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MEMORANDUM FOR Susan Schechter
Chief, American Community Survey Office

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Subject: Unit Response in the American Community Survey Evaluation

Attached is the final evaluation report on Unit Response in the American Community Survey. This report focuses on understanding the variability in levels of unit response rates for the American Community Survey for the years 2005 to 2007. One-year response rates have been calculated for geographic areas of 65,000 people or more and 3-year response rates for geographic areas of 20,000 to 65,000 people.

Any questions about this report may be directed to Michael Springer (x38658).

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Unit Response in the American Community Survey

EVALUATION REPORT

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EXECUTIVE SUMMARY

This study focuses on understanding the variability in levels of unit response rates for the American Community Survey (ACS). Analysis is limited to data collection for housing units, and explores a broad set of geographic levels such as national, state, and sub-state level geography, such as county. While response rates have been strong at national and state levels, we have not looked to see whether the strong rates hold for the full set of areas for which we publish data. In this report, we will study the sub-state level geography response rates to ensure the rates are at an acceptable level.

For this evaluation, 1-year response rates were calculated over the individual years from 2005 to 2007, the first three years of full implementation of the ACS. Three-year response rates were calculated for the full 2005-2007 period. The 1-year response rates were computed for all geographic areas with 65,000 or more people, while the 3-year response rates were calculated for all geographic areas with 20,000 to 65,000 people.

Results suggest that response rates for the ACS are very strong for the first three years that the ACS was in full implementation. The national response rate was around 97 percent for these years.

The response rates at sub-state levels of geography are also strong. For areas with 65,000 or more people (1-year areas), there are no instances when the response rate was below 80 percent, and over 90 percent of these areas had response rates of 95 percent or higher. The distributions and ranges of response rates for the sub-state levels of geography are similar in nature to that of the higher-level geographies. Mean response rates across the sub-state levels of geography are in the 97 to 98 percent range and only a few in these areas fall below 90 percent. Areas that will only receive 3-year estimates and not 1-year estimates (areas with populations of 20,000 to 65,000) also showed strong response rates, with no areas falling below 84 percent. Therefore, the ACS overall attains high response rates for all published geographies for 2005 to 2007.

1. INTRODUCTION

The American Community Survey (ACS) began full-scale data collection in all counties in the United States and all municipios in Puerto Rico in 2005. Each month, the ACS collects data from housing units using three response modes: mail, Computer-Assisted Telephone Interviewing (CATI), and Computer-Assisted Personal Interviewing (CAPI). Data collection for each monthly sample panel occurs across a three-month period. Selected addresses are first sent a mail questionnaire package at the beginning of the first month. If the Census Bureau has not received the questionnaire after three weeks, a second mail questionnaire is sent. Addresses that do not return the questionnaire by the end of the first month and have a telephone number available are contacted for a CATI interview in the second month. Finally, a subsample of those who do not respond by either mail or telephone (in the first or second month) or those that were not eligible for mail or CATI is contacted for a CAPI interview in the third month. However, some initially sampled addresses may only be eligible for CAPI. About 5 percent of all sample addresses are not eligible for mail or CATI because the address is incomplete. The ACS Design and Methodology Document, Technical Paper 67, provides more detail about the survey.

This study focuses on understanding the variability in levels of unit response rates for housing units only, across national, state, and sub-state level geography, such as county. Previous calculations for the ACS Quality Measures Web Site for the years 2000 to 2006 have shown that response rates have been strong at national and state levels; however, we need to study the sub-state level geography response rates to ensure the rates are at an acceptable level.

The 1-year response rates were calculated over the individual years from 2005 to 2007, and the first three years of full implementation of the ACS for all geographic areas with populations of 65,000 or more. The 3-year response rates for 2005-2007 were calculated for all geographic areas with populations of 20,000 to 65,000 people. The response rates are based on data collected in a given calendar year (not for the 12 monthly sample panels in the ACS) and reflect responses received in any of the three modes of data collection.

To be included in a response rate for a particular year, a case must have been completed and processed, or tabulated, in that year also. For example, a case must be tabulated between January 1, 2005 and December 31, 2005 to be included in a response rate for 2005, regardless of the sample panel of a case (Technical Paper 67).

2. RESEARCH QUESTIONS

The purpose of our evaluation is to study response rates in the following contexts:

How do housing unit survey response rates vary across geographies with populations of 65,000 or more?

How do housing unit survey response rates vary across geographies with populations of 20,000 to 65,000?

3. METHODOLOGY

3.1 Response Rate

The survey response rates in this study were calculated using the same definition used for the survey response rates released annually from 2000 to 2006 as part of the ACS Quality Measures Web Site. Starsinic (2007) specifies the input files, coding, and the process for calculating the rate. Rates are computed for both the United States and Puerto Rico.

A response rate for a particular area is defined as the weighted estimate of completed interviews in the geography divided by the weighted estimate of cases eligible to be interviewed in the geography. To determine whether a case is eligible to be interviewed, we look at its housing unit status. There are three ways that a case may respond: either through mail, CATI, or CAPI.

More specifically, the definition for the response rate used in this evaluation is the rate of responding units to the sum of eligible units and units of unknown eligibility, taken from the Census Bureau Response Rate Definition Standard (Bates et al, 2007). This is similar to the American Association for Public Opinion Research (AAPOR) Response Rate 2 definition (AAPOR, 2008). The computation of this rate is $R / (E+U)$, where R = responses, E = sample cases confirmed eligible, and U = the sample cases of unknown eligibility. More details for these components are provided below.

Only those sample addresses corresponding to housing units with a final status of occupied, regular vacant, or temporarily occupied vacant (indicating that a complete interview was obtained), are considered eligible to be interviewed. If the housing unit status indicates that the sample address is out-of-scope (for example, a business), has been subsampled out at the CAPI stage, or is part of a sample reduction, it is not considered eligible. These cases are excluded from the numerator and denominator and are neither responses nor nonresponses.

The numerator R is the number of eligible units with sufficient data to be classified as a response. This is the sum of all responses across data collection modes. Compared to the AAPOR definition, this is equivalent to the number of complete interviews plus the number of partial interviews (disposition codes 1.1 and 1.2).

To be considered an interview for our response rate calculation, a housing unit's response had to have an "acceptability index" of at least 2.5 (Technical Paper 67). This index is computed by counting the number of basic survey items with answers and dividing the total by the number of people in the household. This means that on average only 2.5 responses are needed for each person for the response to be classified as complete. Responses for vacant housing units are not subject to a minimum data requirement. If a housing unit's response falls below this number, it has insufficient data and is considered a noninterview.

The denominator of the response rate is the sum of cases considered to be eligible and those with an unknown eligibility (E and U). A sample address is eligible if an attempt has been made to collect data and the unit at the address is confirmed to be a member of the target population (for example, residential households would be a member of the target population while business establishments would not be). This is equivalent to the AAPOR “interview” and “eligible, non-interview” disposition code (1.0 and 2.0). A sample address for which eligibility could not be determined are cases for which data have not been collected and it is unknown whether or not the address corresponds to a housing unit that is a member of the target population. This is equivalent to the AAPOR “unknown eligibility, non-interview” disposition code (3.0). Addresses with a status of eligible or an unknown status include responses, refusals, addresses that could not be located or where no one was home, units that were temporarily absent, households that could not be interviewed due to language problems, and interviews with insufficient data.

