
- U.S. Census Bureau, *2020 Post-Enumeration Survey Specification for Initial Housing Unit and Final Housing Unit Clerical Matching Quality Control*, DSSD 2020 Census Post-Enumeration Survey Memorandum Series #2020-K-26, DSSD 2020 Decennial Census Memorandum Series Q-27, dated May 19, 2023
- Federal Committee on Statistical Methodology, *A Systematic Review of Nonresponse Bias Studies in Federally Sponsored Surveys*, FCSM-20-02, dated March 2020
- Federal Committee on Statistical Methodology, *Best Practices for Nonresponse Bias Reporting*, dated June 2023

We contracted with IDA, an independent firm, to assess whether the bureau's methodologies for carrying out the 2020 PES were consistent with relevant federal and agency statistical standards. We assessed IDA's competence and professional qualifications and oversaw the progress of its work. Further, we used IDA's analysis in reaching the findings and conclusions presented in this report.

We gained an understanding of internal control processes significant within the context of the audit objective by interviewing bureau officials and reviewing documentation for evidence that the bureau carried out internal control procedures. We also carried out attribute testing (described below) to determine whether internal controls, specifically QC processes, were carried out appropriately. We reported the internal control weaknesses in the Objective, Findings, and Recommendation section of this report. Our audit found no incidents of fraud, illegal acts, or abuse.

Statistical Sampling⁴¹

To determine whether PES QC processes were effective, we statistically sampled between 66 and 75 randomly selected cases from the respective universes to examine the following PES operations and QC components:

- IL – 66 IL QC cases out of a universe of 2,200 cases.
- PI – 67 PIRI Original cases out of a universe of 29,000 cases and 66 PIRI Reopen cases out of a universe of 3,100 cases.
- IHU AFU Clerical Matching – 68 IHU AFU IL address (P-Sample) clerical matching cases out of a universe of 31,000 cases and 68 IHU AFU Census address (E-Sample) clerical matching cases out of a universe of 58,500 cases.
- Person BFU Clerical Matching – 75 Person BFU IL (P-sample) cases out of a universe of 11,000 cases and 75 Person BFU census (E-Sample) cases out of a universe of 10,500 cases.

We then selected operations based on the risk of noncompliance with quality standards for detailed testing. We tested whether (1) QC cases were completed within specified time frames, (2) the appropriate percentages of cases for each operation were selected for QC, (3) cases that failed QC were reworked, and (4) second-level reviewers in the matching operations conducted the required reviews. Each sample estimate is within a 90 percent confidence level and a margin of error of no greater than 10 percentage points. We used the results of our testing to project over the respective populations for each selected operation.

We were unable to carry out similar testing on samples of cases from the PFU, IHUFU, and FHUFU field operations because bureau documentation was unavailable. These three operations were paper-based, which required enumerators to notate and correct, if necessary, information for each case or household directly onto paper packets as they worked cases nationwide. Those packets, which were classified as temporary records, were then returned to the bureau's National Processing Center for processing and use in subsequent matching operations. Soon after the PES results were released in March and May of 2022, the bureau destroyed the paper packets, in July and August of 2022, in accordance with its records retention schedule.⁴² This occurred despite congressional interest⁴³ in the PES results.

⁴¹ Disclosure avoidance techniques used to protect respondent confidentiality have been applied to the sizes of the respective universes of cases, per bureau guidance.

⁴² The bureau's schedule governing the retention and disposition of 2020 Census records was approved on December 9, 2019, by the National Archives and Records Administration, which is responsible for overseeing agencies' adequacy of documentation and records disposition programs and practices. The schedule prescribes that temporary records can be destroyed when they are 10 years old or no longer needed for evaluation or other program purposes. In this case, the "no longer needed" standard applied, which allowed program officials to destroy the records before 10 years had passed. See National Archives and Records Administration, December 9, 2019. *2020 Decennial Census Records Schedule*, DAA-0029-2019-0004. Washington, DC: NARA, sequence numbers 6.2 and 6.3. Available online at www.archives.gov/records-mgmt/rcs/schedules/index.html?dir=/departments/department-of-commerce/rg-0029 (accessed July 10, 2024).

⁴³ Two letters from members of Congress expressed interest in the PES results: (1) United States Senate, March 31, 2022. *Letter to Secretary Gina Raimondo and Census Bureau Director Robert Santos regarding the 2020 Census*

According to National Archives and Records Administration guidance, temporary records that attract congressional interest or national media attention may deserve special consideration and warrant retention, which should have prompted the bureau to retain these records. The bureau informed us that paper records were destroyed because program officials had determined the records were no longer needed and due to storage space concerns at the bureau's National Processing Center facility. Accordingly, we were unable to determine whether QC processes were carried out for the follow-up operations.

