# ESTIMATES ABOUT FERTILITY AND GRANDPARENTS FROM THE ACS, THE CPS, C2SS, AND CENSUS 2000

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## INTRODUCTION

This report compares national distributions based on data from the American Community Survey (ACS) with those based on data from various Census Bureau surveys for two items: fertility (women who gave birth in the past 12 months) and grandparents residing with their grandchildren. This report first compares estimates of the number of women who gave birth in the 12 months preceding the survey date based on the 2004 ACS with estimates based on the 2004 June Fertility Supplement to the Current Population Survey (CPS). It then notes variations that are both statistically and substantially different, and for those found, offers possible explanations.

The second analysis compares estimates of the number of grandparents living with grandchildren under 18, if they are primarily responsible for the care of their grandchild, and the duration of their responsibility. The 2004 ACS data on grandparents are compared with Census 2000 sample data and the Census 2000 Supplementary Survey (C2SS) data because the Census 2000 data constitute the most comparable data. For the analysis of both fertility and grandparents, the universe is restricted to people recorded as living in households.

## METHODOLOGY

The tables included in this report compare the most commonly tabulated data on fertility and grandparents from the ACS, the CPS, C2SS, and Census 2000. Comparisons consist

primarily of percentage-point differences between the ACS and all other comparison distributions. Tables display the survey estimates, the margins of error from which 90-percent confidence intervals of the estimates can be derived, and the difference between the estimates. In the case of frequency distributions, the difference is calculated as the percent difference between the two estimates. In the case of relative frequency distributions, the difference is calculated as the percentage-point difference between the two estimates. An asterisk (*) denotes statistically significant differences.

At the national level, survey variances were small, resulting in many statistically significant differences between the distributions. This report focuses on statistically significant differences of 0.5 percentage points or more. This yardstick can vary based on the relative size of the category. For example, for population groups constituting a relatively large percentage of the population (such as children born to women with at least one year of college), a 0.5 percentage-point difference in the estimates might be relatively small, while for population groups constituting a smaller percentage of the population (such as children born to women who have not completed high school), a 0.5 percentage-point difference could be relatively large. Users may choose statistically significant differences that are smaller or larger than 0.5 percentage points for their own analytical purposes.

The remainder of this section examines differences in methodology between these different data sets.

**Sample Frame**

The 2004 ACS surveyed a national sample of housing units, both occupied and vacant. An initial sample of 838,000 households resulted in 569,000 completed interviews. Data were collected in a total of 1,240 counties of the 3,141 counties in the United States. The sample is designed to provide estimates of housing and socio-economic characteristics for the nation, all states, most areas with a population of 250,000 or more, and selected areas of 65,000 or more.

The 2004 June CPS surveyed a national sample of approximately 51,000 households in 792 primary sampling units. The sample is designed to produce estimates of the labor force characteristics of the civilian noninstitutionalized population 16 years of age and older for the nation and all states.[1]

One difference between the ACS and the CPS survey universes is that the CPS includes a small number of individuals living at addresses that were housing units in 2000 but have since been converted into noninstitutional group quarters (e.g. emergency and transitional shelters and group homes). For the purposes of this report, all individuals with detailed household and family status of "in group quarters" (HHDFMX = 51) were excluded from the CPS estimates for all comparisons shown on this report.

The long-form questionnaire used in Census 2000 was sent to a sample of approximately 1-in-6 households. This sample was designed to produce national, state, and substate

[1] For a detailed explanation of the basic monthly survey CPS sampling frame, see the following Internet site: <www.bls.census.gov/cps/bsampdes.htm>.

estimates of many social and economic characteristics from questions that were not included on the Census 2000 short-form that was sent to the entire population.[2]

The C2SS was conducted as part of Census 2000 to demonstrate the operational feasibility of ACS methods. The C2SS distributions in this report come from information collected in the year 2000 from the original 36 ACS test counties plus another sample of 1,203 counties selected and surveyed using current ACS operational and data collection methods.[3]