The response rates are fully weighted to account for the different probabilities of selection due to the initial sample design and the CAPI subsampling.

3.2 Geographies

There are approximately 6,500 geographic areas for which the Census Bureau released 1-year estimates in 2005, 2006, and 2007. These geographic areas can be categorized by the type of geographic area or “summary level.” There are 13,721 geographic areas for which the Census Bureau released 2005-2007 ACS 3-year estimates, and 7,128 for which have populations of 20,000 to 65,000, in which only 3-year estimates were released. Response rates for areas in which 1-year estimates are released and for areas in which only 3-year estimates are released is the focus of this analysis.

Table 1 on the following page shows the types of geographic areas and the number of each type of area included in this study. It should be noted that many types of geographic areas did not have any areas with a population of 20,000 to 65,000 people, such as Metropolitan Division and Congressional District.

Note that many of these geographies are not unique. For example, the District of Columbia is counted as a state and a county. San Francisco City is the same, in geographic boundary, as San Francisco County.

Table 1. Types of Geographic Areas

Type of Geographic Area	Number of Geographic areas with:			
	Population of 65,000 or more			Population of 20,000 to 65,000
	2005	2006	2007	2005-2007
Nation	1	1	1	0
Region	4	4	4	0
Division	9	9	9	0
State (including the District of Columbia and Puerto Rico)	52	52	52	0
County	787	795	800	1,082
County Subdivision	186	187	187	812
Place	499	511	520	1,559
Alaska Native Regional Corporation	0	3	3	1
American Indian Area/Alaska Native Area/Native Hawaiian Area	14	14	15	21
Metropolitan statistical Area/Micropolitan statistical Area	500	507	510	412
Principal City	335	355	367	400
Metropolitan Division	29	29	29	0
Combined Statistical Area	123	125	126	0
Combined New England City and Town Area	9	9	9	1
New England City and Town Area	25	25	25	15
Principal city of New England City and Town Area	19	20	21	27
Metropolitan Division of New England City and Town Area	9	9	9	0
Urban Area	373	389	394	456
Congressional District – 109 th Congress	437	437	437	0
Public Use Microdata Area	2,101	2,098	2,098	0
School District, Elementary	65	69	73	214
School District, Secondary	89	91	91	118
School District, Unified	725	763	786	2,010
Total	6,391	6,502	6,566	7,128

4. LIMITATIONS

Since the ACS has only been in full implementation since 2005, for the full range of all the areas discussed in this report, we only have response rates for the years 2005 to 2007. Therefore we are limited in seeing long-term trends for the response rates for the smaller geographic areas. Response rates have previously been calculated and released at the state and national level between 2000 and 2007.

The demonstration stage of the ACS, between 2000 and 2004, occurred when the Census Bureau carried out large-scale, nationwide survey and produced reports for the country, states, and large geographic areas. The full implementation stage began in January 2005 with an annual housing unit sample of about three million addresses throughout the United States and about 36,000 addresses in Puerto Rico. As survey data continue to be collected, we will have additional response rates to compare to the historical response rates. Also, enough data will be available to calculate response rates for areas with population of less than 20,000.

5. RESULTS

5.1 How do housing unit survey response rates vary across geographies with populations of 65,000 or more?

There are 23 major levels of geography for which the ACS publishes 1-year estimates (areas with populations of 65,000 or more). Across these geographies, the response rates are strong and fairly stable, with similar distributions and ranges.

Over the three years combined, we calculated 19,459 response rates for areas with populations of 65,000 or more. All of the response rates for these areas are above 80.2 percent. In 2005, the lowest rate was 80.2 percent; in 2006, 84.5 percent; and in 2007, 83.5 percent. Table 2 below summarizes descriptive statistics about each of the years.

Table 2. Response Rate Descriptive Statistics by Year, Areas with Populations 65,000 or more

Year	Number of Geographic Areas	Mean (%)	Median (%)	Minimum (%)	Maximum (%)
2005	6,391	97.4	97.9	80.2	100.0
2006	6,502	97.5	97.9	84.5	100.0
2007	6,566	97.7	98.1	83.5	100.0

In Table 3 below, the response rates have been grouped into four categories to better see the range of the response rates. The first category includes all response rates of 98.0 to 100.0 percent. The second category is 96.0 percent up to, but not including, 98.0 percent. The third category is 94.0 percent up to, but not including, 96.0 percent. The fourth category is all other response rates below, but not including, 94.0 percent.

In total, over 95 percent of the response rates are at or above 94.0 percent, over 85 percent of the response rates are at or above 96.0 percent, and over 49 percent (just under half) of the response rates are at or above 98.0 percent.

Table 3. Response Rate Categories, Areas with Populations of 65,000 or more, 2005, 2006 and 2007 ACS

Response Rate (%)	Number of Geographic Areas	Percent of Geographic Areas (%)	Cumulative Number of Geographic Areas	Cumulative Percent of Geographic Areas (%)
98.0 to 100.0	9,560	49.1	9,560	49.1
96.0 up to 98.0	7,011	36.0	16,571	85.2
94.0 up to 96.0	1,972	10.1	18,543	95.3
Less than 94.0	916	4.7	19,459	100.0

From previous response rate calculations for the ACS Quality Measures Web Site, we know that the response rate for the ACS at the national level has been very strong, showing the success of data collection methods for the survey overall. The national

response rate has ranged from 97.3 percent in 2005 to 97.7 percent in 2007.¹ Table 4 below shows the national rates and their standard errors. Based on statistical testing at the 90 percent confidence level, the rates have increased from 2005 to 2006, from 2006 to 2007, and from 2005 to 2007.

Table 4. National Response Rates by Year

Year	Response Rate (%)	Standard Error (%)
2005	97.3	0.021
2006	97.5	0.016
2007	97.7	0.016

A response rate this high is very good from a survey perspective. A response rate of about 97.5 percent means that on average nationally, out of cases that were eligible to respond in any of the three stages of data collection (mail, CATI, or CAPI), the ACS is able to get a completed interview for about 39 out of every 40 of those cases.

In the following pages, the response rates will be summarized by year and geography. Each year will have its own set of summary tables showing the distribution of response rates in each geography for which ACS data are published. Maps at the state level are also displayed, showing where higher or lower response rates are clustered in areas of the country.

¹ Consistent with the ACS Quality Measures Web site, this national response rate does not include Puerto Rico in the calculations.

2005 ACS Response Rates

As seen in Table 5, overall 93.8 percent of published geographies in 2005 had response rates of 94.0 percent or higher. Also in Table 6 on the next page, there are no unusual patterns in the response rates in 2005 across the types of geography. The mean response rates range from 95.9 to 98.0 percent and the medians range from 95.9 to 98.3 percent. This indicates that the response rates are consistently high across the types of geography. Also, for every type of geography, the proportion of areas in the less than 94.0 percent category is low, about 10 percent or less (except for Principal City of a New England City and Town Area (NECTA) and Metropolitan Division of a NECTA categories).