Data Reliability

In satisfying the audit objective, we obtained computer-processed data from the following systems:

- Mobile Case Management/Listing and Mapping Application
- ROSCO
- SMarCS
- Person Matching, Review, and Coding System
- Housing Unit Matching, Review, and Coding System

To assess the reliability of survey data for our analysis, we conducted testing to determine data consistency, completeness, and accuracy. We also performed reasonableness testing, such as looking for missing fields, duplicative records, invalid time frames, and illogical relationships between data elements, to identify any errors. Based on these efforts, we believe the information we obtained was sufficiently reliable for this report.

We conducted our audit from June 2023 through October 2024 under the authority of the Inspector General Act of 1978, as amended (5 U.S.C. §§ 401-424), and Department Organization Order 10-13, as amended October 21, 2020. We performed our work remotely.

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 that provides a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

population undercounts. (2) United States House of Representatives, April 5, 2022. Letter to Secretary Gina Raimondo and Census Bureau Director Robert Santos regarding the 2020 Census PES results.

Appendix B: State Undercounts and Overcounts

Tables B-1 and B-2 capture states with statistically significant undercounts and overcounts.⁴⁴

Table B-1. States with Statistically Significant Undercounts

State	Error Size (percent)	Standard Error (percent)
Arkansas	-5.04	+2.21
Florida	-3.48	+0.91
Illinois	-1.97	+0.89
Mississippi	-4.11	+1.63
Tennessee	-4.78	+1.51
Texas	-1.92	+0.82

Source: OIG analysis of U.S. Census Bureau census coverage estimates for people in the United States by state and census operations

Table B-2. States with Statistically Significant Overcounts

State	Error Size (percent)	Standard Error (percent)
Delaware	+5.45	+2.82
Hawaii	+6.79	+1.68
Massachusetts	+2.24	+1.06
Minnesota	+3.84	+0.97
New York	+3.44	+0.94
Ohio	+1.49	+0.67
Rhode Island	+5.05	+1.43
Utah	+2.59	+1.23

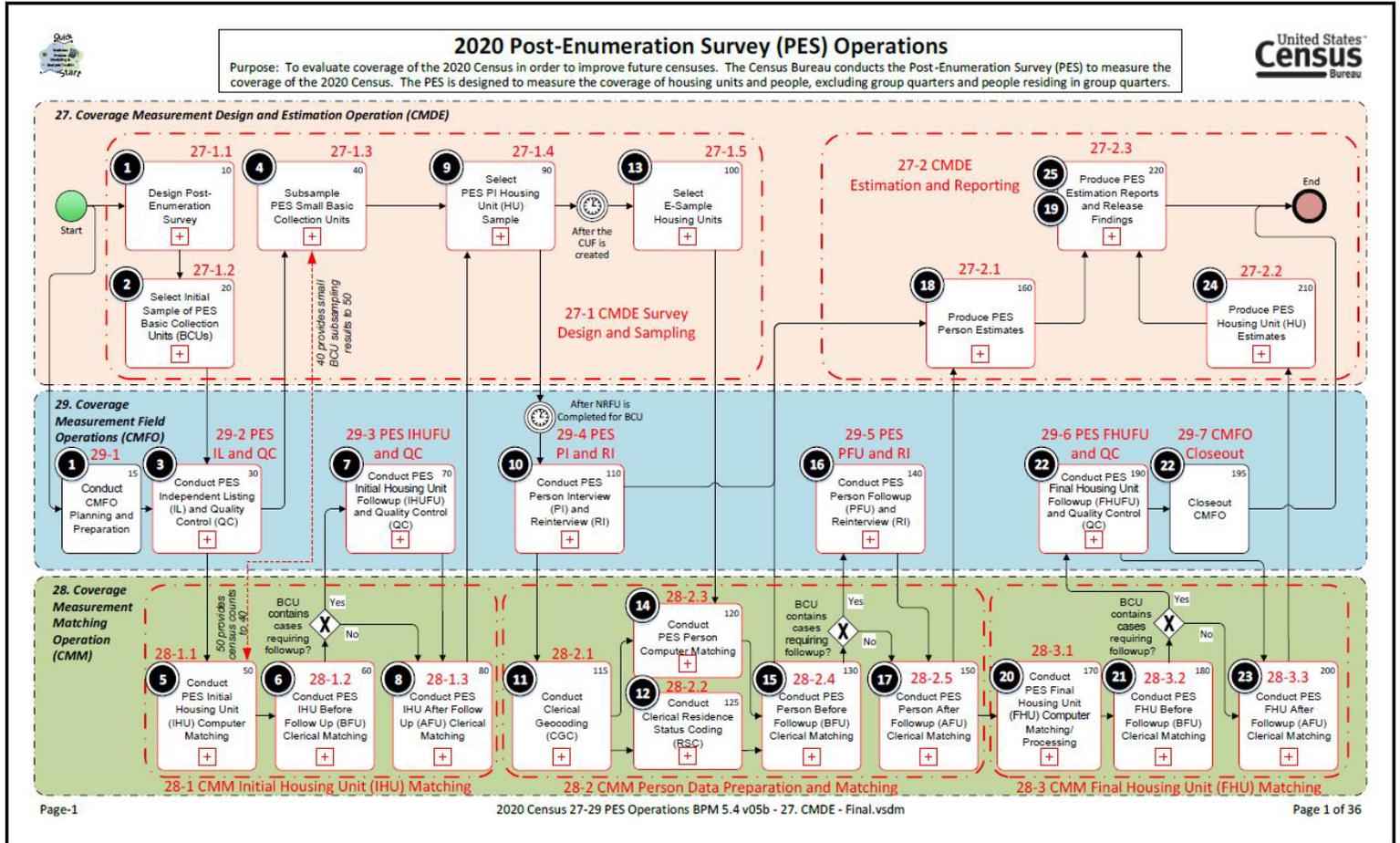
Source: OIG analysis of Census Bureau census coverage estimates for people in the United States by state and census operations