**Sample Size and Mode of Data Collection**

The 2004 ACS interviewed a total of 534,383 occupied households. Data were collected continuously throughout the year using a combination of mail-out/mail-back questionnaires, Computer-Assisted Telephone Interviewing (CATI), and Computer-Assisted Personal Interviewing (CAPI). Each month a unique national sample of addresses received an ACS questionnaire. Addresses that did not respond were telephoned during the second month of collection if a phone number for the address was available, and personal visits were conducted during the third month and the last month of data collection for a subsample of the remaining nonresponding units. The 2004 ACS achieved an overall survey response rate of 93.1 percent, calculated as the initially

[2] For a detailed explanation of the Census 2000 sampling frame and data collection procedures, see U.S. Census Bureau, *Census 2000 Summary File 3: Technical Documentation.* U.S. Census Bureau: Washington, DC 2002, chapter 8.

[3] For a detailed explanation of the C2SS survey and comparisons with Census 2000 sample items, see U.S. Census Bureau, *Meeting 21st Century Demographic Data Needs—Implementing the American Community Survey. Report 9: Comparing Social Characteristics with Census 2000.* Washington, DC, 2004.

weighted estimate of interviews divided by the initially weighted estimate of cases eligible to be interviewed.

The 2004 June CPS contained interviews from about 51,000 households. The fertility items were included in a supplement to the June CPS that was conducted during the third week of June 2004. All CPS data are collected via Computer-Assisted Telephone and Personal Interviews (CATI/CAPI), with interviews conducted during one week each month. The response rate for the basic 2004 June CPS was 92 percent. Both the ACS and the CPS employ experienced, permanent interviewers for CATI and CAPI data collection.

The Census 2000 Supplementary Survey (C2SS) used the same methods as the 2004 ACS. The unit survey-response rate for the C2SS was 95.1 percent. In Census 2000, the sample households had a unit survey-response rate of 91.2 percent.[4]

**Residence Rules**

The ACS, the CPS, C2SS, and Census 2000 used different residence rules to determine which individuals in a household would be eligible for interview. This difference may contribute to variation in the universes from which the social characteristics are measured.

[4] Deborah Griffin, Susan Love, and Sally Obenski, "Can the American Community Survey Replace the Census Long Form?" Paper presented at the Annual Meeting of the American Association for Public Opinion Research, Nashville, TN, May 14-18, 2003.

The ACS and C2SS used identical rules. These surveys collected interviews from everyone in the sample housing unit on the day of interview who was living or staying there for more than two months, regardless of whether or not they maintained a usual residence elsewhere or if they did not have a usual residence. If a person who usually lived in the housing unit was away for more than two months at the time of the survey contact, he or she was not considered to be a current resident of that unit. This rule recognizes that people can have more than one place where they live or stay over the course of a year, and these people can affect the estimate of the characteristics of the population for some areas. However, at high geographic levels such as the nation or the state, it is not expected that these rules would affect survey estimates.

The CPS interviews all people staying in the housing unit at the time of the interview who consider the housing unit to be their usual residence or who have no usual residence. The CPS also includes temporarily absent individuals who consider the housing unit as their usual residence.

The different residence rules result in one notable difference in the universes of these two surveys. Because the 2004 ACS and C2SS excluded group quarters from the sample frame and interviewed individuals at their current residence, college students living in dormitories were not included in the ACS universe. In contrast, the CPS interviewers were instructed to include as household members any college students who were temporarily absent from the household, including those who were currently residing in college dormitories. The resulting CPS sample universe included more college students

than the ACS sample universe, even if they lived most of the year away from their parent's home in a school dormitory.

For Census 2000, each person was enumerated as an inhabitant of his or her "usual residence." Usual residence is the place where the person lives and sleeps most of the time. If a person had no usual residence, the person was to be counted where he or she was staying on Census Day (April 1, 2000). Unlike the CPS, college students were counted as residents of the area in which they were living while attending college. Children in boarding schools below the college level were counted at their parental home. For Census 2000, people living in group quarters were included in the Census enumeration, but they were excluded in the analysis in this paper.

