GRANDPARENTS LIVING WITH AND PROVIDING CARE FOR GRANDCHILDREN: A COMPARISON OF DATA FROM CENSUS 2000 AND 2000 AMERICAN COMMUNITY SURVEY

Jane Lawler Dye, Fertility and Family Statistics Branch
U.S. Census Bureau, Population Division, FB 3, Room 2353, Washington DC 20233-8500

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1. Introduction[1]

New data from the Census 2000 estimated that 5.6 million[2] grandparents were living with grandchildren in the United States and a significant percentage of them were responsible for the care of their grandchildren. This paper will compare grandparents response items on Census 2000 and the American Community Survey (ACS) 2000. Data was evaluated to determine the extent to which the ACS was successful in replicating long form Census data for this special population. Three levels of geography were examined: national, state and the 31 ACS counties selected for test sites. The response items are based on questions answered by the population who were age 30 and over in 2000. Respondents were asked if they were living with their own grandchild(ren) under the age of 18. Those who answered Ayes@ were asked if they were responsible for most of the basic needs of their coresident grandchildren and how long they had been responsible for them. Findings suggest that the differences between Census and ACS grandparents' data seem reasonable and small given sampling error. However, the 90 percent confidence intervals around the ACS estimates are large for smaller areas, making the usefulness of such data be questionable. Several explanations of the differences in estimates based on the two surveys are explored.

1. This paper reports the results of research and analysis undertaken by the U.S. Census Bureau staff. It has undergone a Census Bureau review more limited in scope than that given to official Census Bureau publications. This report is released to inform interested parties of ongoing research and to encourage discussion of work in progress.
2. All Census 2000 estimates in this report are based exclusively on sample data. Although some of the reported characteristics are also available from the 100% data, grandparent data – the essential focus of this report – are only available for the people in the sample. As a result, sample data is used to estimate characteristics for consistency.

Estimates are weighted to represent the population. As with all surveys, estimates may vary from the actual values because of sampling variation or other factors. Explicit comparisons made in this report have undergone statistical testing and are significant at the 90-percent confidence level, unless otherwise noted.

2. Background

The American Community Survey (ACS) was designed to replace the long form of the decennial census and consequently collected the same information as Census 2000 on grandparent caregivers. This paper seeks to identify the differences between the two sources of data on grandparent caregivers, while investigating potential areas for improvement with respect to data collection, data quality, mail response, and imputation rates.

The ACS represents the biggest change in federal data collection in 50 years. With the ACS, we are implementing a new paradigm where relevant, timely and detailed long form type data will be available every year for most geographic areas. In contrast to the once-a-decade sample data provided by the census long form (an approximate 1-in-6 sample of households), the annual ACS will significantly increase the timeliness of the long form data while reducing respondent burden, as only about 2.5 percent of the population will be surveyed each year.

The development of the ACS began with four test sites and expanded to 31 test sites throughout the late 1990s. The Census Bureau conducted the Census 2000 Supplementary Survey (C2SS) evaluation study to test the concept and operational feasibility of conducting the ACS nationally at the same time as Census 2000. The C2SS consisted of a sample in 1,203 counties that collected information using essentially the same questions as the census long form. This evaluation study provided important information about the operational feasibility of converting from the long form to the American Community Survey. Furthermore, now we are able to investigate the quality of the data obtained from the 31 ACS sites and the national C2SS data compared with Census 2000 long form data. The ACS and C2SS combined (simply referred to as 2000 ACS from this point on) provided nationally representative data comparable to Census 2000 long form data.

This paper compares items on Census 2000 and 2000 ACS on the topic of grandparents caring for their coresident grandchildren. The U.S. Census Bureau, in complying with federal legislation enacted by the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996, collected information in Census 2000 about grandparents who have primary responsibility for the care of their grandchildren. Data were evaluated to determine the

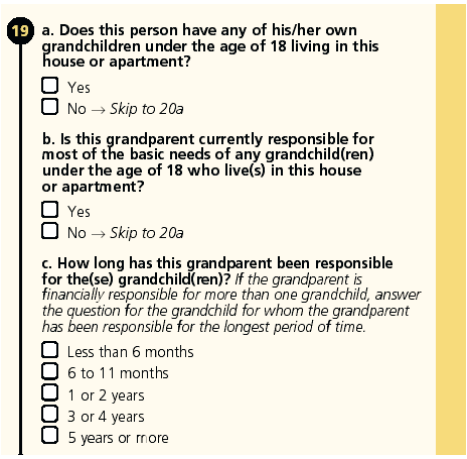
extent to which the 2000 ACS was successful in replicating long form Census data for this special population by examining sampling rates, non-response follow-up, allocation rates, and edit procedures. Three levels of geography were examined: national, state and county.