Table 5. 2005 Response Rate Categories, Areas with Populations of 65,000 or more

Response Rate (%)	Number of Geographic Areas	Percent of Geographic Areas (%)	Cumulative Number of Geographic Areas	Cumulative Percent of Geographic Areas (%)
98.0 up to 100.0	3,032	47.4	3,032	47.4
96.0 up to 98.0	2,232	34.9	5,264	82.4
94.0 up to 96.0	731	11.4	5,995	93.8
Less than 94.0	396	6.2	6,391	100.0

Table 6 on the following page shows the 23 different types of geographies, the number of areas within each geography, the mean and median response rate of those areas within each geography, and the proportion that fall into each response rate category.

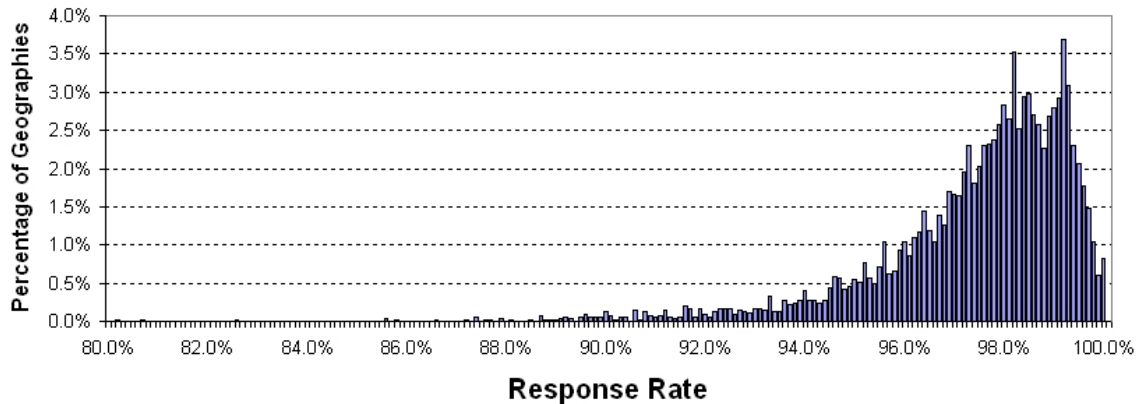
Table 6. 2005 Response Rate Categories by Type of Geographic Area, Areas with Populations of 65,000 or more

Type of Geographic Area	Total	Mean Response Rate	Median Response Rate	Response Rates of			
				Less than 94.0 (%)	94.0 up to 96.0 (%)	96.0 up to 98.0 (%)	98.0 to 100.0 (%)
Nation	1	97.3	97.3	0.0	0.0	100.0	0.0
Region	4	97.3	97.4	0.0	0.0	75.0	25.0
Division	9	97.5	97.2	0.0	11.1	55.6	33.3
State (including the District of Columbia and Puerto Rico)	52	97.7	97.8	1.9	3.8	48.1	46.2
County	787	97.7	98.1	3.4	9.4	34.2	53.0
County Subdivision	186	97.3	98.1	9.7	13.4	25.8	51.1
Place	499	97.1	97.6	8.4	17.2	34.5	39.9
Alaska Native Regional Corporation	0	N/A	N/A	N/A	N/A	N/A	N/A
American Indian Area/Alaska Native Area/Native Hawaiian Area	14	97.8	98.1	7.1	7.1	28.6	57.1
Metropolitan statistical Area/Micropolitan statistical Area	500	98.0	98.3	1.6	5.6	36.0	56.8
Principal City	335	97.1	97.5	7.5	17.9	37.0	37.6
Metropolitan Division	29	96.4	96.8	10.3	24.1	51.7	13.8
Combined Statistical Area	123	97.8	98.1	0.8	8.9	38.2	52.0
Combined New England City and Town Area	9	97.1	97.1	0.0	0.0	88.9	11.1
New England City and Town Area	25	97.6	97.9	0.0	4.0	56.0	40.0
Principal city of New England City and Town Area	19	95.9	95.9	15.8	36.8	36.8	10.5
Metropolitan Division of New England City and Town Area	9	96.8	97.6	11.1	22.2	22.2	44.4
Urban Area	373	97.7	98.0	1.3	9.1	37.3	52.3
Congressional District – 109 th Congress	437	97.3	97.7	6.4	8.7	42.8	42.1
Public Use Microdata Area	2,101	97.3	97.9	8.8	11.2	32.4	47.6
School District, Elementary	65	97.8	98.3	1.5	13.8	27.7	56.9
School District, Secondary	89	97.9	98.0	0.0	7.9	40.4	51.7
School District, Unified	725	97.3	97.8	6.6	14.2	34.1	45.1
TOTAL	6,391	97.4 ²	97.9 ²	6.2	11.4	34.9	47.4

² The mean and median response rates here are computed over the rates for each geographic area. This is not the same as the mean and median national response rate.

Figure 1 contains a histogram of the response rates for 2005 for all geographic areas. The purpose of the histogram is to show the range of the response rates. It can be seen that the bars of the histogram peak toward the upper end of the response rate range, showing that most of the response rates are high. This was also shown in Table 6, the response rates categories by type of geographic area.

Figure 1. Histogram of 2005 Response Rates, Areas with Populations of 65,000 or more



To look where response rates might vary across areas of the country in 2005, we will look at higher levels of geography first and work our way downward. The Census Bureau divides the country into four regions (the Northeast, the Midwest, the South, and the West), and they are grouped at the state level³.

Shown in Table 7 below, based on statistical testing at the 90 percent confidence level, the Northeast Region had the lowest Region response rate in 2005 of 96.1 percent. The Midwest Region had the highest response rate of 98.4 percent. Note that all statistical testing is based on unrounded response rates and standard errors.

Table 7. 2005 Census Region Response Rates, Areas with Populations of 65,000 or more

Census Region	Response Rate (%)	Standard Error (%)
Northeast	96.1	0.051
South	97.0	0.036
West	97.7	0.039
Midwest	98.4	0.029

³ The four regions and nine divisions of the United States are:

Northeast Region – New England Division: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont; **Middle Atlantic Division:** New Jersey, New York, Pennsylvania.

Midwest Region – East North Central Division: Illinois, Indiana, Michigan, Ohio, Wisconsin; **West North Central Division:** Kansas, Iowa, Minnesota, Missouri, Nebraska, North Dakota, South Dakota.

South Region – South Atlantic Division: Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia; **East South Central Division:** Alabama, Kentucky, Mississippi; Tennessee; **West South Central Division:** Arkansas, Louisiana, Oklahoma, Texas.

West Region – Mountain Division: Arizona, Colorado, Idaho, Montana, Nevada; New Mexico, Utah, Wyoming; **Pacific Division:** Alaska, California, Hawaii, Oregon, Washington.

In census geography, the next level below a Census Region is a Census Division. There are nine Census Divisions, which are smaller areas within the Census Regions. Shown in Table 8 below, based on statistical testing at the 90 percent confidence level, the Middle Atlantic Census Division had the lowest Division response rate of 95.8 percent and the West North Central Census Division had the highest response rate of 98.8 percent.

The Middle Atlantic Census Division contains New Jersey, New York, and Pennsylvania, of which some areas are metropolitan, such as Philadelphia, PA and New York, NY. The West North Central Census Division contains Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

Table 8. 2005 Census Division Response Rates, Areas with Populations of 65,000 or more

Census Division	Response Rate (%)	Standard Error (%)
Middle Atlantic	95.8	0.065
South Atlantic	96.9	0.057
West South Central	97.0	0.060
New England	97.0	0.106
Pacific	97.2	0.058
East South Central	97.7	0.075
East North Central	98.3	0.034
Mountain	98.7	0.054
West North Central	98.8	0.041

States and counties within these divisions exhibited similar patterns, that is, a state or county that is in a Census Region that has a relatively lower response rate in general also had a lower response rate. Based on statistical testing at the 90 percent confidence level, the District of Columbia (92.3 percent) had the lowest state response rate. Maryland (94.1 percent) and New York (95.2 percent) were the next two lowest state response rates. All three are statistically different from each other.