⁴⁴ “Statistically significant” describes an estimate that was statistically different from zero. A positive number greater than the standard error indicates an overcount, while a negative number greater than the standard error indicates an undercount.

Appendix C: PES Operational Activities

Figure C-I shows the complexity of the 2020 PES operations.

Figure C-I. 2020 PES Operations



Source: U.S. Census Bureau

Appendix D: PES Operational Timelines

Table D-I outlines the PES production operational time frames for those operational activities we selected for review.

Table D-I. PES Production Operational Time Frames

PES Operational Activity	Planned Start Date ^a	Target End Date	Actual Start Date	Actual End Date
Independent Listing	1/16/2020	3/14/2020	1/16/2020	3/13/2020
IHU Computer Matching	4/1/2020	4/24/2020	4/6/2020	6/3/2020
IHU BFU Clerical Matching	4/15/2020	5/15/2020	5/28/2020	6/25/2020
IHUFU	5/6/2020	6/13/2020	7/30/2020	9/25/2020
IHU After Followup Clerical Matching	6/2/2020	7/24/2020	8/14/2020	11/4/2020
PI ^b	6/17/2020	9/12/2020	9/14/2020	1/5/2021
PI Reopen ^c	N/A	N/A	2/9/2021	3/13/2021
Person BFU Clerical Matching	1/7/2021	2/19/2021	5/21/2021	7/16/2021
PFU	2/3/2021	3/20/2021	6/1/2021	9/3/2021
FHUFU	5/19/2021	6/12/2021	11/29/2021	2/28/2022

Source: OIG analysis of U.S. Census Bureau PES design and operational assessments

^a Table D-I does not include additional time for QC and RI operations, but indicates that in general, QC and RI start 1 week after the planned start date. We only included dates from the operations that were selected for review.

^b PI started with a soft launch beginning on September 14, 2020, with full production beginning on September 24, 2020. The PI soft launch consisted of working at least one PI case in each RCC in advance of full production to confirm all systems were operational.

^c PI Reopen was not an operation that was planned prior to the start of the PES. PI Reopen started with a soft launch beginning on February 9, 2021, with full production beginning on February 11, 2021.

Appendix E: Missing Data and Mitigations

Table E-I captures the rates of missing data in the 2020 PES and 2010 CCM along with actions taken to mitigate missing data.

