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2010 CENSUS

Follow-up Should Reduce Coverage Errors, but Effects on Demographic Groups Need to Be Determined



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Why GAO Did This Study

The U.S. Census Bureau (Bureau) puts forth tremendous effort to conduct a complete and accurate count of the nation's population and housing; yet some degree of error in the form of persons missed, duplicated, or counted in the wrong place is inevitable due to the complexity in counting a large and diverse population. The Bureau designed two operations, Coverage Follow-up (CFU) and Field Verification (FV), to reduce certain types of counting, or coverage, errors in the 2010 Census. GAO was asked to assess (1) the extent to which the Bureau completed CFU and FV on schedule and within estimated cost and (2) the implications of their key design elements for improving coverage.

GAO reviewed Bureau evaluations, planning, and other documents on CFU and FV, and prior GAO work, and interviewed Bureau officials.

What GAO Recommends

GAO recommends that the Secretary of Commerce direct the Bureau to assess (1) how well questions to help identify miscounted people on census forms helped reduce differences in the undercounts between demographic groups; (2) the degree to which telephone numbers led to completed contacts for households of various demographic characteristics; and (3) how trends in telecommunication usage and new technology may influence the effectiveness of CFU. The Secretary of Commerce concurred with our recommendations.

View [GAO-11-154](#) or key components. For more information, contact Robert Goldenkoff at (202) 512-2757 or goldenkoffr@gao.gov.

2010 CENSUS

Follow-up Should Reduce Coverage Errors, but Effects on Demographic Groups Need to Be Determined

What GAO Found

The Bureau completed CFU and FV on schedule and within budget. FV cost \$21 million (about 38 percent less than estimated) and CFU cost about \$267 million (about 2 percent less than estimated). These operations followed up on potential errors on census returns or lists of addresses after census data had been initially collected. Their completion provided follow-up data used by subsequent data processing that removed errors from the official census tabulations.

Three of the Bureau's key CFU design elements will likely improve overall census accuracy, but their effect on undercounts of different demographic groups is not clear. One key design element increased the number and types of follow-up cases. The Bureau expanded the scope of CFU from about 2 million households in the 2000 Census to more than 7 million in 2010. It also added 20 different types of households for potential follow-up. New types included households that reported members temporarily residing elsewhere, such as at college, in nursing homes, or in jail. According to the Bureau, the 2010 CFU operation should remove more than 2.7 million coverage errors from the census.

Another key design element of CFU prioritized follow-up cases based on their likelihood to result in a census correction, which was a reasonable attempt to leverage the resources for the operation. However, the Bureau's evaluation plans, based on considerations of what may best reduce cost or increase accuracy in the future, do not link the demographic characteristics of households to how they responded to the additional questions or CFU results for those households. Therefore, it is unclear whether the prioritized follow-up will help reduce differences in the accuracy of census counts across demographic groups.

Finally, CFU's design relied on a telephone-only approach to complete follow-up rather than personal visits. This limited costs, resulting in more follow-up and likely more coverage errors being removed from the census. But the telephone-only decision excluded about 700,000 households from CFU that could not be contacted by telephone. Prior Bureau experience indicates that some historically undercounted groups were less likely to be reachable by telephone, and more recent independent research suggests that trends in telecommunication usage may also make it harder to reach some demographic groups this way in the future. Yet the Bureau's evaluation plans do not include an assessment of either the usefulness of the telephone numbers it collected in reaching specific groups or the effect of these trends. Greater understanding of how best to reach different groups as well as the influence of trends on the effectiveness of CFU could help to control costs while working to further reduce differential undercounts.

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Abbreviations

Bureau	U.S. Census Bureau
CFU	Coverage Follow-up
FV	Field Verification
IT	information technology

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United States Government Accountability Office
Washington, DC 20548

December 14, 2010

The Honorable Thomas R. Carper
Chairman
The Honorable John McCain
Ranking Member
Subcommittee on Federal Financial Management, Government
Information, Federal Services, and International Security
Committee on Homeland Security and Governmental Affairs
United States Senate

The Honorable Darrell E. Issa
Ranking Member
Committee on Oversight and Government Reform
House of Representatives

The Honorable William Lacy Clay
Chairman
The Honorable Patrick T. McHenry
Ranking Member
Subcommittee on Information Policy, Census, and National Archives
Committee on Oversight and Government Reform
House of Representatives

The U.S. Census Bureau (Bureau) puts forth tremendous effort to conduct a complete and accurate count of the nation's population and housing; nonetheless, some degree of error in the form of persons missed, duplicated, or counted in the wrong place during the decennial census is inevitable due to the complexity of counting a large and diverse population.