At the county level, the standard errors of the response rate in the lower range of response rates did not provide enough evidence that counties were significantly different from each other. Two counties among the lowest were Prince George’s County, MD (87.9 percent) and Philadelphia County, PA (88.6 percent).

A map of the United States with response rates for 2005 by state is shown on the following page, in Figure 2. The categories that we used previously to group response rates, with the less than 94.0 percent category combined with the 94.0 to 96.0 percent category, are used to shade the states by their response rate.

The darkest shaded states in Figure 2, ones with a response rate of 98.0 to 100.0 percent, are clustered in areas in the Mountain Census Division, West North Central Division and East North Central Division. New York, Maryland, and the District of Columbia (not shown on the map) were the only states in the less than 96.0 percent category, shown in white.

2006 ACS Response Rates

For 2006, response rates were similar to that of 2005. As seen in Table 9, overall, 95.6 percent of the geographic areas had response rates that were 94.0 percent or higher. This compares with 93.8 percent of response rates in 2005, meaning that more areas had high response rates in 2006.

Table 9. 2006 Response Rate Categories, Areas with Populations of 65,000 or more

Response Rate (%)	Number of Geographic Areas	Percent of Geographic Areas (%)	Cumulative Number of Geographic Areas	Cumulative Percent of Geographic Areas (%)
98.0 up to 100.0	3,093	47.6	3,093	47.6
96.0 up to 98.0	2,447	37.6	5,540	85.2
94.0 up to 96.0	679	10.4	6,219	95.6
Less than 94.0	283	4.4	6,502	100.0

In Table 10, we again see that there are no unusual patterns in the response rates in 2006 across the types of geography. The means of the response rates range from 95.5 to 98.0 percent and the medians range from 95.2 to 98.2 percent. This again indicates that the response rates are consistently high across the different types of geographic area.

Table 10. 2006 Response Rate Categories by Type of Geographic Area, Areas with Populations of 65,000 or more

Type of Geographic Area	Total	Mean Response Rate	Median Response Rate	Response Rates of			
				Less than 94.0 (%)	94.0 up to 96.0 (%)	96.0 up to 98.0 (%)	98.0 to 100.0 (%)
Nation	1	97.5	97.5	0.0	0.0	100.0	0.0
Region	4	97.5	97.4	0.0	0.0	75.0	25.0
Division	9	97.5	97.4	0.0	0.0	66.7	33.3
State (including the District of Columbia and Puerto Rico)	52	97.6	97.8	1.9	3.8	57.7	36.5
County	795	97.8	98.1	2.8	7.8	35.5	54.0
County Subdivision	187	97.2	97.8	6.4	18.7	29.4	45.5
Place	511	97.3	97.8	5.7	14.3	37.4	42.7
Alaska Native Regional Corporation	3	96.6	96.4	0.0	33.3	66.7	0.0
American Indian Area/Alaska Native Area/Native Hawaiian Area	14	97.9	97.9	0.0	0.0	50.0	50.0
Metropolitan statistical Area/Micropolitan statistical Area	507	98.0	98.2	1.0	6.7	36.9	55.4
Principal City	355	97.3	97.8	5.9	12.7	38.0	43.4
Metropolitan Division	29	96.8	96.9	3.4	17.2	62.1	17.2
Combined Statistical Area	125	97.9	98.0	0.0	4.0	45.6	50.4
Combined New England City and Town Area	9	97.0	97.1	0.0	11.1	77.8	11.1
New England City and Town Area	25	96.7	96.7	0.0	28.0	60.0	12.0
Principal city of New England City and Town Area	20	95.5	95.2	20.0	45.0	20.0	15.0
Metropolitan Division of New England City and Town Area	9	97.1	96.7	0.0	22.2	55.6	22.2
Urban Area	389	97.7	98.0	1.5	7.7	41.1	49.6
Congressional District – 109 th Congress	437	97.5	97.9	4.8	8.0	43.0	44.2
Public Use Microdata Area	2,098	97.4	97.9	6.1	10.7	35.9	47.4
School District, Elementary	69	97.6	98.0	0.0	13.0	37.7	49.3
School District, Secondary	91	97.5	97.8	4.4	9.9	40.7	45.1
School District, Unified	763	97.6	97.9	3.9	11.9	36.6	47.7
TOTAL	6,502	97.5 ⁴	97.9 ⁴	4.4	10.4	37.6	47.6

⁴ The mean and median response rates here are computed over the rates for each geographic area. This is not the same as the mean and median national response rate.

A histogram of the response rates for 2006 is shown below. Similar to 2005, the response rates are grouped towards the higher end of the range.

Figure 3. Histogram of 2006 Response Rates, Areas with Populations of 65,000 or more

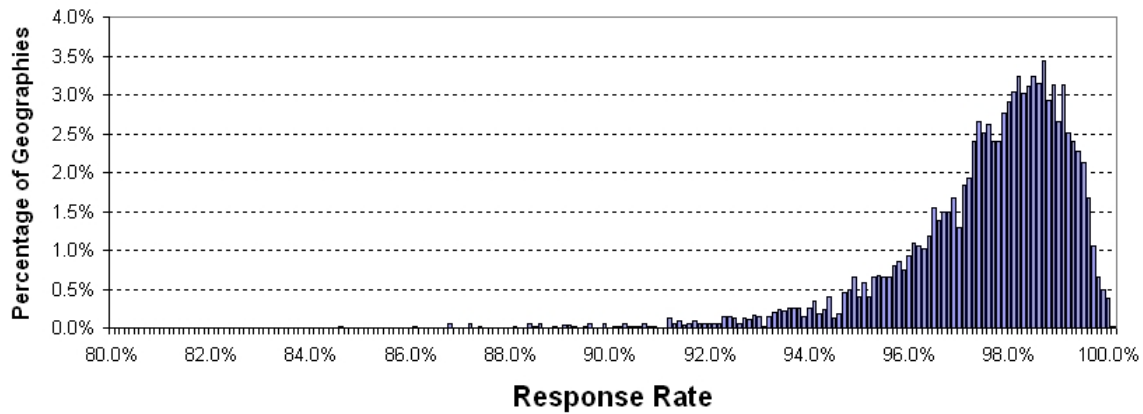


Table 11 below contains the Census Region response rates. Based on statistical testing at the 90 percent level, the lowest region response rate was 96.6 percent in the Northeast. The Midwest Region had the highest region response rate of 98.3 percent. The South and West regions were not significantly different from each other. In 2005, the Northeast and Midwest regions also had the lowest and highest response rates, respectively.

Table 11. 2006 Census Region Response Rates, Areas with Populations of 65,000 or more

Region	Response Rate (%)	Standard Error (%)
Northeast	96.6	0.042
South	97.4	0.027
West	97.4	0.036
Midwest	98.3	0.022

Table 12 displays the Census Division response rates. Based on statistical testing at the 90 percent level, in 2006 every division is significantly different from one another. The Middle Atlantic Census Division has the lowest response rate of 96.5 percent, and the West North Central Division has the highest of 98.5 percent. These two divisions were also the lowest and the highest, respectively, in 2005.