Table E-I. Missing Data and Mitigations in the 2020 PES and 2010 CCM^a

Areas of Missing Data	2020 PES (percent)	2010 CCM (percent)	Actions Taken to Mitigate Missing Data
Missing data in the PES			
Non-interviews of occupied HUs in P-sample	16.8	3.7	Distribute sampling weights from non-interviews to interviews
Unresolved person enumeration status in E-sample	11.6	4.8	(1) Impute the probability of correct enumerations (2) Make an upward adjustment of imputed probabilities
Unresolved person inclusion status in P-sample	7.0	2.9	Use imputation for person inclusion status
Unresolved mover status in P-sample	5.6	2.2	Use imputation for mover status
Unresolved match status in P-sample	5.0	1.9	Use imputation for non-mover and in-mover match statuses
Unresolved detailed enumeration statuses	12.0	6.0	(1) Use imputation for enumeration status (2) Make adjustments to imputed probabilities
Missing data in the Decennial Census			
WPIs	3.4	2.0	Exclude WPIs from dual system estimation ^b

Source: OIG analysis of 2020 PES estimation methods

^a We rounded some of these percentages to the nearest tenth of one percent.

^b A WPI is a census person record for which all demographic characteristics were imputed. When such records lack sufficient information to determine (1) whether they are correct or erroneous enumerations and (2) whether they are matches to PES persons, they are considered non-data-defined records and are excluded from the dual-system estimation process.

Appendix F: Agency Response

The bureau's response begins on the following page.



UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

December 26, 2024

MEMORANDUM FOR:

Arthur L. Scott Jr.
Assistant Inspector General
For Audit and Evaluation
Office of Inspector General

From:

Robert L. Santos
Director
U.S. Census Bureau

Subject:

U.S. Census Bureau's Response to the Office of the
Inspector General's Draft Report: *"The Census Bureau
Should Address Challenges from the 2020 Post-
Enumeration Survey Ahead of the 2030 Census."*

Thank you for the opportunity to provide comments to the Office of Inspector
General's draft report titled, *"The Census Bureau Should Address Challenges from the
2020 Post-Enumeration Survey Ahead of the 2030 Census."* dated October 21, 2024.
The U.S. Census Bureau respectfully submits the attached comments.

Attachment

U.S. Census Bureau Comments on the Office of Inspector General’s Report:

“The Census Bureau Should Address Challenges from the 2020 Post-Enumeration Survey Ahead of the 2030 Census.”

December 2024

General Comments:

The U.S. Census Bureau appreciates the opportunity to comment on this draft report and its recommendation regarding the 2030 Census coverage estimation activities. This memo summarizes the Census Bureau’s response to the report’s findings and recommendation.

The fundamental design of the 2020 PES was developed in the 1980s and 1990s and has been refined in the subsequent decades. Intense scrutiny around the 2000 PES led to major quality improvements to the PES methods. The 2010 and 2020 PES continued to build upon the previous decades’ design.

The 2020 PES was challenged particularly by the COVID-19 pandemic and by other difficulties as stated in the draft report. However, these challenges did not prevent the PES from meeting its goals. With careful management, thousands of dedicated staff, and sound statistical procedures, the PES successfully overcame these challenges and produced high-quality estimates of census coverage.

The 2020 PES successfully achieved its primary goal of estimating the coverage of national-level census counts by demographic groups and state-level counts. The 2020 PES estimates were similar to independent estimates from the Demographic Analysis ¹(2022). Additionally, the 2020 PES estimates aligned with historic trends in census coverage error. In summary, the PES estimates are trusted to provide valuable information about the 2020 Census.

With this understanding, the Census Bureau believes that the 2020 PES was planned and executed successfully to achieve its intended goal of estimating coverage error. However, we recognize that there is room for improvement to strengthen the survey in the future. It is in this context that we comment on each of the three findings and the one recommendation.

¹ U.S. Census Bureau, “Demographic Analysis,” March 8, 2022, <https://www.census.gov/programs-surveys/decennial-census/about/coverage-measurement/da.html>.

Finding 1: Operational disruptions and mitigations in response to missing data increased uncertainty in PES estimates.

A. The 2020 PES experienced increased levels of missing data.

Although the 2020 PES had a lower response rate than the 2010 PES, the 2020 PES estimates are robust and trustworthy. The impact of nonresponse on coverage estimates of housing units is minimal because the Independent Listing and Initial Housing Unit Followup efforts primarily relied on observation by the listers (with confirmation from respondents) rather than on interviews with household members. The Person Interview operation achieved a unit response rate of over 80% in the middle of the COVID-19 pandemic. This response rate was higher than many other nationally representative surveys. It also exceeded guidelines established.^{2,3}

B. The bureau did not always quantify sources of non-sampling error.

The 2020 PES met federal and Census Bureau standards and best practices on analyzing and quantifying nonsampling errors. The person and housing unit source and accuracy statements included the PES coverage rate, confusion matrix for different measurements between the decennial census and the PES, and the PES response rates. In addition, the 2020 PES published six operational assessments and eight in-depth estimation reports including results of various key estimation techniques.⁴

Although it was not required, the PES also conducted a nonresponse bias analysis using pattern-proxy mixture models. Users of the PES can trust its results, knowing that great efforts were taken to quantify, minimize, and report nonsampling errors.