The questions on grandparent care were equivalent on both surveys. To reduce the number of skip patterns on the questionnaire, respondents age 15 and over were asked if they were living with their own grandchild(ren) under the age of 18 (Figure 1). Those who were under age 30 were considered out of universe in the edited data. Since the PRWORA legislation required the identification of grandparents who are "providing a home" for a grandchild, subsequent questions asked if the grandparent had the primary responsibility for providing the basic needs of the grandchild. Situations in which a grandparent provided childcare while the child was still primarily under their parent's care should not be included. Those who answered that they were living with a grandchild were then asked if they were responsible for most of the basic needs of their coresident grandchild and how long they had been responsible for them. The aim of these questions is to distinguish between households in which the grandparent temporarily provides a home for a grandchild for a few weeks or months and households in which a grandparent provides a home for a grandchild on a more permanent basis and serves as the primary caregiver for the grandchild. These questions identify both short and long-term living arrangements for minor grandchildren in terms of the duration of time the coresident care was provided.

3. Methods

Data collection for the 2000 ACS began in January of 2000 in 1203 counties and ran through December of 2000. The workload for the C2SS and ACS test sites combined was approximately 870,000 addresses, about 0.8 percent of households in 2000. When fully implemented in 2004, about 2.5 percent of the population will be surveyed every year for the ACS. The 2000 ACS sample was drawn from the Master Address File (MAF) and questionnaires were mailed out. Those who did not return their survey in the mail received another questionnaire about 3 weeks later. Those who did not respond and for which telephone numbers were available were contacted by phone for a Computer Assisted Telephone Interview (CATI). Finally, a subsample of remaining nonrespondents (1-in-3) were contacted in person for a Computer Assisted Personal Interview (CAPI). CATI and CAPI make up our non-response follow-up (NRFU) procedures. The 2000 ACS used permanent, well-trained field staff to collect the data in NRFU. The 2000 ACS weighted response rate was 95.4 percent including responses from all of these data collection methods. When the ACS is fully implemented, data will be available every year. The estimates for the geographies with fewer than 65,000 people will be based on 3 and 5 year averages and will be updated every year.

Figure 1. Reproduction of the questions on grandparents living with grandchildren from Census 2000


19 **a. 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 20a*

b. 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 20a*

c. 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 years or more

Source: U.S. Census Bureau, Census 2000 questionnaire.

For Census 2000, survey activity was centered around one point in time, the Census Day of April 1, 2000. The sample was about 1-in-6 of all households in the United States. There was considerable publicity and urging the population to complete the forms. A Field Representative (FR) subsequently visited those who didn't return the surveys in the mail for NRFU. The FR administered the census long form on paper to the households that could be reached. If the FR was unable to contact someone in the household, they asked a neighbor for proxy information about the residents within the household. Many of the field staff in the Census were short-term employees hired just to collect Census 2000 data. They underwent different training procedures than the permanent field staff used for 2000 ACS. Furthermore, decennial census data are only available once every 10 years and the sample data, which contains the grandparent items, took about 2 years to be processed and released.

In both 2000 ACS and Census 2000, when questions were not answered and data was missing or the answers were inconsistent with other responses on the questionnaire, edit and allocation procedures were employed to correct inconsistencies or impute missing responses. Slightly different imputation methods were

used, as Census 2000 data on the ages (in months) and relationship of people in the household (including nephews/nieces) were collected in greater detail than on the 2000 ACS. However, the basic principles of ensuring consistent responses between the respondents' answers and the presence of other people in the household, based on the age and relationship, were similarly employed. Still, the census imputation results benefited from having this greater detail in getting a tighter identification of the presence of a grandchild and duration of care. Overall, for basic population items the 2000 ACS imputation rates were significantly lower than Census imputation rates (Griffin, et al, 2002).

The 2000 ACS sampling errors were higher than for Census 2000 because the 2000 ACS surveyed a smaller sample of the population. Therefore, it is expected that smaller places, especially those of less than 65,000 population, will have higher variances in the 2000 ACS than in Census 2000. In addition to the variability that arises from sampling procedures, nonsampling error may be introduced during any of the various complex operations used to collect and process data. Nonsampling error is not accounted for in the variance estimates.

