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2011 AMERICAN COMMUNITY SURVEY RESEARCH AND EVALUATION REPORT
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MEMORANDUM FOR ACS Research and Evaluation Steering Committee

From: James B. Treat **{signed 6/23/2011}**
Chief, American Community Survey Office

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Subject: Cost and Workload Implications of a Voluntary American Community Survey

Attached is the final American Community Survey (ACS) Research and Evaluation report on the Cost and Workload Implications of a Voluntary American Community Survey. This project provides updated information about the costs and workloads associated with implementing a voluntary ACS.

If you have any questions about this report, please contact Deborah Griffin at (301) 763-2855.

Attachment

cc:
ACS Research and Evaluation Team

MAY 18, 2011

Cost and Workload Implications of a Voluntary American Community Survey

FINAL REPORT

INTRODUCTION

At the request of Congress, the U.S. Census Bureau conducted research in 2002 and 2003 to determine whether the American Community Survey (ACS) could be implemented as a voluntary, rather than a mandatory, survey. The Census Bureau designed a test to answer key questions on mail response, survey quality, and costs. U.S. Census Bureau (2003) and U.S. Census Bureau (2004) document key findings from that test. This report provides updated information about the costs and workloads associated with a voluntary ACS based on more current ACS cost and workload data.

RESEARCH QUESTIONS

1. What are the projected costs and workloads by data collection mode that would be associated with a voluntary implementation of the ACS?
2. How would those costs increase if efforts were made to maintain current levels of reliability?
3. If costs were frozen at current levels, what would the impact be on the reliability of survey estimates under a voluntary implementation?

METHODOLOGY

This report summarizes expected workloads and costs associated with a voluntary ACS. The following three voluntary options are analyzed along with the current, mandatory ACS.

- ***Maintain current sample*** – This option would use voluntary methods and the current initial sample. This option would result in a reduction in the reliability of survey estimates due to a drop in the total number of completed interviews and the shift of more interviews into personal visit follow up which implies that more sample cases would have larger weights. The costs of implementing this option would increase relative to the current design due to fewer cases being interviewed in the least expensive modes.
- ***Maintain current reliability*** – This option would use voluntary methods and increase the initial sample to offset the loss in reliability. The reliability of survey estimates under this option would approximate current levels. Survey costs would increase given the larger initial sample and the greater proportion of cases interviewed in the most expensive mode.
- ***Maintain current costs*** – This option would use voluntary methods and decrease the initial sample to be able to complete the survey within the current budget. There are several options that could be considered to reduce survey costs. The choice to cut the initial sample maintains the optimum subsampling rate. This option would result in the greatest reduction in the reliability of survey estimates in order to maintain costs.

The workload estimates used in this analysis are based on 2009 ACS production data and on data from the 2003 Test of Voluntary Methods. The workloads shown in Table 1 are the 2009 ACS workloads documented in the 2009 ACS Housing Unit Workload Counts (U.S. Census Bureau,

2010). The mandatory workload estimates, shown as a percent of the initial sample, are based on these 2009 ACS workloads. The voluntary workload estimates (in percent form) were extrapolated from the mandatory workload estimates using adjustments derived from the 2003 test. Specifically, the adjustment factors are based on the ratio of the 2003 Voluntary Test telephone and personal visit voluntary and mandatory workloads. The mail workload continues to be about 95.2 percent of the initial sample. Workloads for the telephone and personal visit follow up operations were increased by factors of 1.149 and 1.317, respectively resulting in assumptions that voluntary telephone workloads would be about 42.7 percent of the initial sample and voluntary personal visit workloads would be about 25.3 percent of the initial sample.

Table 1. Workload Estimates – 2009 ACS

	2009 ACS Workload	Mandatory Workload Estimates (Percent of Initial Sample)	Voluntary Workload Estimates (Percent of Initial Sample)
Mail	2,757,357	95.2	95.2
Telephone	1,076,411	37.2	42.7
Personal Visit	557,022	19.2	25.3
Initial Sample	2,897,256	100.0	100.0

Source: U.S. Census Bureau (2010) and U.S. Census Bureau (2003).

