

# The 2005 American Community Survey

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## Proceed with caution

**T**he American Community Survey is a new national survey conducted every month by the U.S. Census Bureau designed to provide state and local data more frequently than every 10 years. (See sidebar, below.) When the Census Bureau released the 2005 ACS data in the fall of 2006, it marked the survey's national debut as the new replacement for the long form sample data collected during decennial censuses.<sup>1</sup>

From the earliest planning stages, the national State Data Center program and its Alaska mem-

<sup>1</sup> The decennial census is a count of the U.S. population conducted every 10 years by the Census Bureau in years ending in zero.

ber, the Census and Geographic Information Network,<sup>2</sup> maintained an open dialogue with the Census Bureau about the ACS, providing suggestions and feedback about many aspects of the survey.

The ACS was introduced to Alaska's data users as early as 1995 via a Census Bureau-sponsored stakeholder meeting where input was

<sup>2</sup> The national State Data Center program provides access to and education about Census Bureau products and programs. Each state has a network of affiliates – 1,800 agencies nationwide – that helps people find and use Census Bureau statistical resources. The Alaska Department of Labor and Workforce Development serves as Alaska's lead agency and houses the Census and Geographic Information Network, or CGIN, which maintains the State Data Center program for Alaska.

### What is the American Community Survey?

The American Community Survey is a new approach to how the U.S. Census Bureau collects demographic, social, economic and housing information about the people in the U.S.

The national survey will replace the sample portion of the upcoming 2010 Census, as well as all future censuses, by collecting comparable statistics on a monthly basis. The increased collection frequency means state and some local data will be released every year instead of every 10 years.

#### An overview

The traditional decennial census has consisted of two types of questionnaires: a "short form" and a "long form." All house-

holds in 2000 received the short form, which counts the population and gathers basic characteristics. In 2010, the census short form will continue to go to all U.S. households to count the population.

The census long form is more detailed and asks numerous questions about such items as income, education, rent and mortgages, commute times to work and who speaks what languages at home. In the 2000 Census, the long form went to about 17 percent of all households.

The ACS will replace the decennial census long form. Its objective is the same as the long form's – to describe the population rather than count it. It will ask the same types of questions, but every

month instead of every 10 years. It is being sent to some 250,000 addresses in the U.S. each month.

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*To access the ACS, go to the Alaska Department of Labor and Workforce Development's Research and Analysis Section Web site at [almis.labor.state.ak.us](http://almis.labor.state.ak.us). Click on "Population & Census" on the left, and below that, click on "American Community Survey." For more background on the ACS, see Alaska Economic Trends' February 2006 issue, which is available on the Research and Analysis Web site. Click on "Pubs/Manual/Surveys/News" on the left, and below that, click on "Alaska Economic Trends." Previous issues are also available on the Department of Labor's Web site at [labor.state.ak.us](http://labor.state.ak.us) by clicking on the current Trends issue. People may also contact Research and Analysis at (907) 465-4500 for copies.*

solicited about how such a survey could best be conducted in Alaska. As the survey evolved, and with Alaska's unique needs in mind, the state's census and population program members made recommendations about sample size, field operations, and the Master Address File and TIGER database<sup>3</sup> from which the sample would be pulled. Despite that input, the 2005 ACS data for Alaska, which this article will discuss, has many shortcomings.

Good demographic survey data are based on sound sampling techniques, quality street and address resources that allow for full sample distribution, and high response rates that increase the robustness of the tabulation results. Unfortunately, the ACS has problems that re-

duce confidence in this release of the data for Alaska.

## Problems with the ACS

One major problem that impacts the reliability of the ACS data has to do with response rates. In creating the ACS, the Census Bureau's goal was to mirror the decennial census sample data as much as possible, yet keep costs down. The agency established a sampling strategy that would produce annual tabulations for areas with more than 65,000 people, and that would be augmented by three- and five-year collections of averaged data for areas with smaller populations. In order for a statewide sample to be representative, however, it must contain adequate responses from both rural and urban areas.

The ACS was structured as a mail-out/mail-back process. This required that housing units have accurate street addresses to deliver the surveys. Even though many areas of Alaska have non-

<sup>3</sup> The Master Address File is designed to be a complete and current list of all addresses and locations where people live or work. TIGER is an acronym for Topologically Integrated Geographic Encoding and Referencing, the digital database that identifies the type, location and name of streets, rivers, railroads and other geographic features, and geospatially defines their relationships to each other and the MAF addresses.