4. Findings

4a. National Level Data

The results of the two surveys portray a similar picture of coresident grandparent caregiving at the national level. The 2000 ACS estimated 5.6 million grandparents living with grandchildren, slightly less than the Census 2000 estimate of 5.8 million (Table 1). Although these numbers are statistically different, the 90 percent confidence interval around the 2000 ACS estimate (5,485,845 to 5,677,723) was not far from the Census 2000 confidence interval (5,761,261 to 5,782,081). These survey samples at the national level are so large that almost every estimate from one will be statistically different from the other; however, these differences are typically less than 1 percent and are therefore not meaningful in a substantive way.

Nationally, the 2000 ACS estimated that 2.35 million grandparents were responsible for most of the basic needs of their coresident grandchildren, compared with 2.43 million in Census 2000. The differences between these two estimates could not be accounted for by sampling error alone, as the standard error for the 2000 ACS estimate was 34,606, compared with the standard error for Census 2000 of 4,148. These estimates may vary due to data collection, data processing, or other sources of nonsampling error.

The Census 2000 and 2000 ACS national estimates for the percentage of grandparents living with grandchildren are similar. Census 2000 estimated that 3.6 percent of the population age 30 and over were grandparents living with grandchildren, compared with 3.5 percent in the 2000 ACS. Although significant, a one-tenth-percentage point difference is not practically meaningful. In contrast, the two estimates for the percentage of coresident grandparents responsible for grandchildren were not significantly different. Census 2000 estimated that 42.0 percent of grandparents living with grandchildren were responsible for their care, compared with 42.2 percent in 2000 ACS.

Table 1. Grandparents Living with Grandchildren, Responsibility and Duration of Care in the United States: Census 2000 and 2000 ACS
(Data based on sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see www.census.gov/prod/cen200/doc/sf3.pdf and www.census.gov/acs/www/Downloads/C2SS/Accuracy00.pdf.)

	Census 2000			2000 ACS		
	Estimate	Lower bound[1]	Upper bound[1]	Estimate	Lower bound[1]	Upper bound[1]
Grandparents living with grandchildren	5,771,671	5,761,261	5,782,081	5,581,784	5,485,845	5,677,723
Percent of the population 30 and older	3.63	3.62	3.64	3.52	3.49	3.55
Grandparents responsible for coresident grandchildren	2,426,730	2,419,907	2,433,553	2,352,724	2,295,797	2,409,651
Percent of coresdient grandparents	42.05	41.92	42.17	42.15	41.70	42.60
Percent distribution of time responsible						
Total	100.00			100.00		
Less than 1 year	22.90	22.73	23.07	22.88	22.29	23.47
1-2 years	23.22	23.05	23.39	24.05	23.45	24.65
3-4 years	15.42	15.28	15.57	17.68	17.14	18.22
5 or more years	38.46	38.27	38.66	35.38	34.71	36.05

1. Lower and Upper bounds are based on 90% confidence intervals.

Source: U.S. Census Bureau, Census 2000 SF-3 special tabulations and 2000 ACS detailed tables.

Both Census 2000 and 2000 ACS estimated that 22.9 percent of coresident grandparents responsible for grandchildren were responsible for them for less than one year. Census estimated 23.2 percent responsible for 1 to 2 years, compared with 24.1 percent in 2000 ACS. Census estimated 15.4 percent responsible for 3 to 4 years, compared with 17.7 in 2000 ACS. Finally Census estimated 38.5 percent responsible for 5 or more years, compared with 35.4 percent in 2000 ACS. All of these comparisons, except for those responsible less than one year were significantly different. Basically, at the national level, the two sources of data yield comparable results although some estimates show small, statistically significant differences.

4b. State Level Data

Analyzing the differences in the data from smaller geographies gives more depth to the study. However, data from smaller geographic areas are less reliable. Michigan and Arizona are two large states with different types of populations and places where grandparents caring for grandchildren reside (Table 2).

Table 2. Selected Characteristics of Grandparents Living With Grandchildren in the United States by State Census 2000 and 2000 ACS.
(Data based on sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see www.census.gov/prod/cen200/doc/sf3.pdf and www.census.gov/acs/www/Downloads/C2SS/Accuracy00.pdf.)