The Bureau estimates that the 2000 Census undercounted certain population groups, including minorities, renters, and children, but somewhat overcounted the population as a whole. An undercount occurs when the census misses an individual who should have been enumerated; an overcount occurs when an individual is counted in error. Differences among undercounts of ethnic, racial, and other groups are referred to as "differential undercounts," which may have implications for political representation and other uses of census data. In an effort to improve accuracy and reduce differential undercounts of the population in 2010, the Bureau conducted the Coverage Follow-up (CFU) and Field Verification (FV) operations, two programs intended to clean up possible

errors identified after households provided their census responses. During CFU, a contractor telephoned certain households in an attempt to determine if someone had been miscounted, such as when the number of people reported living in a household did not match the number of people whose name and demographic information was included on the household's census form. During FV, the Bureau visited addresses that had been provided by persons that thought they had been missed by the census and that did not match the Bureau's master address list. From the 2000 Census, the Bureau expanded CFU and allocated more than \$200 million in additional funds—including \$30 million provided by the American Recovery and Reinvestment Act of 2009¹—which allowed the Bureau to include an additional 1.1 million households within the scope of CFU.

After reviewing the status of CFU in 2008, we recommended that the Bureau submit its plans for CFU to Congress and decide how it would conduct the operation.² The Bureau did so and completed CFU in August 2010 and FV in September 2010. As requested, for this review we examined (1) the extent to which FV and CFU were completed on schedule and within cost estimates, and (2) key design elements of CFU and FV, the implications for those design elements on improving coverage, and possible lessons learned to the extent similar efforts are used in the 2020 Census. This report is one of three we are releasing today.³ The other reports focus on the Bureau's efforts to reach out to and enumerate hard-to-count populations, and efforts to complete other key census-taking activities. Both reports identify preliminary lessons learned, as well as potential focus areas for improvement.

To meet both objectives, we assessed Bureau planning, testing, and schedule documents and interviewed Bureau officials to supplement and verify the currency and relevance of documentation obtained. For the first objective we also assessed the performance of CFU and FV against the

¹Pub. L. No. 111-5, div. A, tit. II, 123 Stat. 115, 127.

²GAO, *2010 Census: Bureau Needs to Specify How It Will Assess Coverage Follow-up Techniques and When It Will Produce Coverage Measurement Results*, [GAO-08-414](#) (Washington, D.C.: Apr. 15, 2008).

³GAO, *2010 Census: Key Efforts to Include Hard-to-Count Populations Went Generally as Planned; Improvements Could Make the Efforts More Effective for Next Census*, [GAO-11-45](#) (Washington, D.C.: Dec. 14, 2010) and GAO, *2010 Census: Data Collection Operations Were Generally Completed as Planned, but Long-standing Challenges Suggest Need for Fundamental Reforms*, [GAO-11-193](#) (Washington, D.C.: Dec. 14, 2010).

cost, timeliness, and other metrics the Bureau used to monitor the operations. Additionally, for the second objective we reviewed our past reports and Bureau literature on known limitations of follow-up methods to identify key design elements and their implications. We also assessed Bureau study and evaluation plans. We conducted this performance audit from March 2010 to December 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

To help ensure a complete count, the Bureau had a number of operations aimed at capturing census data from people and households that otherwise might have been missed by the census. For example, the Be Counted program was designed to make special census questionnaires available to those who may not have received one, including people who do not have a usual residence, such as transients, migrants, and seasonal farm workers. The questionnaires were placed in over 38,000 locations across the country, including libraries, convenience stores, and other places people might frequent. The Bureau conducted FV to verify the existence of new addresses provided on these questionnaires and through other sources that were not already on the Bureau's master address list. The procedures enumerators followed to verify addresses in 2010 were largely similar to those used in the 2000 Census. In 2000, the Bureau visited nearly 900,000 addresses as part of its FV operation, verifying the addition of over 450,000 addresses to its address list.

To help ensure accuracy in the population count in 2000, the Bureau used telephone interviews in another operation to follow up with two types of household responses: households too large to include all their members on the form and households with apparent discrepancies on their questionnaires, such as when the number of people reported in the household population box does not match the number of people whose name and demographic information is included on the form. The Bureau placed calls to these households to determine if additional persons might have been missed (undercounted), if persons might have been counted in error (overcounted), or if persons might have been counted in the wrong place (possibly an overcount in one place and an undercount in another). The Bureau followed up on over 2.5 million households at a cost of approximately \$67 million, resulting in over 152,000 people being added to the official census count and approximately 258,000 others being removed.