Finding 2: A smaller-than-anticipated sample size contributed to increased uncertainty in PES estimates.

The 2020 PES effectively estimated gross and net coverage errors in the 2020 Census. The standard error of the national net coverage error was 0.25%. These standard errors were made possible through a probability sample from 114,000 households, which is much larger than the sample size of most surveys. The small standard errors allowed the detection of statistically significant census net coverage errors for many demographic groups. It should also be noted

³ Office of Management and Budget, "Standards and Guidelines for Statistical Surveys," September 2006, https://www.whitehouse.gov/wp-content/uploads/2021/04/standards_stat_surveys.pdf

⁴ U.S. Census Bureau, "Post-Enumeration Surveys," March 12, 2024, <https://www.census.gov/programs-surveys/decennial-census/about/coverage-measurement/pes.2020.html>.

that the 2020 PES standard errors included estimated uncertainty resulting from status imputation and nonresponse weighting.

The smaller sample size only impacted the standard error of the estimates, but the overall large sample still allowed the PES to effectively estimate the coverage error of census counts by demographic group and by state.

Finding 3: The bureau did not carry out QC processes for PES operations as planned.

A. QC listers did not complete Independent Listing (IL) QC checks and rectification within the prescribed timelines.

Although some QC checks and rectifications were not completed within the planned timelines, 64% were completed within the 3-day timeframe. The remaining cases were completed by the end of the operation.

B. The bureau did not conduct Person Interview Reinterview (PIRI) within recommended completion time frames.

Although some Person Interview Reinterview cases were not completed within the recommended time frame, it should be noted that the QA plan did not require all cases to be completed within five days, which allowed flexibility for extenuating circumstances. However, the proportion of cases that exceeded the five-day window was beyond what was intended.

C. The bureau reviewed fewer BCUs than planned during clerical matching and did not always review flagged cases.

While it is true that analysts did not always review cases when flagged by technicians, the example in the report is not representative of what would have been checked during QC. The example is an outlier case and does not appropriately describe the normal QC process. Also, QC for Initial Housing Unit Before Followup should not be compared to other matching operations since only analysts worked on Initial Housing Unit Before Followup. They worked as many cases as possible between May 28, 2020, and June 25, 2020.

Despite the findings identified in the report, the overall QC operation was effective and successful in verifying the PES results.

Recommendation 1: As the 2030 PES design undergoes substantial changes, the bureau should consider the corrective actions below to inform its PES redesign. Addressing these issues during the redesign will help ensure that opportunities for improvement are maximized, promoting overall operational improvements to the PES.

We believe the bureau could improve the transparency and accuracy of PES results by considering the actions presented below when finalizing its plan for the 2030 PES:

- **Advancing approaches to mitigate missing data and conducting research to better understand demographic groups most likely to be impacted by missing data.**
- **Analyzing and quantifying major sources of non-sampling error, to include interactions among multiple sources of error, and ensuring the results are communicated to the public.**
- **Ensuring that sampling designs undergo appropriate testing prior to production and are designed to support their intended uses.**
- **Establishing a detailed and effective strategy to ensure computer system relocations are completed on schedule to minimize operational disruptions.**
- **Ensuring changes to quality assurance processes are documented, approved, and widely communicated across all affected divisions and their operational components.**
- **Strengthening the bureau’s quality assurance plan to ensure reinterviewers complete cases within prescribed time frames.**
- **Strengthening the clerical matching QC plan to adhere to applicable QC review thresholds.**
- **Establishing procedures to ensure analysts review flagged clerical matching cases and documentation of analyst reviews is maintained.**
- **Ensuring that the bureau’s records retention schedule for 2030 Census records prescribes only fixed retention periods that also allow records to be available for a sufficient period following the end of operations for internal and external oversight activities.**

The Census Bureau agrees with this recommendation and will consider the suggestions in the recommendation for future coverage estimation activities. The Census Bureau is committed to transparency and accuracy as demonstrated by the 2020 PES. We are currently researching substantial innovations to the coverage estimation program that will improve the already high degree of transparency and accuracy.

REPORT

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