To approximate current per case costs, we divided the estimated FY11 costs by data collection mode that are shown in Table 2 by the 2009 ACS workloads by mode. We used these costs per case to estimate the total data collection costs associated with alternative voluntary ACS design options. Note that the FY11 budget figures do not include the additional funds recently received for 2011 to implement a sample increase and additional quality enhancements.

Table 2. Estimated Costs per Case

	2009 ACS Workload	FY11 Budget	Estimated Costs Per Case
Mail	2,757,357	\$37,940,000	\$13.760
Telephone	1,076,411	\$19,960,000	\$18.543
Personal Visit	557,022	\$79,988,000	\$143.599

Source: U.S. Census Bureau (2010) and Hughes (2011).

We also derived estimates of the expected number of completed interviews from each mode from the 2009 ACS and the 2003 test results. The number of 2009 ACS completed interviews by mode that are shown in Table 3 are the actual completed mail, telephone, and personal visit interviews that were included in the 2009 ACS estimation universe (Hefter, 2011). Ratios of the 2009 ACS completed interviews to the 2009 ACS workloads by mode define the mandatory completed interview rates that were used as the base rates to calculate the percent completed by mode for the three voluntary options.

The estimated mandatory percent completed interviews were adjusted by factors of 0.632 (mail), 1.083 (telephone), and 0.950 (personal visit) resulting in the estimated voluntary percent completed interviews in Table 3. Specifically, these adjustment factors are based on the ratio of the percent completed interviews under the voluntary treatment to the percent completed interviews under the mandatory treatment in the 2003 Voluntary Test. The percent completed

interviews is defined as the number of voluntary (mandatory) completed interviews to the voluntary (mandatory) workload by mode. We estimate that about 28.7 percent of the voluntary mail workload, 22.8 percent of the voluntary telephone workload, and 74.7 percent of the voluntary personal visit workload would result in a completed interview.

Table 3. Percent Completed Interviews by Mode – 2009 ACS

	2009 ACS Workload	2009 ACS Completed Interviews	Mandatory Percent Completed Interviews (Percent of Workload)	Voluntary Percent Completed Interviews (Percent of Workload)
Mail	2,757,357	1,253,740	45.5	28.7
Telephone	1,076,411	226,301	21.0	22.8
Personal Visit	557,022	437,707	78.6	74.7

Source: U.S. Census Bureau (2010) and Hefter (2011).

We made two adjustments to the initial sample sizes to produce these estimates. For the option designed to maintain current levels of reliability, we increased the initial sample by a factor of 1.23. We derived this adjustment from the 2003 test findings to address the expected loss in completed interviews and the increase in the number of interviews with the largest sampling weights. U.S. Census Bureau (2003), Appendix 4 provides greater detail on the derivation of this value. For the option designed to maintain costs, the initial sample had to be reduced to stay within the current budget. We determined this initial sample by fixing the total budget, using the estimated costs per case by mode, and the workloads for each mode as a function of this sample. Specifically we solved for an initial sample size (n) based on the following:

$$0.952n * (\$13.760) + 0.427n * (\$18.543) + 0.253n * (143.599) = \$137,888,000,$$

resulting in an estimated initial sample size of 2,404,411. An analysis similar to the 2003 analysis was completed to estimate the loss in reliability under this option. Refer to Hefter (2011) for details.

LIMITATIONS

The voluntary estimates assume the same level of impact on public cooperation as was measured in the 2003 Test of Voluntary Methods. It is very possible that public reaction today could yield different results with significantly greater cost implications especially if there was considerable media attention given to the shift.

Estimates are only provided for data collection in housing units. No adjustments were made to the costs of implementing a voluntary ACS in group quarters or in Puerto Rico because we did not have data to estimate the likely effects.

RESULTS

What are the projected costs and workloads by data collection mode that would be associated with a voluntary implementation of the ACS?

Table 4 summarizes the housing unit workloads and data collection costs for the current mandatory ACS by mode, using FY11 cost estimates and 2009 ACS workload distributions. The

“Voluntary Methods – Maintain Current Sample” columns summarize the workloads and costs associated with implementing the current ACS sample under voluntary methods. Due to lower rates of response by mail, more cases shift into the telephone and personal visit modes. We estimate that the budget required to complete these interviews would rise by about \$28.3 million each year. U.S. Census Bureau (2003) estimated annual increases of about \$25 million. This estimate reflects a full year of data collection at these workload levels, and does not include the initial startup costs to increase staffing levels to support the increased telephone and personal visit workloads.