In response to Census 2000 experiences and in order to help achieve a Bureau goal of reducing differential undercounts, the Bureau added questions to the 2010 Census questionnaire to better identify potential coverage problems. These additional questions—called coverage probes—were to help identify households that may have omitted (undercounted) persons, due to familial relationships such as young children and extended family residing in the household but not reported on the census questionnaire due to space limitations, or households that may have counted persons more than once (overcounted), due to situations where members spent time elsewhere, such as relatives living in nursing homes or college dormitories. The resulting coverage probes used on the 2010 Census questionnaire are shown below in figure 1.

Figure 1: The Bureau Used Probes on Census Questionnaires to Identify Households with Possible Coverage Errors

1. How many people were living or staying in this house, apartment, or mobile home on April 1, 2010?
 Number of people =

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

3. Is this house, apartment, or mobile home — Mark ONE box.
 Owned by you or someone in this household with a mortgage or loan? *Include home equity loans.*
 Owned by you or someone in this household free and clear (without a mortgage or loan)?
 Rented?
 Occupied without payment of rent?

4. What is your telephone number? *We may call if we don't understand an answer.*
 Area Code + Number
 -

OMB No. 0607-0919-C: Approval Expires 12/31/2011.
 Form **D-61** (1-15-2009)

9. What is Person 1's race? Mark one or more boxes.
 White
 Black, African Am., or Negro
 American Indian or Alaska Native — *Print name of enrolled or principal tribe.*
 Asian Indian Japanese Native Hawaiian
 Chinese Korean Guamanian or Chamorro
 Filipino Vietnamese Samoan
 Other Asian — *Print race, for example, Hmong, Laotian, Thai, Pakistani, Cambodian, and so on.* Other Pacific Islander — *Print race, for example, Fijian, Tongan, and so on.*
 Some other race — *Print race.*

10. Does Person 1 sometimes live or stay somewhere else?
 No Yes — Mark all that apply.
 In college housing For child custody
 In the military In jail or prison
 At a seasonal or second residence In a nursing home
 For another reason

→ If more people were counted in Question 1, continue with Person 2.

U S C E N S U S B U R E A U

Source: GAO Presentation of Census Bureau Information.

The Bureau Completed FV and CFU on Schedule and within Budget, but Needs to Improve the Accuracy of Its Cost Estimates

FV Was Completed on Schedule and Well Under Budget

The 2010 FV operation began July 21, 15 days early, and finished on schedule on September 8, 2010. During that time, the Bureau visited nearly 456,000 addresses. The Bureau's preliminary results show that about 49 percent of those addresses were verified as valid housing units, 33 percent did not exist, and 18 percent were duplicates. The Bureau expects to report the final results in its formal evaluations of FV, planned for release in July 2011.

Completing FV on schedule was commendable, given that the Bureau had to make several late changes to the design of the operation as part of a contingency plan. Before beginning the FV operation, the information technology (IT) system the Bureau had expected to use to support the operation experienced testing and development delays. Furthermore, the Bureau was experiencing difficulty with this system being used to support other major census field operations. Therefore the Bureau developed and implemented a contingency plan, which substituted a modified version of the IT system used to support the 2010 Census Coverage Measurement operations and the IT system used for the 2000 Census, changed some related procedures for shipping workload materials, and significantly expanded the quality-assurance program to mitigate the risk of introducing additional changes to the contingency IT system. The Bureau attributes its ability to complete FV on time to its aggressive monitoring of the risk that IT systems might not be ready, its having identified a contingency IT system in advance, and the small scale of the FV operation compared to other census field operations, which allowed for the rapid adoption of alternative procedures. The Bureau's timely response to IT system delays

demonstrates the benefits of the Bureau having developed risk mitigation plans for significant risks, as we have recommended before.⁴

The Bureau completed FV at a cost of \$21 million, 38 percent lower than the \$33.8 million estimated for the operation. Bureau officials are still researching why costs were lower than expected, but their preliminary analysis attributes cost savings to increased productivity and reduced operational inputs, such as training hours and mileage. The final cost of the operation was unexpected considering that the Bureau estimated that the late changes made by the contingency plan would increase the cost per case and increase total costs by nearly \$15 million for the estimated workload. Under the Bureau's original calculation, adding the contingency plan raised the estimated cost-per-case to about \$74, far more than the \$53 per case assumed in the initial budget estimate or the \$46 per case reported at the end of the operation. The Bureau has not attempted to separately identify how much of the final cost per case increase was attributable to the contingency plan or other factors.