Table 12. 2006 Census Division Response Rates, Areas with Populations of 65,000 or more

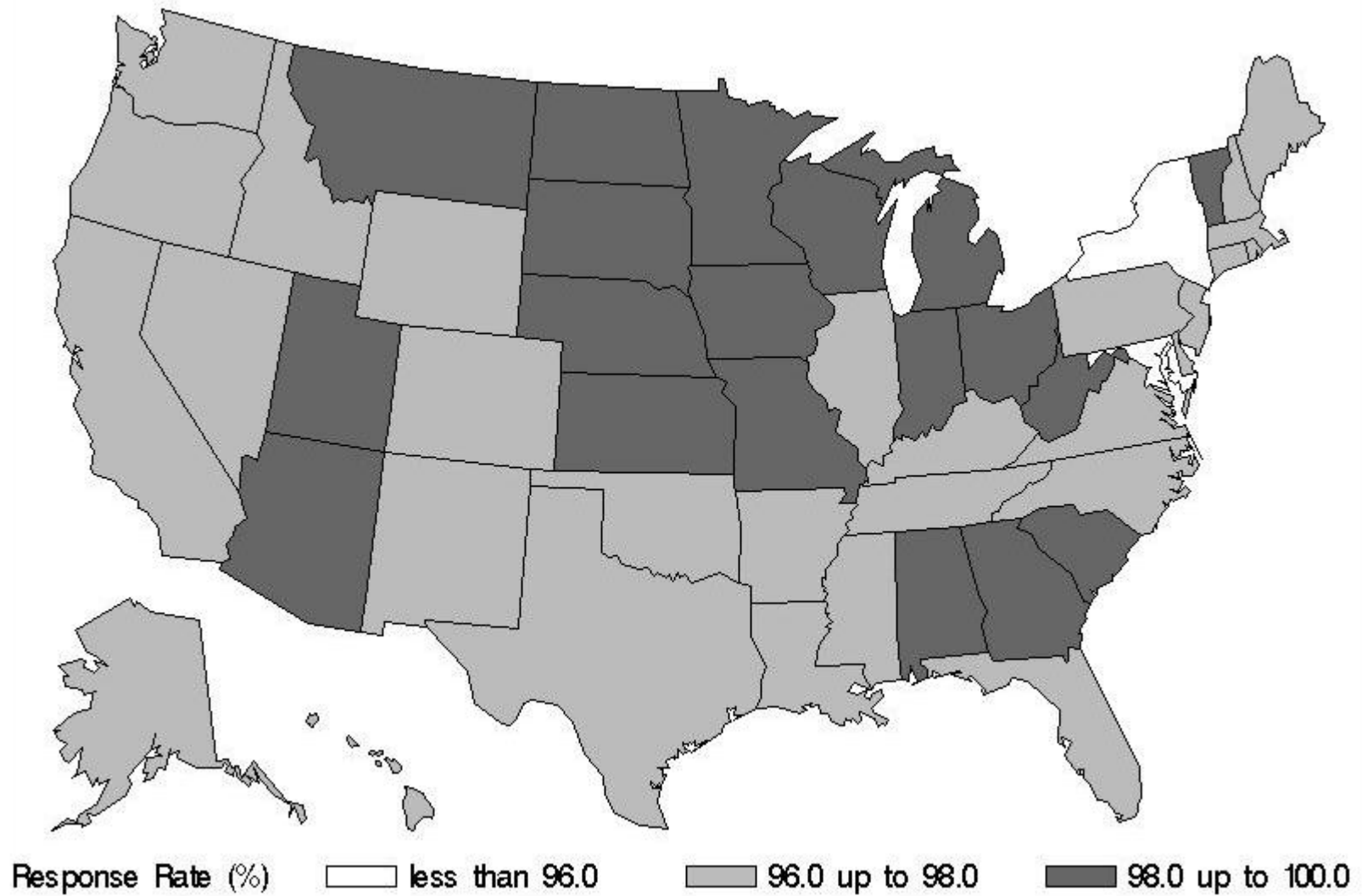
Division	Response Rate (%)	Standard Error (%)
Middle Atlantic	96.5	0.049
New England	96.9	0.082
Pacific	97.2	0.050
West South Central	97.3	0.054
South Atlantic	97.4	0.037
East South Central	97.7	0.060
Mountain	98.1	0.052
East North Central	98.3	0.028
West North Central	98.5	0.042

At the state level, based on statistical testing at the 90 percent confidence level, the District of Columbia's response rate of 91.1 percent was the lowest. Maryland (94.2 percent) and New York (95.9 percent) have the second and third lowest response rates.

Two counties that were among the counties with the lowest response rates were Columbia County, FL, (87.1 percent) and Prince George's County, MD (89.8 percent). However, these counties are not significantly different from each other.

The next page shows Figure 4, a state map of the United States with response rates for 2006. At the state level, seven states had dropped from the 98.0 to 100.0 category in 2005 to the 96.0 up to 98.0 category in 2006. They are Arkansas, Colorado, Idaho, Kentucky, Nevada, Oklahoma, and Wyoming. Three states changed categories in the reverse order. Response rates for Alabama, Georgia, and Vermont rose from the 96.0 up to 98.0 category in 2005 to the 98.0 to 100.0 category in 2006.

Figure 4. 2006 State Level ACS Response Rates



Note: The District of Columbia, not shown on this map, is in the category of less than 96.0 percent.

2007 ACS Response Rates

In Table 13, 96.4 percent of response rates were 94.0 percent or higher. Similar to the change from 2005 to 2006, 2006 to 2007 saw an increase in this number, up from 95.6 percent.

Table 13. 2007 Response Rate Categories, Areas with Populations of 65,000 or more

Response Rate (%)	Number of Geographic Areas	Percent of Geographic Areas (%)	Cumulative Number of Geographic Areas	Cumulative Percent of Geographic Areas (%)
98.0 up to 100.0	3,436	52.3	3,436	52.3
96.0 up to 98.0	2,331	35.5	5,767	87.8
94.0 up to 96.0	563	8.6	6,330	96.4
Less than 94.0	236	3.6	6,566	100.0

In Table 14, the means of the response rates range from 95.8 to 98.1 percent, and the medians range from 95.5 to 98.6 percent. Like in the previous years, most of the response rates are typically in the 98.0 up to 100.0 or 96.0 up to 98.0 percent categories. The lowest distributions were still seen in the Principal City of a NECTA geography, where 19 percent of the 21 areas, or 4 areas, had a response rate of less than 94.0 percent