**Question Wording and Reference Periods**

Differences between the ACS, the CPS, C2SS, and Census 2000 in presentation and wording of questions may contribute to differences in estimates.

***Fertility.*** The 2004 American Community Survey asked the following fertility question of all women 15 to 50 years old:

> Has this person given birth to any children in the past 12 months?
>
> Yes
>
> No

This question was asked each month in the ACS over the 12 calendar months; therefore, the data included information referring to periods before 2004.

The June 2004 supplement to the CPS asked the fertility question to women 15 to 44 years old in two parts. First:

> How many live births, if any, have you ever had?
>
> None
>
> Number of children ____

Second, for women who had ever had one or more births, the date of the last-born child was asked as follows:

> In what month and year was your (child/last child) born?
>
> Enter month
>
> Enter year ____

If a woman reported a date of last birth between July 2003 and June 2004, then she was categorized as having had a birth in the last 12 months. In this report, estimates from this sample population will be compared with estimates from the ACS sample population described above.

Several important differences exist between these two surveys. First, the ACS surveys women 15 to 50 years of age, while the CPS surveys women 15 to 44 years. In recent years, about 6,000 women aged 45 to 50 have given birth each year, out of a total of 4 million women having a birth.

Second, the ACS estimate for 2004 refers to women answering the question in the period January to December 2004 for the 12-month period prior to the survey date. This means that a person answering in January 2004 may be responding "Yes" to a birth that

happened as far back as January 2003. In the CPS, births in the last 12 months are tabulated as those recorded between July 2003 and June 2004. However, since the CPS is always conducted during the week that contains the 19th day of the month, births occurring in the last week of June (which could account for about 2 percent—80,000—of all births in a 12-month period) were not tallied in the 12-month estimate.

Estimates from the CPS and the ACS may vary because of the different reference periods and ages of women being asked the questions and because the wording and the complexity of the questions differed. To determine if a woman had a birth in the last 12 months, two questions were asked in the CPS, compared with one in the ACS. The ACS data may overestimate the number of women who gave birth in the 12-month period. For example, some women answering the question as "Yes" in May 2004 may have given birth in the early days of May 2003, and hence, may have had their child some days or weeks more than 12 months prior to the interview date.

***Grandparents.*** Three grandparent items were asked in the ACS, C2SS, and Census 2000, using identical wording and response categories. All of the surveys asked the questions of people 15 and older, although the data were tabulated only for people 30 and older due to the low probability of a person under age 30 being a grandparent. In both the ACS and C2SS, follow-up interviews (which made up approximately 40 percent of all interviewed households using the CAPI/CATI instrument), people under age 30 were skipped out of this series of questions. The items were asked as follows (the item

numbers are used here only to demonstrate the skip patterns used in this series of questions):

1a. Does this person have any of his/her own grandchildren under the age of 18 living in this house or apartment?

Yes

No---skip to question 2

1b. Is this grandparent currently responsible for most of the basic needs of any grandchild(ren) under the age of 18 who live(s) in this house or apartment?

Yes

No---skip to question 2

1c. How long has this grandparent been responsible for the(se) grandchild(ren)?

*If the grandparent is financially responsible for more than one grandchild, answer the question for the grandchild for whom the grandparent has been responsible for the longest period of time.*

Less than 6 months

6 to 11 months

1 or 2 years

3 or 4 years

5 or more years

**Item Nonresponse**

Item nonresponse occurs when an individual does not provide complete and usable information for a data item. Item allocation rates are often used as a measure of the level of item nonresponse. Allocation rates are computed as the ratio of the number of eligible people for which a value was allocated during the editing process for a specific item to the number of people eligible to have responded to that item.

***Fertility.*** For the 2004 ACS, the allocation rate for the single fertility item for women 15 to 50 years old was 1.7 percent. For the CPS, the allocation rate for the children-ever-born item for women 15 to 44 years old was 10.9 percent. Among women with one or more children ever born, the allocation rate for the date of birth of the last-born child was 18.1 percent. The need for two pieces of information to identify a birth in the last year in the CPS, including a specific month and year of the birth, may have affected the quality of the data.