Achieving cost savings is a positive development. However, our prior work has highlighted the need for the Bureau to develop more accurate and rigorous cost estimates for census operations.⁵ A high-quality cost estimate is the foundation of a good budget, providing an estimate of the funding required to efficiently execute a program. Additionally, according to our *Cost Assessment Guide*, a cost estimate should be a "living" document that is continually updated as actual costs begin to replace original estimates, so that it remains relevant and current.⁶ We have previously recommended⁷ that the Bureau document where actual costs differ from those estimated to help document lessons learned and the basis for changes made to assumptions used. The Bureau updated its cost estimate for FV as its estimated workload changed and when it considered adoption of the contingency plan. However, moving forward it will be important to be able to explain the variation in its cost estimates.

⁴GAO, *Information Technology: Census Bureau Needs to Improve Its Risk Management of Decennial Systems*, [GAO-08-79](#) (Washington, D.C.: Oct. 5, 2007).

⁵GAO, *2010 Census: Census Bureau Should Take Action to Improve the Credibility and Accuracy of Its Cost Estimate for the Decennial Census*, [GAO-08-554](#) (Washington, D.C.: June 16, 2008).

⁶GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, [GAO-09-3SP](#) (Washington, D.C.: March 2009).

⁷[GAO-08-554](#).

CFU Was Completed on Schedule and Exceeded Performance Targets

The 2010 CFU operation began and finished on schedule, ensuring that CFU data were available for subsequent data processing. From April 11 to August 14, Bureau contractors telephoned nearly 7.4 million households, of which 4.9 million (66 percent) were complete interviews, meeting their estimated workload target. The Bureau expects to be able to report an analysis of the effect of CFU on census coverage in the spring of 2011.

The Bureau completed CFU at an estimated cost of \$267 million, about 2 percent less than the initial cost estimate for the operation. As shown in table 1 below, the Bureau completed a slightly higher percentage of cases it attempted and spent on average less time on the phone completing each interview than expected.

Table 1: CFU Performance Exceeded Targets

Performance measure	Target	Actual
Case-completion rate (percent)	65	66
Cases completed per hour per interviewer	2.36	2.35
Average interviewer score for quality assurance (percent)	97	99
Average call time (seconds)	249	208

Source: Census Bureau.

Note: Data are from Census Bureau management reporting.

Given mandated deadlines that the Bureau faces for delivering census tabulations, completing field data collection including CFU and FV on schedule was crucial for subsequent processing activities to proceed and be completed on schedule.

CFU Should Help Improve Overall Census Coverage, but Its Effect on Different Demographic Groups May Not Be Uniform

Three design decisions for the 2010 CFU operation should improve overall census accuracy. These decisions include

- expanding the scope of the 2010 CFU operation compared to its 2000 operation,
- prioritizing types of follow-up cases, and
- contacting identified CFU households using only the telephone.

The Bureau's Increase in the Number and Types of CFU Cases Should Improve Overall Census Accuracy

A key design decision the Bureau made for the 2010 CFU was to expand the scope of its coverage follow-up operation from 2000 to follow up on additional types of cases that it believed would help reduce the differential undercount. While continuing to follow up on the two types of cases that constituted the 2000 follow-up operation—large households and those with apparent count discrepancies—the Bureau identified 20 additional types of cases potentially to cover in 2010. One of these types of cases came from the use of administrative records from other federal sources, such as demographic information and addresses of families receiving tenant subsidies from an information system at the Department of Housing and Urban Development, to identify persons associated with a household's address who might have been omitted from the household's census form. Most of the additional types of cases were identified from responses to the new coverage probes on the census questionnaire discussed earlier. Additional types included households with responses indicating household members present who may not have been recorded on the initial census form, such as newborn babies, foster children, roommates or live-in babysitters, or household members who may have lived or stayed at more than one place, such as college students or nursing-home residents.

Expanding the scope of the 2010 CFU increased the number of cases the Bureau followed up on from about 2.5 million cases in 2000 to about 8 million cases in 2010. According to the Bureau, the 2010 CFU operation should result in more than 2.9 million coverage errors being removed from the census, including overcounts and undercounts, compared to more than 400,000 coverage errors being removed in 2000. The more coverage errors are removed from the official census count, the more the overall accuracy of the census is improved.