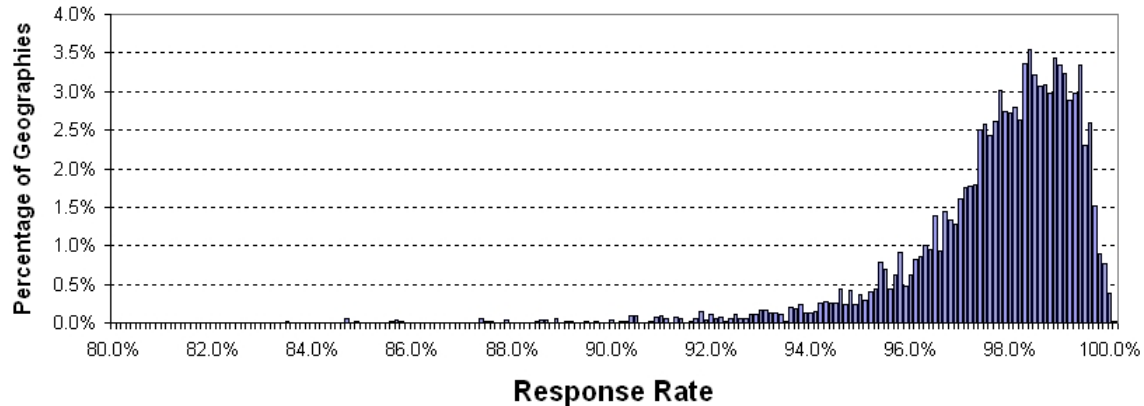
Table 14. 2007 Response Rate Categories by Type of Geographic Area, Areas with Populations of 65,000 or more

Type of Geographic Area	Total	Mean Response Rate	Median Response Rate	Response Rates of			
				Less than 94.0 (%)	94.0 up to 96.0 (%)	96.0 up to 98.0 (%)	98.0 to 100.0 (%)
Nation	1	97.7	97.7	0.0	0.0	100.0	0.0
Region	4	97.6	97.7	0.0	0.0	75.0	25.0
Division	9	97.7	97.8	0.0	0.0	55.6	44.4
State (including the District of Columbia and Puerto Rico)	52	97.7	98.0	1.9	5.8	44.2	48.1
County	800	98.0	98.3	1.9	7.5	32.5	58.1
County Subdivision	187	97.4	98.0	8.6	10.7	29.4	51.3
Place	520	97.5	98.0	4.8	9.4	36.7	49.0
Alaska Native Regional Corporation	3	97.8	97.9	0.0	0.0	66.7	33.3
American Indian Area/Alaska Native Area/Native Hawaiian Area	15	98.0	98.6	0.0	13.3	26.7	60.0
Metropolitan statistical Area/Micropolitan statistical Area	510	98.1	98.3	1.0	6.1	31.8	61.2
Principal City	367	97.6	97.9	4.1	9.5	37.6	48.8
Metropolitan Division	29	96.8	97.0	3.4	31.0	44.8	20.7
Combined Statistical Area	126	98.1	98.3	0.0	4.8	37.3	57.9
Combined New England City and Town Area	9	96.4	96.4	0.0	44.4	55.6	0.0
New England City and Town Area	25	96.6	96.6	0.0	28.0	64.0	8.0
Principal city of New England City and Town Area	21	95.8	96.2	19.0	23.8	52.4	4.8
Metropolitan Division of New England City and Town Area	9	96.0	95.5	11.1	55.6	22.2	11.1
Urban Area	394	97.9	98.1	1.5	6.1	38.6	53.8
Congressional District – 109 th Congress	437	97.6	97.9	3.7	6.6	43.0	46.7
Public Use Microdata Area	2,098	97.6	98.1	5.0	9.3	34.4	51.3
School District, Elementary	73	98.1	98.3	0.0	6.8	30.1	63.0
School District, Secondary	91	97.9	98.0	0.0	9.9	41.8	48.4
School District, Unified	786	97.8	98.2	3.4	8.3	34.5	53.8
TOTAL	6,566	97.7 ⁵	98.1 ⁵	3.6	8.6	35.5	52.3

⁵ The mean and median response rates here are computed over the rates for each geographic area. This is not the same as the mean and median national response rate.

Figure 5 below is a histogram of the response rates for 2007. This histogram looks similar to the 2005 and 2006 histograms, suggesting the distributions are also similar for all of the years.

Figure 5. Histogram of 2007 Response Rates, Areas with Populations of 65,000 or more



Below in Table 15, the Census Region response rates are shown for 2007. Based on statistical testing at the 90 percent level, every region is statistically different from one another. Consistent with 2005 and 2006, the Northeast had the lowest response rate of 96.4 percent and the Midwest had the highest region response rate of 98.5 percent.

Table 15. 2007 Census Region Response Rates, Areas with Populations of 65,000 or more

Region	Response Rate (%)	Standard Error (%)
Northeast	96.4	0.050
South	97.6	0.031
West	97.8	0.026
Midwest	98.5	0.027

In Table 16 below, 2007 Census Division response rates are shown. The lowest response rate was 96.3 percent for the Middle Atlantic Census Division. The highest two divisions are West North Central and the East North Central region, both 98.5 percent. They are not statistically different from each other.

Table 16. 2007 Census Division Response Rates, Areas with Populations of 65,000 or more

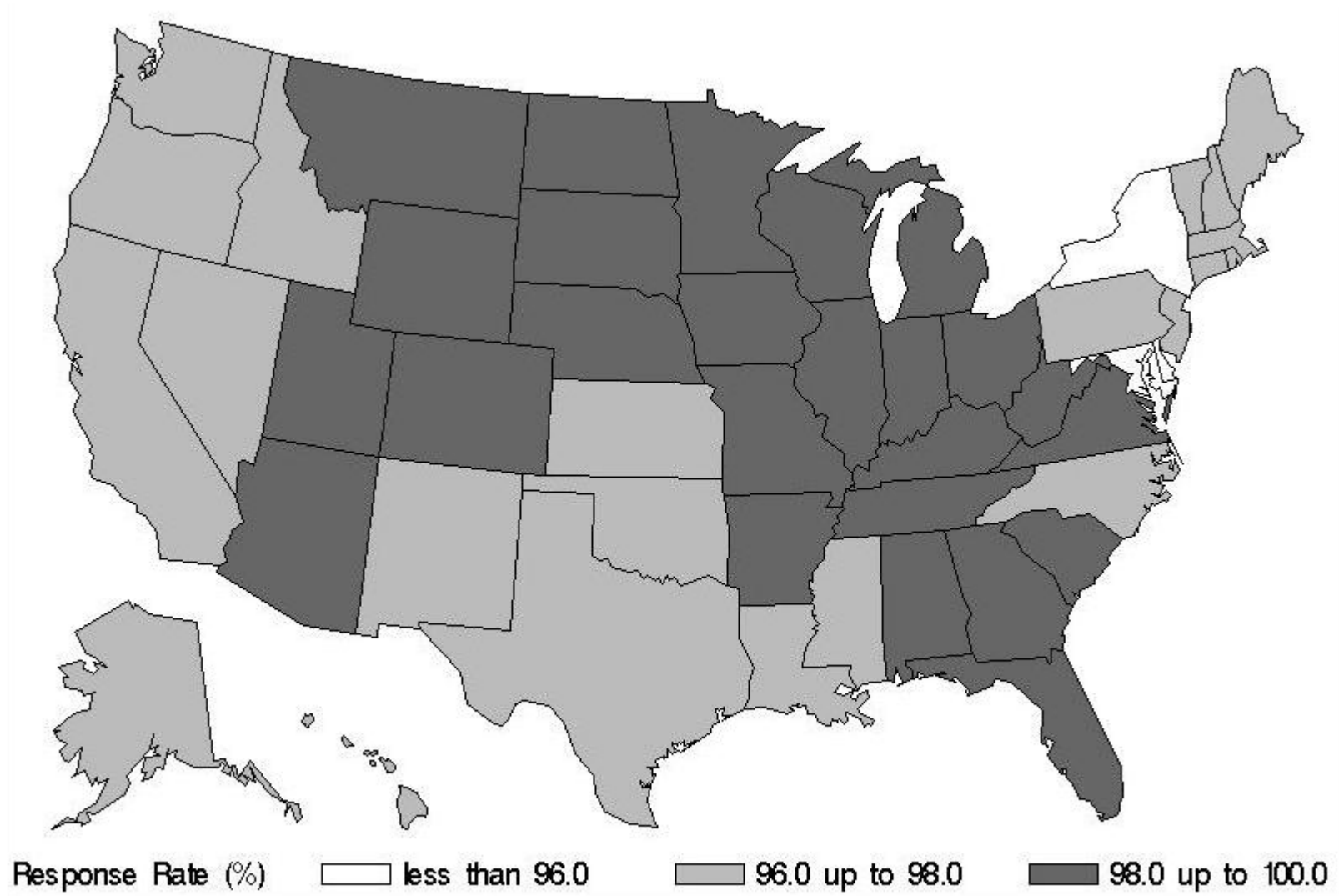
Division	Response Rate (%)	Standard Error (%)
Middle Atlantic	96.3	0.053
New England	96.6	0.085
Pacific	97.4	0.039
West South Central	97.6	0.043
South Atlantic	97.8	0.035
East South Central	98.1	0.058
Mountain	98.1	0.051
West North Central	98.5	0.045
East North Central	98.5	0.033