Table 4. Summary of Housing Unit Workloads and Annual Data Collection Costs Associated with a Voluntary ACS (Costs displayed in thousands)

	Mandatory Methods		Voluntary Methods Maintain Current Sample		Voluntary Methods Maintain Current Reliability		Voluntary Methods Maintain Current Costs	
	Workload	Cost (\$000)	Workload	Cost (\$000)	Workload	Cost (\$000)	Workload	Cost (\$000)
Initial Sample	2,897,000	--	2,897,000	--	3,564,000	--	2,404,000	--
Mail	2,757,000	\$37,940	2,757,000	\$37,940	3,393,000	\$46,682	2,289,000	\$31,497
Telephone	1,076,000	\$19,960	1,237,000	\$22,940	1,522,000	\$28,216	1,027,000	\$19,038
Personal Visit	557,000	\$79,988	733,000	\$105,259	902,000	\$129,468	608,000	\$87,354
Subtotal		\$137,888		\$166,139		\$204,367		\$137,888
Increase over mandatory		\$0		\$28,251		\$66,479		\$0

Source: U.S. Census Bureau (2010) and Hughes (2011).

How would those costs increase if efforts were made to maintain current levels of reliability?

Due to the subsampling that takes place after telephone follow up, decreased response in mail and telephone results in fewer total interviews. The “Voluntary Methods – Maintain Current Reliability” columns of Table 4 summarize the cost increases that would be incurred if we increased the initial sample size to improve the reliability of survey estimates. We estimate that the initial sample would need to be increased by a factor of 1.23 (U.S. Census Bureau, 2003) and that today the associated costs would be increased by about \$66.5 million. U.S. Census Bureau (2003) estimated these costs at about \$59 million. This estimate reflects a full year of data collection at these workload levels, and does not include the initial startup costs to increase staffing levels to support the increased workload.

If costs were frozen at current levels, what would the impact be on the reliability of survey estimates under a voluntary implementation?

The final set of columns in Table 4 summarize the cost and workloads of a voluntary option that would have a reduced sample size (about 2.4 million) in order to afford completing the more expensive interviews associated with a voluntary ACS. We used all of the voluntary parameters to determine the workloads and costs for this final option. The costs are controlled so this option has no increase in costs but it would result in a large reduction in the number of completed interviews.

Table 5 summarizes the expected initial sample sizes and the expected total number of completed interviews under each option. Comparisons are made back to the current, mandatory option. Estimated increases in the sampling variances are also included. If the ACS was a voluntary survey and no additional funding was provided, we estimate that sampling variances would be increased by 45 percent. This would raise questions about whether or not these estimates should be released to the public. While estimates for the largest geographic areas would be based on sufficiently large samples, large areas are not the focus of the ACS. The ACS was designed to produce 5-year estimates at the tract-level and such deterioration in sample sizes and reliability would compromise our ability to accomplish that goal.

Table 5. Completed Interviews and Reliability Measures Associated with a Voluntary ACS

	Mandatory Methods	Voluntary Methods Maintain Current Sample	Voluntary Methods Maintain Current Reliability	Voluntary Methods Maintain Current Costs
Initial sample	2,897,000	2,897,000	3,564,000	2,404,000
Expected completed interviews	1,918,000	1,621,000	1,994,000	1,345,000
Change in completed interviews	0	-297,000	+76,000	-572,000
Estimated increase in variances	0	23%	0	45%

Source: U.S. Census Bureau (2010) and Hefter (2011).

CONCLUSIONS

The cost implications of a shift from mandatory to voluntary methods are considerable. To support production of sufficiently reliable ACS small area estimates, an additional \$66 million would be required each year. If no additional funding were provided, management would need to reexamine other aspects of the program and consider cutting them in order to increase the sample size to address these concerns. If reallocation of existing funds could not support the minimal sample size needed to produce reliable tract level estimates, the Census Bureau believes that the quality of survey estimates would be unacceptable and the ACS would not meet its responsibility to produce data of sufficient quality to replace the estimates from the census long form.

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