The Effect of the Bureau's Prioritization of Coverage Follow-up on Differential Undercounts Is Not Clear

A second key design decision the Bureau made for CFU was to prioritize the types of cases it would follow up on, likely increasing the overall number of coverage errors corrected but possibly affecting demographic groups differently. The Bureau had to prioritize follow-up cases, since the expansion of the CFU scope resulted in an estimated 22.5 million potential CFU cases, far exceeding what its time and budget for the 2010 CFU operation would permit. Bureau planning documents indicate that along with the extra time needed to pursue 22.5 million cases, it would have cost approximately \$800 million more to complete all of the possible follow-up cases.

In April 2010, the Bureau formally documented its decision to prioritize follow-up based on cost and estimates of the number of corrections that

would result from each type of case, and documented which cases it planned to include in follow-up. The Bureau estimated that in addition to households with apparent discrepancies on their questionnaires and households too large to include all their members on the form—the two types of cases it focused on in 2000—it would complete follow-up on 8 of 20 additional types of cases. However, due to a combination of higher call efficiency and lower-than-expected workloads for some of the selected types of cases, in the end the Bureau was able to follow up on an additional three types of CFU cases.

The Bureau's decisions to expand the scope of CFU and prioritize the CFU cases will likely result in a greater number of coverage errors being removed from official census tabulations than were removed in 2000, increasing CFU's effectiveness in improving overall census accuracy in 2010. Prioritization of the CFU cases to contact was a reasonable attempt to leverage the resources and time available for the operation. However, because the specific coverage probes the Bureau used on census questionnaires do not clearly map to specific demographic groups, the extent to which the prioritized follow-up will help achieve the Bureau's goal of reducing the differential undercount is unclear. For example, one of the Bureau's priorities for follow-up was households indicating that persons may have been included who should have been counted elsewhere, such as persons in jail, in college, or in the military. Among the types that the Bureau did not follow up on were households that reported persons who were sometimes living elsewhere seasonally or as part of custody-sharing arrangements. The demographic characteristics of the people covered by each of these probes are not likely to be the same as the general population. Thus, following up on one set of cases but not others will likely have a different, though unknown, effect on particular demographic groups.

The Bureau acknowledges that, in so far as households in certain groups are not contacted by telephone but have coverage errors, there would likely be a smaller improvement in coverage for those demographic groups. Yet Bureau officials maintain that since it would be difficult to design follow-up based directly on household characteristics such as race and Hispanic origin, relying on situation- and relationship-based probes on census questionnaires—such as the Bureau did in 2010—may be the most effective way to identify coverage follow-up cases. To that end, the Bureau has 2010 data on how each household responded to each coverage probe and the demographics of each household, and will ultimately know which probes led to corrections of census coverage errors. The Bureau plans to report the demographic groups for which CFU identified corrections as

part of its formal assessment of CFU, but that assessment does not include a link between the results for each probe and historically undercounted groups. Bureau officials have explained that its evaluation choices are driven by consideration of the best value to the decennial census in terms of informing possible cost benefit analyses and improvements to accuracy, and can change in response to new information the Bureau may obtain. Linking these data from 2010 CFU could help the Bureau decide which of the probes and priorities best helped the Bureau both improve overall accuracy and reduce the differential undercount, and better inform the Bureau decision making on the use of coverage probes for 2020.

The Effect of the Bureau's Telephone-Only Approach on Differential Undercounts Is Not Clear

A third key design decision the Bureau made for CFU was to rely solely on telephone interviews rather than use personal visits to contact households during the 2010 CFU operation. For those households the Bureau can reach by telephone, this decision should have enabled the Bureau to reduce many more census errors, because it allowed the Bureau to follow up with more households than it could have with personal visits using the same level of funding. A Bureau evaluation of its 2000 coverage follow-up activities suggested that personal visits be used for households for which the Bureau has no valid telephone number, noting that traditionally undercounted groups, such as renters and certain minority groups, were less likely to have valid phone numbers. Yet personal visits are significantly more expensive than telephone calls, costing about \$71 per case compared to about \$19 per case for telephone calls, according to Bureau results from a 2006 census test of CFU.

To increase the effectiveness of its telephone-only approach, the Bureau implemented several specific recommendations from its evaluation of the 2000 follow-up operation, including the use of a commercial database to assist with identifying the telephone numbers that were invalid or missing for CFU cases. Bureau officials believe that adopting these recommendations led to significant increases in the effectiveness of telephone follow-up, with reported response rates to telephone calls conducted as part of 2010 Census tests of 63 percent in 2004, 80 percent in 2005, and 78 percent in 2006. For 2010 CFU, Bureau management reporting indicates that the response rate exceeded its target goal of 65 percent.