## Comparing the Population Counts ACS 2005 versus the 2000 Census



	ACS 2005				Census 2000	
	Household Population Estimate <sup>1</sup>	Total Population Estimate <sup>2</sup>	Difference Equals Group Quarters <sup>3</sup> Estimate <sup>3</sup>	Percentage of Total Population in Group Quarters	Household Population	Total Population
<b>Alaska</b>	641,724	663,661	21,937	3.3%	607,583	626,932
<b>Anchorage, Municipality of</b>	266,281	275,043	8,762	3.2%	253,269	260,283
<b>Matanuska-Susitna Borough</b>	75,001	76,006	1,005	1.3%	58,337	59,322
<b>Fairbanks North Star Borough</b>	83,656	87,560	3,904	4.5%	79,760	82,840

Notes: Each annual ACS release is controlled to the Census Bureau's population estimate for that year. Two situations, however, may introduce some confusion as to what is the real or official value of a population estimate for any particular year.

The first is the practice by the Census Bureau and the Alaska Department of Labor and Workforce Development to release revised state and sub-state population estimates each year. While the estimates in the above table are those originally released for 2005 (which also makes them the controls for the 2005 ACS data), revised 2005 population estimates were released earlier this year that differ from those in the table. The revised 2005 population estimates are: statewide, 663,253; Anchorage, 277,980; Mat-Su Borough, 74,011; and Fairbanks North Star Borough, 87,608.

The second potential for confusion is that the annual state and sub-state population estimates produced by the Department of Labor may also differ from those released by the Census Bureau due to variations in the methods used.

The ACS tables will not be revised. One rule of thumb to follow: Always use the control estimate in the ACS table when using the ACS data for that year.

<sup>1</sup> For the 2005 ACS, a household population estimate was specially derived from the total population estimate to serve as the control.

<sup>2</sup> This is the Census Bureau's 2005 total population estimate.

<sup>3</sup> This is the total population estimate minus the household population estimate.

Sources: U.S. Census Bureau and the Alaska Department of Labor and Workforce Development, Research and Analysis Section

# 2 American Community Survey

## Population and housing profiles

General Demographic Characteristics
Sex and age
Race
Hispanic origin and race
Relationship
Households by type
Selected Social Characteristics
School enrollment
Educational attainment
Marital status
Fertility
Grandparents
Veteran status
Disability status
Residence one year ago
Place of birth
U.S. citizenship status
Year of U.S. entry
World region of birth of foreign born
Language spoken at home
Ancestry
Selected Economic Characteristics
Employment status
Commute to work
Occupation
Industry
Class of worker
Income and benefits
Poverty status
Selected Housing Characteristics
Housing occupancy
Units in structure
Year structure built
Number of rooms
Number of bedrooms
Housing tenure
Year householder moved into unit
Vehicles available
House heating fuel
Occupants per room
Value
Mortgage status and selected monthly owner costs
Gross rent (including gross rent as a percentage of household income)

Source: U.S. Census Bureau, American Community Survey

standard addresses where mail is not delivered, the ACS went forward with the mail-out/mail-back procedure.

Using those flawed procedures, close to 29 percent of the initial sample in 2005 was classified “unmailable,” and nearly half the state’s smaller-populated county equivalents (census areas or boroughs) had “unmailable” rates above 50 percent. To make matters worse, 21 percent of the surveys that were mailed out

were undeliverable, which is a high rate. The ACS did not have alternative means to get those surveys delivered – a standard practice for decennial censuses.

Those problems impact the data in three ways. First, the characteristics associated with the more rural areas of the state will be underrepresented. Second, the removal of these surveys makes the sample size for the 2005 data even smaller, which automatically reduces confidence in its accuracy. Third, the already marginal sample size for small places – which will depend on three- and five-year averages – may be impacted so severely that the data will not be released.

Another major factor affecting the reliability of the data is the version of the Census Bureau’s state and county population estimate series used to control the ACS responses. The Census Bureau has produced a Modified Age Race Sex, or MARS, file since 1980 to correct for shortcomings in the decennial data. These corrections are carried forward throughout the decade as part of the Census Bureau’s yearly population estimates.