	Census 2000				2000 ACS			
	Grandparents living with grandchildren		Grandparents responsible for coresident grandchildren		Grandparents living with grandchildren		Grandparents responsible for coresident grandchildren	
Area	Number	Percent of population aged 30 and older	Percent responsible[1]	Percent responsible 5 or more years[2]	Number	Percent of population aged 30 and older	Percent responsible[1]	Percent responsible 5 or more years[2]
UNITED STATES	5,771,671	3.6	42.0	38.5	5,581,784	3.5	42.2	35.4
Region								
Northeast	1,006,496	3.2	34.3	40.1	970,870	3.1	36.8	40.1
Midwest	991,295	2.7	44.4	36.0	1,035,544	2.8	43.4	32.9
South	2,302,754	4.1	48.3	40.5	2,208,464	3.9	47.6	36.0
West	1,471,126	4.3	36.0	35.3	1,366,906	4.0	36.1	32.9
State								
Alabama	100,765	4.0	55.9	43.4	88,188	3.5	58.0	30.6
Alaska	10,423	3.2	52.0	38.5	9,818	3.0	51.0	25.5
Arizona	114,990	4.1	45.4	32.2	109,255	3.9	46.0	32.1
Arkansas	57,895	3.8	58.1	39.7	55,224	3.6	59.8	40.9
California	928,290	5.1	31.8	36.6	859,394	4.7	33.4	34.6
Colorado	66,903	2.8	42.6	35.1	63,828	2.7	38.3	34.2
Connecticut	55,489	2.7	34.1	38.7	58,409	2.9	32.1	40.6
Delaware	16,689	3.7	43.2	45.3	20,435	4.5	41.4	42.1
District of Columbia	16,842	5.3	48.6	53.4	16,611	5.2	49.9	52.4
Florida	345,949	3.5	42.7	39.7	325,903	3.3	40.0	35.9
Georgia	193,825	4.4	47.6	40.6	198,295	4.5	43.1	33.8
Hawaii	49,237	7.0	28.5	44.4	44,692	6.4	25.8	35.3
Idaho	17,447	2.5	46.5	29.5	18,656	2.7	48.7	27.4
Illinois	258,038	3.7	40.2	38.3	260,331	3.8	38.8	34.1
Indiana	96,169	2.8	50.1	36.8	103,125	3.0	41.1	37.4
Iowa	28,201	1.7	46.4	30.9	32,579	2.0	46.2	33.8
Kansas	35,274	2.4	50.7	31.7	38,701	2.6	58.6	23.2
Kentucky	69,504	3.0	51.5	39.6	80,969	3.5	52.1	32.6
Louisiana	122,240	5.1	54.9	41.1	111,282	4.6	57.2	33.4
Maine	13,053	1.7	38.9	34.5	15,125	1.9	42.9	31.4
Maryland	125,697	4.1	40.6	45.4	121,322	3.9	43.9	33.0
Massachusetts	98,325	2.6	28.4	37.3	89,835	2.4	34.8	40.6
Michigan	166,705	3.0	42.0	34.9	170,912	3.0	39.2	36.0
Minnesota	45,217	1.6	39.1	29.9	47,013	1.7	39.3	36.0
Mississippi	84,157	5.5	57.1	41.2	71,418	4.7	54.2	36.1
Missouri	90,200	2.8	48.7	36.9	110,941	3.5	47.9	33.9
Montana	11,098	2.1	54.5	33.0	12,057	2.3	50.7	30.8
Nebraska	17,401	1.8	48.6	31.1	16,707	1.8	50.2	20.4
Nevada	45,286	4.0	41.3	34.4	41,465	3.6	45.2	14.8
New Hampshire	14,660	2.0	30.9	34.8	17,346	2.3	33.1	21.9
New Jersey	185,771	3.7	31.6	42.7	159,149	3.2	36.2	38.1
New Mexico	46,014	4.6	52.2	36.7	39,336	3.9	47.2	36.3
New York	412,000	3.8	34.7	40.8	410,829	3.8	34.7	40.3
North Carolina	160,576	3.5	49.7	42.9	155,530	3.4	56.4	38.3
North Dakota	4,645	1.3	54.8	29.4	4,734	1.3	64.8	43.1
Ohio	185,443	2.8	46.4	38.2	183,472	2.8	46.4	29.5
Oklahoma	67,194	3.5	58.5	37.5	59,871	3.1	50.5	32.5
Oregon	51,169	2.6	43.2	32.1	45,074	2.3	32.5	28.6
Pennsylvania	204,909	2.8	39.2	39.3	197,196	2.7	44.2	43.8
Rhode Island	16,957	2.8	29.8	34.3	17,276	2.8	28.8	23.2
South Carolina	99,558	4.4	52.0	44.6	98,454	4.4	54.8	42.7
South Dakota	8,019	1.9	57.8	38.3	5,470	1.3	47.1	29.7
Tennessee	119,968	3.7	51.1	41.4	108,890	3.3	42.2	44.8
Texas	551,047	5.1	46.7	36.8	527,275	4.8	45.5	35.5
Utah	39,564	3.9	40.4	29.8	29,419	2.9	31.3	18.3
Vermont	5,332	1.5	36.3	35.0	5,705	1.6	50.1	31.2
Virginia	140,015	3.4	42.5	42.3	131,530	3.2	46.3	38.5
Washington	84,592	2.5	41.8	30.7	87,899	2.6	40.3	35.1
West Virginia	30,833	2.8	52.4	40.4	37,267	3.4	51.1	21.2
Wisconsin	55,983	1.8	42.3	30.3	61,559	2.0	49.4	30.6
Wyoming	6,113	2.2	58.6	33.1	6,013	2.2	53.7	30.2

1. Percent based on all grandparents living with grandchildren.
2. Percent based on all grandparents responsible for coresident grandchildren.
Source: U.S. Census Bureau, Census 2000 SF-3 special tabulations and 2000 ACS detailed tables.