The Bureau's decision to rely solely on telephone calls and related measures to complete CFU resulted in lower cost and more effective follow-up, and should contribute to a greater number of coverage errors being removed from official census tabulations compared to 2000. While these design decisions helped increase overall census accuracy, their

effect on the Bureau's goal to reduce the differential undercount is less clear. This is because the Bureau excluded from CFU any household for which it did not obtain a useable telephone number. A useable phone number was obtained either from the respondent's return and could be a wireless or landline telephone number or through a telephone number look-up that resulted in the retrieval of landline numbers only. This is potentially problematic for two reasons.

First, current research indicates that there are significant differences between households that use only wireless telephones and those that have landline telephones, with groups of households with high wireless-only usage being part of historically undercounted populations.⁸ According to our analysis of Bureau management reporting, the Bureau excluded about 700,000 households from follow-up because it lacked a usable contact telephone number. The Bureau relied only on landline telephone numbers from its commercial database, due to concerns about not knowing the geographic location of wireless phones it might dial and the possible financial burden on wireless customers from unsolicited calls. The Bureau did not immediately know which household-provided numbers were wireless, so it had rules concerning when calls could be made, to restrict calls to local times appropriate for the location of addresses provided. The Bureau has not attempted to track how many of the telephone numbers it called or excluded from follow-up were wireless numbers, what types of CFU cases they were for, or what the demographic characteristics of these households might be. According to the Bureau, it has asked the contractor that carried out the telephone calls for the Bureau to report the disposition of cases where a number was found during look-up as part of the contractor's forthcoming assessment. Future Bureau decisions about how to contact households for follow-up can be better informed if the Bureau strengthens its understanding of how different sources of contact information can affect its goal to reduce the differential undercount.

Furthermore, trends regarding the use of wireless telephones indicate that some households within hard-to-count populations may be harder to contact in the future using landline telephone operations. For example, a recent Centers for Disease Control and Prevention study shows that wireless-only households has more than doubled between January 2006

⁸National Center for Health Statistics, *Wireless Substitution: Early Release of Estimates from the National Health Interview Survey, July-December 2009* (May 2010). *Pew Research Center, Assessing the Cell Phone Challenge to Survey Research in 2010* (May 2010).

and December 2009 from about 11 percent to more than 24 percent of the nation's households. And in May 2010, the Pew Research Center found that wireless-only adults pose a significant challenge to data collection by telephone, because such adults are substantially different demographically from those reached on a landline phone. According to the Pew Research Center, wireless-only adults tend to be young, single, renters, and with lower income. This research also found that minorities made up a larger share of the wireless-only group with far more Hispanics, African-Americans, and people of other or mixed racial backgrounds than those with landline telephones. Such trends could pose a challenge to possible future Bureau reliance on telephone-based contacts intended to help improve census coverage of such demographic groups to the extent they do not provide their telephone numbers on census questionnaires. Broader ongoing shifts in the use of other telecommunications, including a variety of social media, may also influence the relative effectiveness of strategies relying on telephone communication.

Conclusions

Overall, the Bureau generally implemented FV and CFU on schedule and under budget, which is a noteworthy accomplishment given the inherent challenges of conducting a cost-effective census. The Bureau also updated its cost estimates for FV periodically as its estimated workload for FV evolved, and adopted design changes for CFU that likely contributed significantly to improving the overall accuracy of the census. At the same time, the Bureau's experience in implementing these two operations highlights additional actions that may improve the Bureau's understanding of the effectiveness of CFU in reducing differential undercounts and help improve planning for 2020 to the extent that the Bureau conducts such operations as part of the next decennial.

First, our previous work has highlighted the importance of accurate and rigorous cost estimates; thus, it will be important for the Bureau to assess the factors that led to significant variance in cost estimates for FV. Knowing this will allow the Bureau to develop more accurate cost estimates in the future, and will help the Bureau focus on cost containment as it prepares for the 2020 Census. We are not making recommendations at this time regarding the Bureau's cost estimation methods, as we have already done so in a previous report.⁹ The Bureau

⁹GAO-08-554.

agreed with those recommendations at that time and has begun implementing them.

Second, given the research and testing of coverage probes leading up to their use in 2010, it will be important for the Bureau to assess the degree to which the coverage probes helped address the differential undercount. This will help the Bureau understand whether the probes the Bureau prioritized for follow-up worked as intended and could help the Bureau determine which probes or other follow-up procedures to use in the future to improve census accuracy.