According to Gregory Williams, Alaska’s state demographer, the 2000 Census had significant processing errors for forms from rural Alaska that affected detailed age data for children, yet no MARS adjustments were made to the 2000 Census age or sex data. He describes the extent of the problem:<sup>4</sup>

“The basic census form used in door-to-door enumeration allowed for only five household members to respond (six on the mail-out form). If the household was larger than five, persons were listed by name on the back, and a supplementary form was used for additional persons. In the processing, the private data capture contractor separated the supplementary forms and the connecting information was lost. This meant that the age of children less than 18 years of age had to be imputed<sup>5</sup> for a substantial number of children based on the age distri-

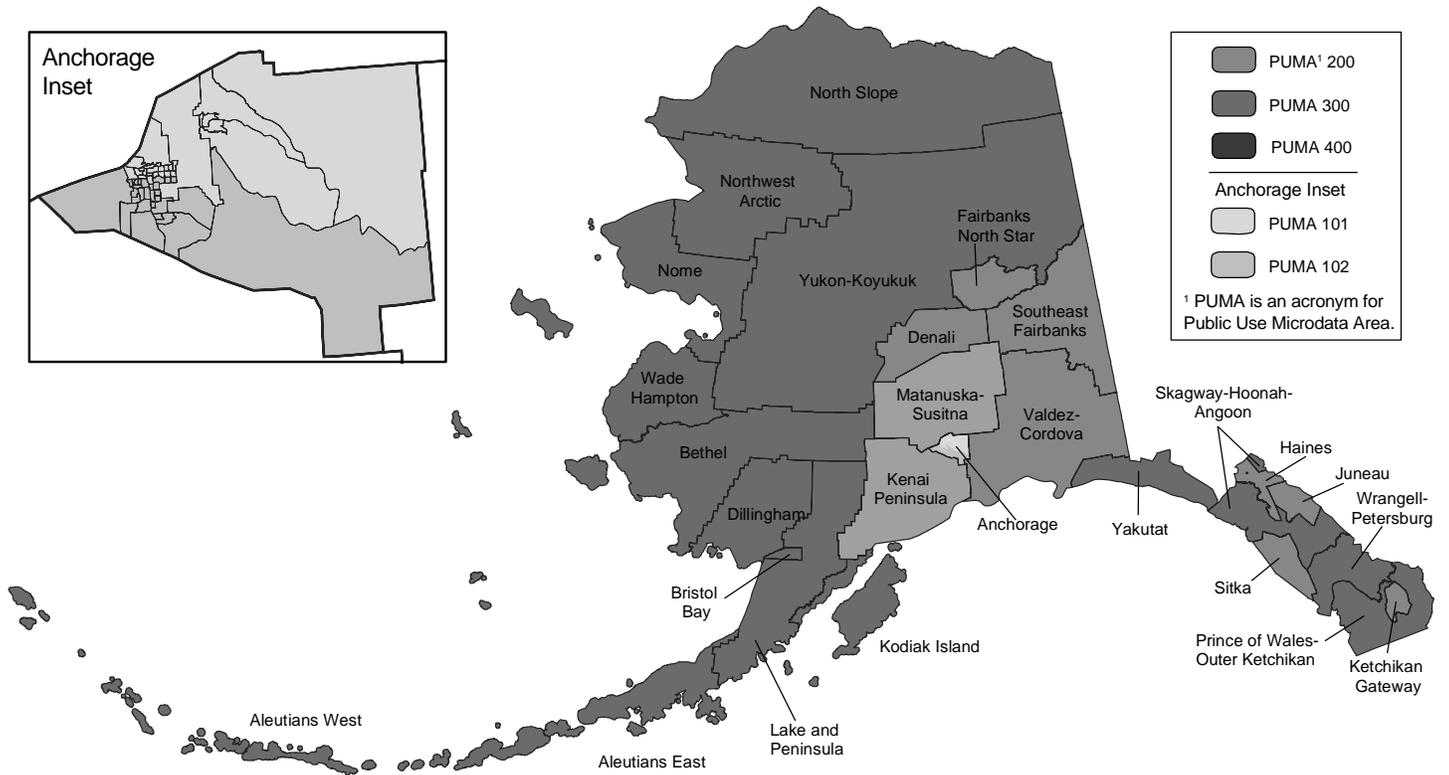
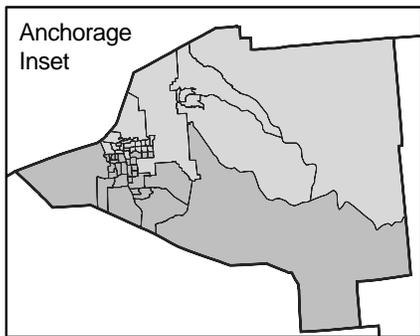
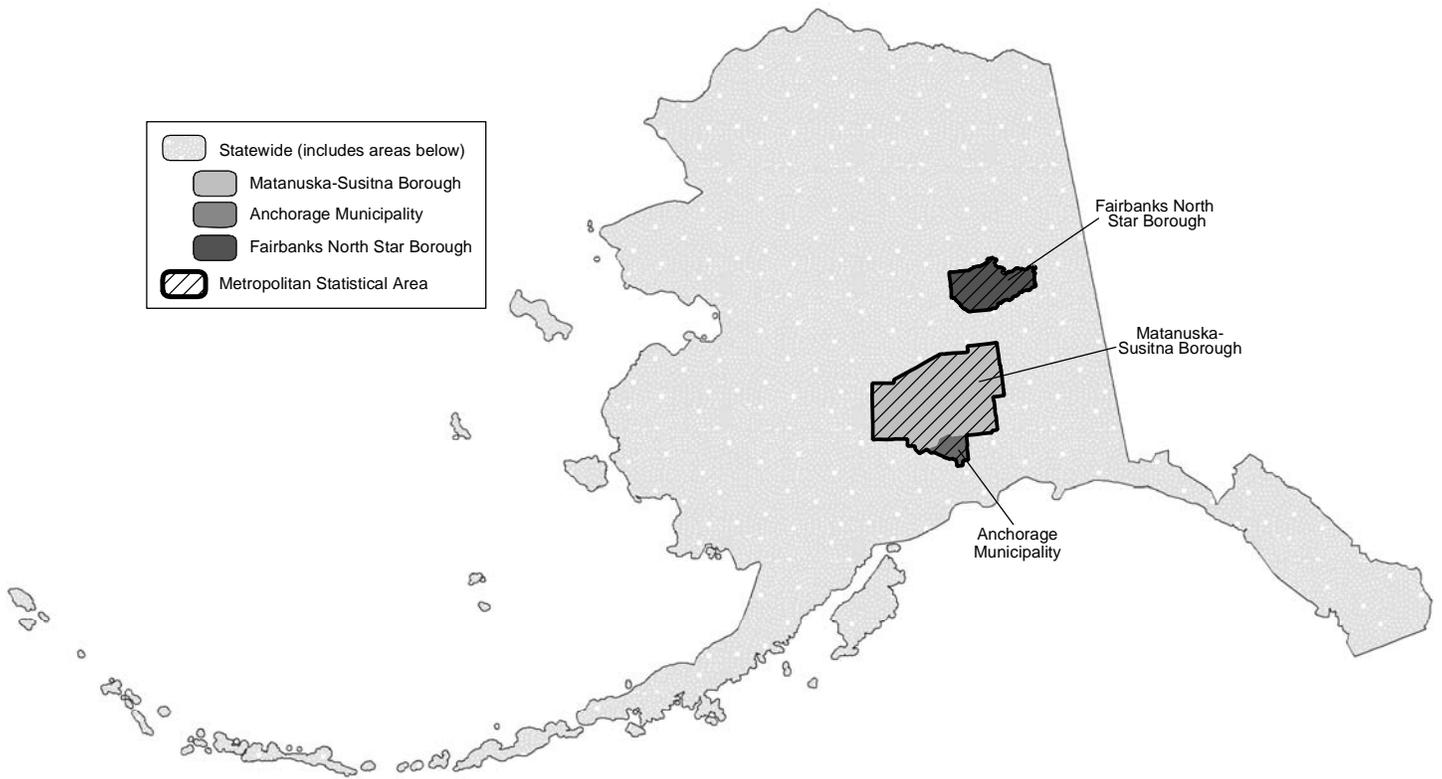
<sup>4</sup> Williams’ description is from the *Alaska Population Overview: 2003-2004 Estimates*, which is available through Research and Analysis and is on its Web site at [almis.labor.state.ak.us](http://almis.labor.state.ak.us).