***Grandparents.*** The 2004 ACS rules for assigning allocation flags for missing/inconsistent data on the grandparent items differed from those in either the C2SS or Census 2000. In the 2004 ACS, if a person answered that they were a coresident grandparent or left the item unanswered, and if they lived in a household where there was no person under 18 who could possibly be their grandchild, that person was assigned a "No" response and their response was flagged as being "assigned" for household consistency reasons. This situation was not treated as an allocated response.[5] For the

[5] Responses were given an answer based on household data (assigned) rather than a randomly imputed answer (allocated).

same situation in the C2SS and Census 2000, this same type of response was also assigned a "No" value but was treated as being "allocated," creating different allocation rates.

In the 2004 ACS, the allocation rate for the first grandparent item was 0.4 percent, compared with 4.6 percent in the C2SS and 6.0 percent in Census 2000. For the remaining two items, ACS item nonresponse was also lower, even though editing procedures and allocation assignments were more consistent. For the grandparent-responsibility item, the ACS allocation rate was 10.3 percent, compared with 17.6 percent in the C2SS and 15.3 percent in Census 2000. For the duration-of-responsibility item, the ACS allocation rate was 10.9 percent, compared with 19.7 percent in the C2SS and 17.8 percent in Census 2000.

A difference in data collection procedures could account for some of the differences in nonresponse rates. The ACS and C2SS data were partly collected using a CATI/CAPI instrument that had internal consistency checking routines, possibly reducing errors from being recorded in the field collection of the data. No CATI/CAPI instrument was used in the Census 2000 sample. In all three surveys, imputation rates for these items were generally higher than for other basic demographic items such as age, sex, and relationship. Whenever a person's age or relationship item in any of these surveys was imputed or altered, it opened the possibility that a grandchild would be created or changed to another relationship category, thus creating the potential for inconsistencies in reporting patterns.

One example would be a 3-year-old with a missing relationship category who is imputed to be the grandchild of the householder. Assigning that 3-year old to be a grandchild triggers a series of required answers, none of which were originally recorded and none of which would be accurate if the child were not, in fact, a grandchild. Hence, an imputation is flagged for this householder because a grandchild was imputed in the relationship editing step.

**Data Editing and Imputation Procedures**

The ACS, the CPS, C2SS, and Census 2000 edit and imputation rules are designed to ensure that the final edited data are as consistent and complete as possible. These rules are used to identify and account for missing, incomplete, and contradictory responses. In each case where a problem is detected, pre-established edit rules govern its resolution.

The four surveys employ two principal imputation methods: relational imputation and hot deck allocation. Relational imputation assigns values for blank or inconsistent responses on the basis of other characteristics on the person's record or within the household. Hot deck allocation supplies responses for missing or inconsistent data from similar responding housing units or people in the sample.

The editing procedures for all surveys employ logical checking routines to produce consistency among household members and other responses. For example, no person under age 30 can be a grandparent and no person can be a coresident grandparent if no one else in the household has a relationship category that would suggest that they are a

potential grandchild of the respondent. When answers cannot be logically assigned or when inconsistencies or missing data are encountered, allocation routines using hot decks generally stratify the donors and recipients of the hot deck by their age, sex, race, and other characteristics of the household. Because of differences in the sample size of these surveys, hot decks will vary in the level of detail and the frequency of updating the individual cells in the hot deck.

**Controls and Weighting**

There are notable differences among the surveys in the selection of controls and the calculation of weights that may lead to differences in estimates. The ACS, the CPS, C2SS, and Census 2000 samples are weighted to account for both the probability of selection and housing unit nonresponse.

After the initial weighting, data from the 2004 ACS, the C2SS, and the 2004 CPS were all controlled to be consistent with independent population estimates. Data from the 2004 ACS and C2SS were controlled at the county level to independent estimates of the population of individuals and housing units using July 2004 and April 2000 controls, respectively. The 2004 June CPS was controlled to independent national estimates of the civilian noninstitutionalized population in June 2004. Because the 2004 ACS and C2SS control to both the total population and the total number of housing units, both files contain both person weights and housing-unit weights. The CPS does not control to the total number of housing units and, thus, the CPS files do not contain an independent

housing-unit weight but instead use the weight of the householder as the weight of the housing unit.