Based on statistical testing at the 90 percent confidence level, the District of Columbia (91.7 percent) has the lowest response rate among the states. Maryland has the second lowest response rate of 94.6 percent.

Two counties that were among the counties with the lowest response rates were Essex County, NJ, at 89.1 percent, and Philadelphia County, PA (90.5 percent).

A state map of the United States with response rates mapped for 2007 are shown on the next page in Figure 6. Comparing 2006 to 2007, the response rates for the states of Arkansas, Colorado, Florida, Kentucky, Tennessee, Virginia, and Wyoming increased from the 96.0 up to 98.0 category in 2006 to the 98.0 to 100.0 category in 2007. Response rates for Nebraska and Vermont dropped from the 98.0 to 100.0 category in 2006 to the 96.0 up to 98.0 category in 2007.

Figure 6. 2007 State Level ACS Response Rates



Note: The District of Columbia, not shown on this map, is in the category of less than 96.0 percent.

Summarizing the results across all three years, we can see that the response rates are comparable between the years. Overall means and medians were in the same range. We can also see that certain areas of the country had lower response rates. We can infer that the states, counties, and lower levels of geographies in these regions will also have lower or higher response rates.

The national response rates in the range of 97.3 to 97.7 are very high. The response rates for other levels of geography are also very high.

Response rates for Census Regions and Divisions were all very high. Statistical testing shows that the Northeast Region had the lowest region response rate each year, around 96 percent (in Tables 7, 11, and 15). Statistical testing also shows that the Middle Atlantic Census Division (a part of the Northeast Region), consisting of New Jersey, New York, and Pennsylvania had the lowest division response rate out of the 9 divisions, around 96 percent each year (in Tables 8, 12, and 16). The West North Central Division, East North Central Census Division, and the Mountain Census Division (combined, 20 states from Ohio to North Dakota to Nevada and all states between) have had the top three division response rates, in the 98 to 99 percent range each year.

The response rates at the state level, 52 areas in all including the District of Columbia and Puerto Rico also as state equivalents, had response rates consistent to the Region and Division levels. The lowest response rate for a state was never below 90 percent in any of the years.

There are 3,141 total counties or county equivalents in the United States and 78 municipios in Puerto Rico. About 800 out of these 3,219 have populations of 65,000 or more. The general trend of the county-level response rates is the same as at the state level, meaning counties in the Midwest Census Region and West Census Region exhibited higher response rates, such as counties in Wisconsin, Utah, and Indiana, compared to the rest of the country. Utah consistently had counties with a response rate of 99 percent or above. Some counties outside of the Midwest and West Regions also had high response rates, such as counties in South Carolina, Louisiana, and Virginia, which had 100 percent response rates.

In the Northeast Region, like the states, some counties exhibited lower response rates. These counties appeared in Pennsylvania and New Jersey, which were around 90 percent or just below. Maryland, in the South Region, also had counties around 90 percent. Only 7 response rates out of 2,382 total response rates (for 787 counties in 2005, 795 in 2006, and 800 in 2007) over the three years were below 90 percent. These seven response rates came from six total counties, with Prince George's County, Maryland having a low response rate for both 2005 and 2006. Florida had three of these seven response rates. The counties in Florida are in the north central part of the state.

The areas with low response rates have densely urban metropolitan areas, which may be contributing to the low state level response rates (Washington, DC; Baltimore, MD; Philadelphia, PA; and New York, NY). Traditionally urban areas have lower response

rates compared to non-urban areas (De Leeuw and de Heer, 2002). However, not all metropolitan areas exhibited low response rates. Areas such as the Los Angeles Metropolitan Statistical Area (MSA), Chicago MSA, and Dallas-Fort Worth MSA, were able to attain response rates between 96.2 to 97.8 percent in each of the years.

American Indian/Alaska Native/Native Hawaiian areas exhibited good response rates, having mean and median response rates in the range of 97 to 99 percent over the three years. Only one of these areas, the United Houma Nation State Designated American Indian Statistical Area in Louisiana, had a response rate below 94.0 percent.

For these large geographic areas of over 65,000, the response rates are high, giving us confidence in data quality for the 1-year estimates.

5.2 How do housing unit survey response rates vary across geographies with populations of 20,000 to 65,000?

In the following section, we will look at the response rates across geographies of 20,000 to 65,000 people for which the ACS publishes data using 3-years worth of data. While ACS 3-year estimates are released for all areas with populations of 20,000 or more, we have focused on less populated areas with 20,000 up to 65,000 people. There are 7,128 areas of this size. However, not all types of geographies have an area with a population between 20,000 and 65,000. Only 14 types of geographies have areas of this size for this evaluation. Counties, county subdivisions, places, and school districts (elementary, secondary, and unified) make up over 80 percent, or 5,795 of these areas.

Table 17 below summarizes the descriptive statistics about the areas as a whole. No response rate is below 84.7 percent, and the mean and median response rate of 97.9 and 98.3 percent, respectively, are similar to that of areas supported by 1-year estimates.

Table 17. Response Rate Descriptive Statistics, Areas with Populations of 20,000 to 65,000

Year	Number of Geographic Areas	Mean (%)	Median (%)	Minimum (%)	Maximum (%)
2005-2007	7128	97.9	98.3	84.7	100.0

Seen in Table 18, nearly 97 percent of the areas have a response rate of 94.0 percent or above, and a majority of the areas (57.8 percent) have a response rate of 98.0 percent or above.