<sup>5</sup> Imputation in statistics is the substitution of some value for a missing data point.

# The American Community Survey in Alaska

## Areas with more than 65,000 people

# 3



Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section; and the U.S. Census Bureau

# 4 ACS Published 11 Areas in 2005 Alaska

The 2005 ACS for Alaska has data in only 11 areas though it may appear there are more. Many of the areas listed below are merely different Census Bureau reporting names for the same geographic area. The data will be the same under the different names. For example, the Fairbanks North Star Borough covers the same area as the Fairbanks Metropolitan Statistical Area and the Fairbanks North Star Borough School District.

It is important to know that Alaska has two metropolitan statistical areas. The first encompasses the Municipality of Anchorage and the Matanuska-Susitna Borough and the second is the Fairbanks North Star Borough.

Each numbered grouping below has the same boundaries. The headings are those used on the Census Bureau's ACS Web page:<sup>1</sup>

1. Alaska  
Alaska's Congressional District for the 109<sup>th</sup> Congress
2. Anchorage Municipality  
Anchorage School District  
(ACS heading) Anchorage Municipality, Anchorage Metropolitan Statistical Area
3. Fairbanks North Star Borough  
Fairbanks North Star Borough School District  
(ACS heading) Fairbanks North Star Borough Metropolitan Statistical Area  
(ACS heading) Alaska; in metropolitan statistical area or micropolitan statistical area – Fairbanks Metropolitan Statistical Area
4. Matanuska-Susitna Borough  
Matanuska-Susitna Borough School District
5. Anchorage Metropolitan Statistical Area (includes the Matanuska-Susitna Borough)  
(ACS heading) Alaska; in metropolitan statistical area or micropolitan statistical area – Anchorage Metropolitan Statistical Area  
(ACS heading) Alaska; in metropolitan statistical area
6. Anchorage Urbanized Area
7. Public Use Microdata Area 101
8. Public Use Microdata Area 102
9. Public Use Microdata Area 200
10. Public Use Microdata Area 300
11. Public Use Microdata Area 400

The following reporting areas do not have profiles or reports. Limited data for these areas are available on the Census Bureau's Geographic Comparison Tables Web site at <http://factfinder.census.gov>. Click on "Data Sets" on the left, and below that, "American Community Survey." Then click on "Geographic Comparison Tables" on the right, select "State," then "Alaska." After that, select a table format and finally a table.

12. Alaska; in metropolitan statistical area – not in principal city (Anchorage is the principal city, so this is the Mat-Su and Fairbanks North Star boroughs.)
13. Alaska; not in metropolitan statistical area or micropolitan statistical area (This is the area outside the Anchorage Municipality, Mat-Su Borough and Fairbanks North Star Borough, plus the micropolitan statistical areas of the Juneau, Ketchikan Gateway and Kodiak Island boroughs.)
14. Alaska; rural
15. Alaska; urban

<sup>1</sup> To go to the Census Bureau's ACS Web page, go to <http://factfinder.census.gov> and, under "American Community Survey" in the middle, click on "get data."

Source: U.S. Census Bureau

bution of similar households by a method statisticians refer to as a 'hot deck.' This method assumed that people listed their children on the census form in random order, rather than sequentially. In fact, most people tend to list their children in age order.

"As a result, a large number of the children whose ages had to be imputed were very young, rather than the expected normal distribution by age of children under 18. The result was that for parts of rural Alaska that have large households, the census reported too many children ages 10 to 17 and too few children from birth to age nine. Ten census areas had errors of at least 6 percent. In some areas the problem was severe. In Wade Hampton, 16 percent of the children were estimated to have misreported ages and Bethel had almost 15 percent."

Therefore, while data for children under 18 as a whole should be accurate, data for children by more detailed age groups may be inaccurate. This age issue will affect the accuracy of ACS data as well.

These issues, along with several others that will be discussed later, put us at the State Data Center program in an awkward position. The 2005 ACS release has been touted as the first official set of ACS products, kicking off the beginning of a new method of data collection in America. A considerable share of the State Data Center federal-state cooperative responsibilities includes assisting Alaska's data users to find and use census data. Since we have concerns about the quality of the numbers, the SDC will instead focus on educating data users how best to navigate and evaluate the use of the data.

## ACS is limited to households

The ACS was designed to be a complete population survey, but, due to federal funding and other operations-related issues, the 2005 ACS was limited to only households. That means a sizeable chunk of the population was excluded – the people living in group quarters, such as those in dormitories, nursing homes, prisons and military barracks. Therefore, the ACS "Total Population"

as it is labeled in the ACS tables, is really “Total Population in Households.”

That limitation makes it difficult to cite trends comparing 2005 ACS data (households only) to the 2000 Census data (the entire population), as the different survey universes must always be taken into account. (See Exhibit 1.)

## The dependability

Changes in who is included in a survey also affect the dependability of the data series. In order for a data set to be used over time, it should ask the same questions of the same population universe. A series, such as the ACS, is weakened when a stable universe is at the mercy of annual funding changes or reductions.

It might not be as critical with a data set that can stand alone on a year’s worth of survey results, but the ACS is modeled on averages of three- or five-year groupings in order to produce estimates for smaller population-sized entities. It is not clear as of this writing how the loss of group quarters data for 2005 will affect the first releases of three- or five-year averaged data in 2008 and 2010, respectively.