After the application of the controls, the CPS data are raked to ensure that the number of husbands and wives are equal and that the number of married-couple households equals the number of married-spouse-present householders. The ACS currently employs no similar raking routine. The C2SS weighting procedure was the same as the 2004 ACS.

Estimates from the Census 2000 sample were obtained from an iterative ratio-estimation procedure that assigned a weight to each sample person. The estimation procedure used to assign the weights was performed in geographically defined weighting areas that were usually formed of contiguous geographic units within counties. Within a weighting area, the long-form sample was ratio-adjusted to equal the 100-percent total for certain categories such as family households or nonfamily households, age, sex, race, and Hispanic origin. This procedure resulted in weights for each person that could vary from person to person within the same housing unit.

## RESULTS

### Fertility

Table 1 indicates that the number of women who gave birth in the 12-month period prior to the survey date was about 350,000 more in the ACS than in the 2004 June CPS. Aside from differences in estimates resulting from differences in the reference period and the age universe, the CPS estimates of births typically fall below the level recorded in the

vital statistics system, even after accounting for some of the differences between survey-based and administrative record systems.[6]

The ACS estimate of 4,089,000 women who gave birth in the last 12 months is not statistically different from the preliminary estimate of births for calendar year 2004 made by the National Center for Health Statistics using the vital statistics registration system--4,116,000 births or approximately 4,050,000 women after accounting for births in multiple deliveries.[7] Because the ACS estimates of the number of women who gave birth is larger than the CPS estimates, the comparison of these two data sets will be presented in terms of the percentage distributions of women by their characteristics instead of the numbers of women in different population groups.

A majority of the percent differences shown in Table 1 are statistically significant at 0.5 percentage points or more, warranting further examination. The ACS data records a larger percentage of women 35 to 50 years old who gave birth in the past 12 months than does the CPS data (18.7 percent and 15.9 percent, respectively). As noted previously, the ACS includes women 35 to 50 years old in this category, while the CPS includes only women 35 to 44 years old. In recent years, vital statistics data indicate about 6,000 women aged 45 to 50 give birth each year out of 4 million (about 1.5 percent of all births), possibly accounting for the higher percentage of births in the 35-to-50 years age category in the ACS than in the CPS. At the same time, the CPS indicates a higher

[6] See the historical table on the annual estimate of births from the CPS and the vital statistics system at the Census Bureau webpage <www.census.gov/population/socdemo/fertility/tabM1.csv>
[7] See the 2003 and 2004 reports on births published in *National Vital Statistics Reports*, Vol. 54, Nos. 2 and 8 (Hyattsville, MD: National Center for Health Statistics, 2005).

proportion of births to teenage women (10.3 percent) than does the ACS (6.7 percent). It is not clear why these differences occur for this particular period.

The older age range of women who gave birth in the ACS may account for differences in other categories too. These categories include the "Now married," "Native," "In labor force," and higher educational attainment categories ("Some college or associate's degree," "Bachelor's degree," and "Graduate or professional degree"), which are likely to have higher percentages of older women. Slightly higher proportions of women with recent births are in these categories in the ACS than in the CPS.

For example, the ACS has a higher percentage of women in the "Now married" category than does the CPS (71.4 percent and 68.3 percent, respectively). Most women 45 to 50 years old are married, and births to this age group are excluded from the CPS universe, possibly giving the CPS a lower percentage of now-married respondents compared with the ACS.

Table 1 also notes a higher proportion of White alone women who gave birth in the last 12 months in the CPS (76.9 percent) than in the ACS (70.4 percent).[8]

[8] For a more detailed discussion of race definitions used in the ACS see the report "American Community Survey 2004 Subject Definitions" (Revised January 2006) www.census.gov/acs/www/Downloads/2004/usedata/Subject_Definitions.pdf

For race definitions used in the CPS see Jane Lawler Dye, "Fertility of American Women: June 2004," Current Population Reports, P20-555. U.S. Census Bureau, Washington, DC, 2005.