Third, it will be important for the Bureau to determine the effectiveness of the phone numbers it obtained from census returns or its commercial database in making contact with households of different follow-up and demographic groups. The decision to rely solely on telephone calls and no personal visits involved an implicit trade-off between the opportunity for cost savings with improved overall census accuracy and an opportunity possibly to help reduce historic differential undercounts. If the Bureau better understood the demographic composition of those for whom it did and did not obtain telephone numbers, and for whom it was and was not successful in reaching by phone, it could better determine the effect of this design decision on differential undercounts. Also, better knowledge of how best to reach different groups could help identify effective sources of contact information or strategies for using them for future censuses, further helping to control costs while still working to address differential undercounts.

Finally, whether it is a trend of households moving away from reliance on landlines, or other possible emerging trends related to growth in other modes of communication and new technology, the Bureau's future design decisions will benefit from tracking and assessing the implications of such trends and leveraging or mitigating their effect where possible. For example, under a scenario where the Bureau continues to rely on telephones for contacting households, the Bureau might need to adopt strategies for increasing the number of usable telephone numbers provided by census respondents or revisit its specific rules concerning when to dial numbers. Moving forward, it will be important for the Bureau to identify how rapid changes in technology and the public's use of them may affect the effectiveness of its efforts to improve census accuracy, both overall and in terms of reducing differential undercounts.

Recommendations for Executive Action

We recommend that the Secretary of Commerce require the Director of the U.S. Census Bureau to take the following three actions to improve the Bureau's planning for the 2020 Census:

- To help the Bureau decide which coverage probes, if any, to use and prioritize for future follow-up efforts, assess the extent to which historically overcounted and undercounted demographic groups responded to the probes the Bureau followed up on and determine the effectiveness of specific probes in reducing differential undercounts.
- To support the Bureau's efforts to control costs while improving census accuracy, determine the demographic characteristics of the households for which it did and did not obtain telephone numbers and, to the extent feasible, assess the degree to which the telephone numbers were usable and led to completed contacts for households of various follow-up groups and demographic characteristics.
- To ensure that the design of future follow-up efforts is effective in improving census coverage, assess the implications that trends in landline and wireless usage and other modes of communication and new technology may have both on the design decisions for future CFU-like operations and on their effectiveness in improving census coverage in terms of both overall census accuracy and differential undercounts.

Agency Comments and Our Evaluation

The Secretary of Commerce provided written comments on a draft of this report on December 1, 2010. The comments are reprinted in appendix I. The Department of Commerce agreed with the overall findings and recommendations and appreciated our efforts in helping the Bureau develop a successful evaluation plan for the 2020 Census. The department also included comments from the Bureau on certain statements in the report.

The Bureau commented on our discussion of its initial estimate that the contingency plan it adopted would increase the cost of FV. The Bureau commented that its initial estimate that the contingency plan would increase the cost of FV by \$15 million was based on estimated workloads, that the final FV workload was much smaller, and that it had not attempted to reestimate the cost effect of the contingency plan separately. We revised the text to more fully reflect that the estimated increase was based on estimated workload, and emphasized the changes in "cost per case," which better reflects the effect on cost of changes in workload.

The Bureau also commented on our discussion of telecommunication trends and the Bureau's need to understand how different sources of contact information can affect its goal to reduce the differential undercount. The Bureau agreed that the trend toward wireless communication needs more attention in the future and described how it had not yet collected certain data that might be needed to carry out evaluation of the type we recommended. According to our analyses, the additional data are easily obtained. We revised the text to point more specifically to the type of data that could help the Bureau with future decisions about how to reach historically undercounted groups.

We are sending copies of this report to the Secretary of Commerce, the Director of the U.S. Census Bureau, and interested congressional committees. The report also is available at no charge on GAO's Web site at <http://www.gao.gov>.

If you have any questions about this report please contact me at (202) 512-2757 or goldenkoffr@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report were Ty Mitchell, Assistant Director; Mark Abraham; Sara Daleksi; Ron Fecso; Andrea Levine; Donna Miller; Jessica Thomsen; Jonathon Ticehurst; Holly Williams; and Katherine Wulff.



Robert Goldenkoff
Director
Strategic Issues

Appendix I: Comments from the Department of Commerce

Note: Page numbers in the draft report may differ from those in this report.



THE SECRETARY OF COMMERCE
Washington, D.C. 20230

December 1, 2010

Mr. Robert Goldenkoff
Director
Strategic Issues
United States Government Accountability Office
Washington, DC 20548

Dear Mr. Goldenkoff:

The U.S. Department of Commerce appreciates the opportunity to comment on the draft report by the United States Government Accountability Office (GAO), entitled "2010 Census: Follow-up Should Reduce Coverage Errors, but Effects on Demographic Groups Need to be Determined" (GAO-11-154). The Department's comments on this report are enclosed.