## What was released?

Throughout the late summer and fall of 2006, the Census Bureau released demographic, social, economic and housing data both for Alaska as a whole and areas with more than 65,000 people. (See Exhibit 2.) That included the state’s three largest boroughs – Anchorage, Fairbanks North Star and Matanuska-Susitna – and five statistical areas called Public Use Microdata Areas, or PUMAs<sup>6</sup>. (See Exhibits 3 and 4.)

## Comparing the 2005 ACS to the Census 2000

The first thing most data users want to do is to

<sup>6</sup> The PUMAs, or Public Use Microdata Areas, are groupings of census areas and boroughs – each grouping has roughly 100,000 people – for which census microdata is available. The microdata are files of actual survey records with the identifying information removed that allow experienced users to evaluate a broader range of topics. The PUMAs are redefined every 10 years through a cooperative program between the Census Bureau and the states.

compare ACS information to 2000 Census data. Is it a legitimate comparison? In some instances, the comparison may be legitimate; in others, it probably is not. A data user should consider three factors when interpreting survey or census results – the target population, the time period the estimates describe and the reference periods covered by the specific questions.

## The target population

Aside from the fact that the 2005 ACS looked at only the household population and the 2000 Census looked at the whole population, the two also have different residence rules.

In the ACS, people are counted at the sample address if they are living or staying there at the time of the survey and their expected length of stay will exceed two months. The survey also includes people who have stayed at the address less than two months but have no other place to live or stay, as well as people who usually live at the address but are away for two months or less when the household is contacted.

In contrast, the 2000 Census counted the usual place of residence as where the person lived most of the year. College students were counted at their college address.

Both the 2005 ACS and the 2000 Census interviewed people living in the U.S. without regard to their legal residency status or citizenship.

## The time period the estimates describe

The 2005 ACS and 2000 Census described two different types of time periods. The 2005 ACS produced period estimates that describe the housing and population characteristics of an area over a set time frame – from January 2005 to December 2005. It collected survey information continuously nearly every day during that year and aggregated the results over the year.

The 2000 Census, in contrast, is a point-in-time survey that counted the population and housing on a specific date – April 1, 2000.

# 5 Comparison Issues 2000 Census and 2005 ACS

Demographic Characteristics
<b>Age</b> – The concept is comparable but the 2000 Census reported age as of April 1, 2000. The ACS reported age as of the survey month.
<b>Household relationship</b> – Comparable though some categories are different. The 2000 Census distinguished between natural-born, adopted and stepchildren while the 2005 ACS had only one category, “son or daughter.”
Social Characteristics
<b>School enrollment</b> – The concept is comparable but the reference periods are different: for the census it was April 1, 2000, while for the ACS it was the survey month. The exclusion of the group quarters’ population in the ACS may also affect this number.
<b>Fertility</b> – Fertility was not included in the 2000 Census.
<b>Disability</b> – Not comparable because the question was redesigned. The 2005 ACS also lacks the group quarters’ population, including the non-institutional segment.
<b>Residence one year ago</b> – Not comparable because the 2000 Census question asked about residence five years prior to completing the questionnaire.
Economic Characteristics
<b>Employment status</b> – Not Comparable. The concept is similar in that both the 2000 Census and the 2005 ACS asked for employment status as of “last week.” In the census, however, the reference week was the last week in March, whereas the ACS reflected an annual average collected throughout the year.
<b>Income</b> – Not comparable, even though the concepts are similar, due to differences in the data collection time periods in the 2005 ACS versus the decennial census; adjustments for inflation in the ACS data; accuracy of the respondents’ answers; and the rates of imputation when the Census Bureau was unable to get answers to these questions.
<b>Per capita and aggregate incomes</b> – Not comparable. Although the concepts are comparable, the 2005 ACS excluded the incomes of people living in noninstitutional group quarters (such as college dormitories and military barracks) and used the household population as the base; the 2000 Census included these incomes and used the total population as the base.
<b>Poverty status</b> – Not comparable. Poverty status is subject to the same problems described under income. Additionally, poverty status in the 2000 Census referred to calendar year 1999. In the 2005 ACS, poverty status referred to the 12 months prior to completing the questionnaire. The difference in residency rules can also affect the number of people in a family – changing the poverty threshold for that family – but it might not have much of an effect on the family’s income.
Housing Characteristics
<b>Owner-occupied versus specified owner-occupied</b> – Not comparable. Tabulations of value, owner costs, mortgage status and costs as a percentage of income in the 2000 Census used “Specified Owner-Occupied” units as a base, which excludes mobile homes, housing units in multi-unit buildings and others. The 2005 ACS used all owner-occupied units, a better, more inclusive universe.
<b>Mortgage status</b> – Not comparable because of the change in universe from specified units to all units. The mortgage status was also impacted by different residency rules and the ACS picking up seasonality.
<b>Vacancy status</b> – Comparable concept though definitely impacted by residency rules and ACS picking up seasonality.
Note: For additional comparisons, go to Research and Analysis’ Web site at <a href="http://almis.labor.state.ak.us">almis.labor.state.ak.us</a> . Click on “Population & Census” on the left, and below that, click on “American Community Survey.” Then, under the reference documents heading at the bottom of the page, click on “2005 ACS Comparability to 2000 Census.” <i>Source: State Data Center program</i>