Differences in marital status may also be attributed to variation in the interviewing structure. The CPS requires personal or telephone contact between respondents and interviewers for all households, while personal or telephone contacts in the ACS are made only for follow-up to nonrespondent households. The presence or absence of an interviewer may affect the response patterns for these questions. As the majority of responses from ACS households are from mail-out/mail-back forms, most respondents see a list of possible responses to the marital status item (Now married, Widowed, Divorced, Separated, or Never married). On the other hand, all data in the CPS are collected via interviewer/respondent mode, either in-person or by telephone, where the interviewer reads the possible responses.

Other differences between the ACS and the CPS may be explained by discrepancies in the reference periods. As previously mentioned, the ACS estimates refer to women who gave birth in the 12-month period prior to the survey date (January to December 2004). In the CPS, births in the last 12-months were tabulated as those recorded between July 2003 and June 2004. Some of the small but statistically significant differences may reflect changes in fertility patterns from one year to the next.

Finally, differences in wording and the resultant complexity of responses may account for differences in reporting between the two surveys. To determine if a woman gave birth in the last 12 months, two questions are used in the CPS compared with the single question used in the ACS. The higher imputation rates on the items used to derive the estimates in the CPS may adversely affect both the number of estimated births in the last year and

data on the characteristics of the women if imputation rates differ among population groups.

**Comparison of Grandparents Data**

Table 2 compares data on grandparents from three surveys: the 2004 ACS, the C2SS, and Census 2000. Results from the 2004 ACS are expected to differ from those from C2SS and the Census sample because the data were collected 4 years apart. No comparable series of grandparent items has ever been placed on a CPS supplement. Despite this difference in years, the data are fairly consistent. Overall, all three data sets indicate that about 5.6 million to 5.8 million grandparents lived with their grandchildren, of whom about 2.4 million were primarily responsible for the grandchildren.

**Grandparents Living with Grandchildren**

Table 3 presents data on grandparents living with grandchildren. While the overall results from the ACS and the Census compare favorably--given the difference in years--a few statistically significant differences of 0.5 percentage points or more are noted in the "Race and Hispanic Origin" category.[9] Principally, the ACS data indicate a higher proportion of co-resident grandparents who reported that they were the single-race group White and a lower proportion of co-resident grandparents who reported that they were the single-race group Black or African American than were recorded in Census 2000 estimates. The population of grandparents living with grandchildren is smaller than many other populations (for example, married-couple family households), possibly resulting in

[9] Comparisons by race between the ACS and Census 2000 data should be treated with caution because of potential differences in editing routines used by the two surveys.

estimates that are more sensitive to yearly fluctuations. Both the ACS and the Census sample indicate that almost two-thirds of all co-resident grandparents are grandmothers.

**Grandparents Responsible for Grandchildren**

Table 4 presents data on grandparents responsible for their grandchildren. Results from the ACS and the Census are again consistent--given the difference in years. Statistically significant differences of 0.5 percentage points or more are again noted in the "Race and Hispanic Origin" category, with proportionately more single-race White grandparents responsible for their grandchildren shown in the ACS than in Census 2000. This is the same pattern found in Table 3 when comparing the characteristics of all grandparents. No statistical differences were found between the ACS and Census 2000 percent distributions by the sex of the grandparent or their poverty status.

**SUMMARY**

Data from the 2004 American Community Survey (ACS) on fertility and grandparents are consistent with those from the 2004 June Fertility Supplement to the Current Population Survey (CPS), the Census 2000 Supplementary Survey (C2SS), and Census 2000. The principal difference noted in this paper for fertility data is the higher proportion of women with recent births in the ACS than in the CPS who are in population groups associated with older ages. Data from the ACS for the number of women with births in the last 12 months came closer to annual birth levels reported by the National Center for Health Statistics than did data from the Current Population Survey, even after accounting for differences in data collection procedures. For grandparent data, the

principal difference noted is the higher proportion of single-race White grandparents in the ACS than in Census 2000.