Table 18. 2005-2007 ACS Response Rate Categories, Areas with Populations of 20,000 to 65,000

Response Rate (%)	Number of Geographic Areas	Percent of Geographic Areas (%)	Cumulative Number of Geographic Areas	Cumulative Percent of Geographic Areas (%)
98.0 up to 100.0	4,120	57.8	4,120	57.8
96.0 up to 98.0	2,200	30.9	6,320	88.7
94.0 up to 96.0	590	8.3	6,910	96.9
Less than 94.0	218	3.1	7,128	100.0

In Table 19, the patterns seen here for the smaller areas are similar to those for areas with populations of 65,000 or more. For each type of geographic area (except for the American Indian/Alaska Native/Native Hawaiian area category), the proportion of areas with response rates of less than 94.0 is low – less than 10 percent. Similar to the findings of areas of 65,000 or more, the mean response rates for each type of area range from 96.4 to 98.4 percent and the medians from 96.6 to 98.7 percent.

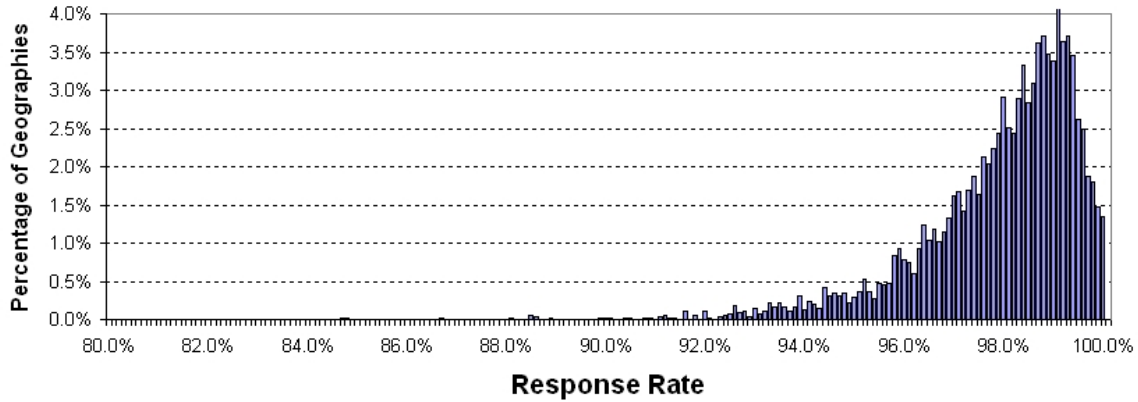
Table 19. 2005-2007 ACS Response Rate Categories by Type of Geographic Area, Areas with Populations of 20,000 to 65,000

Type of Geographic Area	Total	Mean Response Rate	Median Response Rate	Response Rates of			
				Less than 94.0 (%)	94.0 up to 96.0 (%)	96.0 up to 98.0 (%)	98.0 to 100.0 (%)
Nation	0	N/A	N/A	N/A	N/A	N/A	N/A
Region	0	N/A	N/A	N/A	N/A	N/A	N/A
Division	0	N/A	N/A	N/A	N/A	N/A	N/A
State (including the District of Columbia and Puerto Rico)	0	N/A	N/A	N/A	N/A	N/A	N/A
County	1,082	98.3	98.7	1.1	4.7	23.8	70.3
County Subdivision	812	97.9	98.3	3.9	8.4	30.5	57.1
Place	1,559	97.5	98.0	5.6	11.1	33.5	49.8
Alaska Native Regional Corporation	1	97.6	97.6	0.0	0.0	100.0	0.0
American Indian Area/Alaska Native Area/Native Hawaiian Area	21	97.4	98.0	14.3	4.8	33.3	47.6
Metropolitan statistical Area/Micropolitan statistical Area	412	98.2	98.6	1.0	5.8	26.5	66.7
Principal City	400	97.8	98.1	2.5	9.3	36.3	52.0
Metropolitan Division	0	N/A	N/A	N/A	N/A	N/A	N/A
Combined Statistical Area	0	N/A	N/A	N/A	N/A	N/A	N/A
Combined New England City and Town Area	1	98.4	98.4	0.0	0.0	0.0	100.0
New England City and Town Area	15	97.3	97.1	0.0	13.3	53.3	33.3
Principal city of New England City and Town Area	27	96.4	96.6	3.7	25.9	70.4	0.0
Metropolitan Division of New England City and Town Area	0	N/A	N/A	N/A	N/A	N/A	N/A
Urban Area	456	97.9	98.3	2.0	6.1	32.9	59.0
Congressional District – 109 th Congress	0	N/A	N/A	N/A	N/A	N/A	N/A
Public Use Microdata Area	0	N/A	N/A	N/A	N/A	N/A	N/A
School District, Elementary	214	97.7	98.1	2.8	12.1	32.2	52.8
School District, Secondary	118	98.1	98.3	1.7	5.9	34.7	57.6
School District, Unified	2,010	98.0	98.3	2.6	8.3	31.0	58.2
TOTAL	7,128	97.9 ⁶	98.3 ⁶	3.1	8.3	30.9	57.8

⁶ The mean and median response rates here are computed over the rates for each geographic area. This is not the same as the mean and median national response rate.

For comparison to the response rates for areas populations of 65,000 or more, a histogram of the response rates for areas of 20,000 to 65,000 is shown in Figure 7 below. This histogram indicates that most response rates are in the high range.

Figure 7. Histogram of 2005-2007 ACS Response Rates, Areas with Populations of 20,000 to 65,000



There are nine areas that have a response rate significantly below 92 percent, at a 90 percent confidence level. Five of these areas are in New Jersey and four are in Maryland. Five of the areas are Census Designated Places, two are county subdivisions, and two are elementary school districts located in Baltimore County, MD; Prince George’s County, MD; Essex County, NJ; and Bergen County, NJ.

The response rates for American Indian/Alaska Native/Native Hawaiian areas are at a good level, with a mean of 97.4 percent. Three response rates are in the less than 94.0 percent category, with the lowest being 93.4 percent, and all of them are significantly below 96 percent. They are the Kaw/Ponca joint-use Oklahoma Tribal Statistical Area in Oklahoma, Chickaloon Alaska Native Village Statistical Area in Alaska, and the United Houma Nation State Designated Tribal Statistical Area in Louisiana.

6. CONCLUSIONS

Response rates for the ACS have been very strong for the first three years that ACS has been in full implementation. Response rates are generally consistent from year to year and possibly even slightly increasing in most areas, as evidenced by an increased national response rate. In many household surveys, nonresponse has been growing (Groves, 2006).

The national response rate has been in the range of 97.3 to 97.7 percent each year and is high for a survey response rate. Response rates for sub-state levels of geography appear to be strong also, and consistent with state and national response rates. Mid-sized areas that will only receive 3-year estimates and not 1-year estimates also showed strong response rates.

Areas with some of the lowest response rates were in the Middle Atlantic Division and parts of the South Atlantic Census Division (specifically the District of Columbia and Maryland). Many metropolitan areas lie within those divisions, such as Washington, DC, Philadelphia, PA, and New York, NY. Areas that have among the highest response rates are the West North Central Census Division and Mountain Census Division. The response rates for American Indian/Alaska Native/Native Hawaiian areas are in line with response rates for other types of geographies.

The low levels of nonresponse that currently exist substantially reduce the risk of nonresponse bias occurring in ACS data. Nonresponse bias occurs when nonrespondents would answer differently to questions than those that did respond. To keep any potential bias to a minimum, it is important to continue efforts to keep a high response rate for the ACS. Response rates alone cannot speak to the quality of a survey but must be taken into account with other quality measures, such as item nonresponse and coverage rates.

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