## The time period specific questions reference

Most ACS questions do not stipulate a reference period, and when that is the case, the reference period is the interview date. Some examples include questions about tenure, citi-

zenship, marital status, relationship and veteran status.

Other questions specify a period of time, such as “last week” or “in the last three months,” relative to the date of interview. Examples include questions that ask about the place of work, employment status, cost of electricity and school enrollment. These estimates are still interpreted as yearly averages, but the averages cover a slightly different time period than the calendar year. For example, school enrollment asks if the person attended school or college in the last three months. The overall reference period for the 2005 ACS estimates was therefore the entire 2005 calendar year plus the last few months of 2004.

The 2000 Census, in comparison, collected most responses specific to the census date of April 1, 2000, or for the previous week or calendar year. Regardless of when the questionnaire was filled out, most, if not all responses corresponded to the exact same reference period.

Many times, because the reference periods are so different between the 2005 ACS and the 2000 Census, they are not comparable. For example, on income questions, the ACS asks about income in the previous 12 months and the census asks about income in the previous calendar year.

Although the ACS gets adjusted for inflation, Census Bureau test results have shown evidence that income reported with the ACS version of the question is consistently lower (about 4.4 percent nationwide). The bottom line is that

users should exercise caution – meaning they should probably not do it – when trying to do trend analysis for income or poverty measures using the decennial census versus ACS data.

See Exhibit 5 for other comparisons between the two surveys.

## Ways to determine data accuracy

It is critical to understand confidence intervals and margins of error to fully understand the ACS. In fact, the Census Bureau promotes the use of these measures of reliability so vigorously that it includes margins of error for every data estimate.

### Sampling error

Sampling error occurs when a survey produces estimates of the whole population by collecting data from only a portion of the population. Since the ACS is based on a sample of the population, the estimates contain sampling error. The sampling error is reduced as the sample size increases. The decennial long form estimates had a smaller sampling error than the 2005 ACS because the census long form sample was much larger than the 2005 ACS sample.

Two related measures of sampling error are standard error and margin of error.

### Standard error

The standard error measures the variability of an estimate due to sampling and depends on the sample size. In general, the larger the sample size, the smaller the standard error. Conversely, the smaller the sample, the larger the standard error.

### Margin of error

The term margin of error, or MOE, is used to measure the uncertainty associated with estimates based on a survey. The margin of error describes the precision of the estimate at a given level of confidence. The confidence level measures the likelihood that the true value is within a certain distance of the results of a sample estimate.

Instead of providing the upper and lower confidence bounds as was done in pre-2005 ACS tables, the published 2005 ACS tables use the margin of error. The margin of error is the difference between an estimate and its upper or lower confidence bound. Both the confidence bounds and the standard error can easily be computed from the margin of error. All ACS-

published margins of error are based on a 90 percent confidence level.

$$\text{Standard Error} = \text{Margin of Error} / 1.65$$

$$\text{Lower Confidence Bound} = \text{Estimate} - \text{Margin of Error}$$

$$\text{Upper Confidence Bound} = \text{Estimate} + \text{Margin of Error}$$

The following is an example of how ACS data are displayed in most tables. To make use of the margin of error, one would say that with 90 percent confidence, the interval 323,808 – 327,590 contains the true number of males in households in Alaska in 2005:

Table A. Example of Margins of Error – Sex

Subject: Male

Estimate: 325,699

Margin of Error: +/- 1,891

In general, larger samples are more likely to yield results closer to the target population quantity and therefore have smaller margins of error than smaller samples. Small population group estimates typically have relatively large margins of error. Another example from the Alaska ACS tables bears this out:

Table B. Example of Margins of Error – House Heating Fuel

Subject: Solar Energy

Estimate: 142

Margin of Error: +/- 138

In this case, the interval 4 – 280 contains, with 90 percent confidence, the number of houses that heat with solar energy. The farther apart the confidence intervals, the greater the uncertainty about the estimate.