Sincerely,

A handwritten signature in black ink that reads "Gary Locke".

Gary Locke

Enclosure

U.S. Department of Commerce
Comments on the
United States Government Accountability Office
Draft Report, Entitled
“2010 Census: Follow-up Should Reduce Coverage Errors, but Effects on
Demographic Groups Need to be Determined”
(GAO-11-154)
December 2010

The U.S. Department of Commerce thanks the U.S. Government Accountability Office (GAO) for its efforts in examining the 2010 Census Coverage Follow-up (CFU) and Field Verification (FV) operations. The GAO assessed the Census Bureau’s performance in completing these operations on schedule and within budget and evaluated their efficacy in accurately reducing coverage errors.

We have no fundamental disagreements with the overall findings or with the recommendations regarding items to be studied for the 2020 Census. However, the Census Bureau provides the following comments about statements and conclusions in this report.

- **Page 7, first full paragraph:** “The final cost of the operation was unexpected considering that the Bureau estimated that the late changes made by the contingency plan would increase costs by nearly \$15 million.”

Census Bureau response: Prior to the operation, the Census Bureau used a preliminary workload estimate to roughly calculate operational costs under the contingency plan. Using the preliminary workload figures, the estimated impact was a \$15 million increase in the budget. The actual workload was much lower than originally estimated. The total budget for the entire operation was only \$33.8 million, including any impact of the contingency approach. The Census Bureau did not separate out the costs associated with the contingency plan, though clearly it would be less than the earlier \$15 million estimate because the actual workload was much smaller than what was assumed when constructing that earlier impact estimate.

- **Page 16, paragraph continued from page 15:** “The Bureau has not attempted to track how many of the households it called or excluded from follow-up had wireless numbers, what types of CFU cases they were, or what the demographic characteristics of these households might be.”

Census Bureau response: The Census Bureau agrees the trend towards wireless numbers (and away from landlines) needs more attention in the future for operations like CFU that depend entirely on telephone interviews. Unfortunately, the Census Bureau did not collect the data during the 2010 Census CFU operation that would be needed to conduct the analysis GAO recommends. The numbers that we called during CFU came primarily from the

**Appendix I: Comments from the Department
of Commerce**

telephone numbers that people provided to us on their 2010 Census questionnaire. Some of the numbers would have been for landline telephones, and some numbers would have been for wireless telephones. However, we didn't collect the information to know which numbers corresponded to which devices, or whether people we called on a landline telephone also had a wireless telephone number. For the 2020 Census research and testing program, the Census Bureau is committed to closely following and studying these trends towards wireless communications.

In conclusion, we acknowledge the GAO's extensive work in reviewing these activities, and we appreciate its ongoing efforts to help us develop a successful evaluation plan for the 2020 Census.

Related GAO Products

2010 Census: Key Efforts to Include Hard-to-Count Populations Went Generally as Planned; Improvements Could Make the Efforts More Effective for Next Census. [GAO-11-45](#). Washington, D.C.: December 14, 2010.

2010 Census: Data Collection Operations Were Generally Completed as Planned, but Long-standing Challenges Suggest Need for Fundamental Reforms. [GAO-11-193](#). Washington, D.C.: December 14, 2010.

2010 Census: Census Bureau Continues to Make Progress in Mitigating Risks to a Successful Enumeration, but Still Faces Various Challenges. [GAO-10-132T](#). Washington, D.C.: October 7, 2009.

GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs. [GAO-09-3SP](#). Washington, D.C.: March 2009.

2010 Census: The Bureau's Plans for Reducing the Undercount Show Promise, but Key Uncertainties Remain. [GAO-08-1167T](#). Washington, D.C.: September 23, 2008.

2010 Census: Census Bureau Should Take Action to Improve the Credibility and Accuracy of Its Cost Estimate for the Decennial Census. [GAO-08-554](#). Washington, D.C.: June 16, 2008.

2010 Census: Bureau Needs to Specify How It Will Assess Coverage Follow-up Techniques and When It Will Produce Coverage Measurement Results. [GAO-08-414](#). Washington, D.C.: April 15, 2008.

Information Technology: Census Bureau Needs to Improve Its Risk Management of Decennial Systems. [GAO-08-79](#). Washington, D.C.: October 5, 2007.

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