When constructing confidence bounds from the margin of error, the user should be aware of any natural limits on the bounds. For example, if a population estimate is near zero, the calculated value of the lower confidence bound may be negative. Negative values for most characteristics, however, are not admissible, so the lower limit of the confidence interval is set to zero by default.

Total household population will not display a margin of error, as it is fixed to the population estimate used as a control during weighting. In this case, an ACS table will instead show a series of asterisks in place of the margin of error.

Other data values that may be found in the ACS tables include an N, which indicates an estimate or its margin of error cannot be provided because the number of sample cases is too small for the given geographic area. An X denotes the estimate is not applicable or available. A Z means an estimate is not available for an undefined reason. And a dash indicates that no sample observations were available to compute an estimate, or a ratio of medians could not be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.

### Applying statistical testing to ACS data

Users should do a statistical test to determine if two estimates are statistically different from each other. Two estimates are “significantly different” at the 90 percent confidence level if the difference between them is large enough to infer that there is less than a 10 percent chance that the difference is purely random.

For example, if you want to say:

- Estimate X is bigger than estimate Y;
- Estimate X this year is larger than estimate X last year;
- Estimate X is smaller than that value in the Census 2000;
- State Z has the highest value of this characteristic;

or any similar statement, you need to first do the appropriate statistical test.

The first step is to calculate the standard error of the difference. The second step is to calculate the margin of error of the difference. Finally, the original difference between the estimates is compared to the margin of error of that difference. If the difference is greater than the margin of error, then you conclude that the two estimates are significantly different. If the difference is less

than the margin of error, you conclude that the two estimates are not significantly different.

The following example will show how to conduct a statistical test. Suppose you want to know if the proportion of owner-occupied housing units in one geographic area (the Anchorage Municipality) is significantly different from the proportion in another geographic area (the Mat-Su Borough). Table C shows the estimates and margins of error for the two geographic areas:

Table C. Example of Statistical Testing: The Proportion of Owner-Occupied Housing Units

Geographic Area	Estimate (Percentage of the Total)	Margin of Error
Anchorage	65.9	+/-2.4
Mat-Su	82.9	+/-4.1

To calculate the standard error, or SE, of the difference, you must calculate the standard error for each estimate. For margins of error calculated at the 90 percent confidence level, the standard error for each estimate is defined as the margin of error divided by 1.65.

$$SE(estimate) = \frac{MOE(estimate)}{1.65}$$

$$SE(Mat - Su) = \frac{4.1}{1.65} = 2.48$$

$$SE(Anch) = \frac{2.4}{1.65} = 1.45$$

The standard error of the difference is the square root of the sum of the squares of the two standard errors (assuming the estimates are uncorrelated). The standard error of the difference for this example is equal to 2.88, as shown below:

$$SE(Diff) = \sqrt{SE(Mat - Su)^2 + SE(Anch)^2}$$

$$SE(Diff) = \sqrt{2.48^2 + 1.45^2} = 2.88$$

To calculate the margin of error of the difference, simply multiply the standard error of the difference by 1.65:

$$MOE(Diff) = 1.65 \times SE(Diff)$$

$$MOE(Diff) = 1.65 \times 2.88 = 4.75\%$$

Finally, compare the difference of the estimates to the margin of error of the difference.

$$Diff = 82.9 - 65.9 = 17.0\%$$

$$MOE(Diff) = 4.75\%$$

The difference between the estimates is greater than the margin of error of the difference.

Therefore, one can conclude that the two estimates are significantly different with 90 percent confidence.

## In conclusion

The ACS in a perfect world would provide robust and timely data unfettered by sampling issues, survey procedures or large confidence intervals. While the availability of comprehensive information for Alaska, more current than every 10 years, is a positive goal, the ACS data is not of the same quality as the decennial census data and cannot be used as freely.

Data users across the country are experiencing similar problems and concerns. Most acknowl-

edge that the newness of the series has both the producers and users caught up in a steep learning curve. One improvement for 2006 is that group quarters were reinstated in the full sample, and will hopefully remain entrenched as an integral part of future surveys.

Another improvement most users would like to see is an increase in the ACS sample size, but they realize the increase would mean a sizeable budget increase as well.

The ACS is a new approach to providing critical information about the nation's people. Only time will tell how successful it is in meeting that objective.

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*Volumes have been written that define and explain the wide variety of topics that surround the ACS methodology and data. For a list of reference documents, go to Research and Analysis' Web site at [almis.labor.state.ak.us](http://almis.labor.state.ak.us). Click on "Population & Census" on the left, and below that, click on "American Community Survey." The reference documents are listed on the bottom of the page.*

## Trends Authors



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