Based on Census 2000, in Arizona, the percentage of the population living with grandchildren was larger than in Michigan (4.1 and 3.0 percent of the 30 and over population, respectively). In Arizona, the percentages from the two data sources were 2000 ACS estimate of 3.9 percent and Census estimate of 4.1 percent, not a significant difference. In Michigan, both Census and 2000 ACS estimated 3.0 percent of the 30 and over population living with grandchildren.

Now we turn to the percentage of grandparents who were responsible for coresident grandchildren in Arizona and Michigan. In Arizona, the 2000 ACS estimated the percentage of coresident grandparents responsible for grandchildren as 46.0 percent, compared with Census estimate of 45.4 percent, not a significant difference. In Michigan, the 2000 ACS estimated the percentage of grandparents responsible for grandchildren at 39.2 percent, a significant difference when compared with 42.0 percent based on Census 2000. To be more concise this analysis is restricted to state data for the grandparents responsible for 5 years or more, as this is an important measure of long-term grandparent caregivers. Both measures of long-term grandparent caregiving in Arizona were about 32.0 percent. In Michigan, the two estimates of grandparents responsible 5 or more years were not significantly different - 36.0 percent in 2000 ACS compared to 34.9 percent in Census 2000.

Next, we will look at two smaller states with diverse populations, Kentucky and Maine. In Kentucky, the census estimated that 3.0 percent of the population 30 and over were grandparents living with grandchildren, compared with 3.5 percent based on 2000 ACS, a significant difference. In Maine, the percentages were not statistically different, 1.7 and 1.9 percent, respectively. The percentages of coresident grandparents responsible for grandchildren in Kentucky were 51.5 percent based on Census 2000 and 52.1 percent from the 2000 ACS, not a significant difference. In Maine the corresponding estimates were also not significantly different, 38.9 percent and 42.9 percent. The percentage of coresident grandparents responsible for 5 years or more were 34.5 percent based on Census 2000 and 31.4 percent from the 2000 ACS in Maine, not a significant difference. Finally, the census estimated 39.6 percent of coresident grandparents in Kentucky were responsible for 5 years or more, a significant difference compared with 32.6 percent based on the 2000 ACS.

4c. ACS Site Level data

The national data for the Census 2000 Supplementary Survey included smaller levels of geography from the 31 test sites used in the ACS. As we move to smaller levels of geography the data become increasingly variable. As a result, it is not possible to draw general conclusions. Table 3 displays county-level estimates for Census 2000 and 2000 ACS, although none of these comparisons are statistically significant.

At the county level, Census 2000 and 2000 ACS present different pictures of grandparents living with grandchildren, especially for the smaller ACS

Table 3. Selected Characteristics of Grandparents Living With Grandchildren for 2000 American Community Survey Sites[1] and Comparable Counties fr
(Data based on sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see www.census.gov/prod/cen200/doc/sf3 and www.census.gov/acs/www/Downloads/C2SS/Accuracy00.pdf.)

	Census 2000				2000 ACS			
	Grandparents living with grandchildren		Grandparents responsible for coresident grandchildren		Grandparents living with grandchildren		Grandparents responsible for coresident grandchildren	
Area	Number	Percent of population aged 30 and older	Percent responsible[2]	Percent responsible 5 or more years[3]	Number	Percent of population aged 30 and older	Percent responsible[2]	Percent responsible 5 or more years[3]
Pima County, Arizona	18,399	3.9	46.0	29.4	17,495	3.7	43.7	37.7
Jefferson County, Arkansas	2,880	6.5	53.1	38.3	2,280	5.1	72.3	43.9
San Francisco County, California	19,838	4.0	27.6	40.3	17,695	3.6	28.6	38.2
Tulare County, California	11,832	6.7	34.5	28.9	9,611	5.5	43.1	28.1
Broward County, Florida	34,557	3.4	37.6	43.4	32,198	3.2	37.0	26.5
Lake County, Illinois	10,127	2.9	32.5	35.2	11,001	3.1	38.5	32.1
Black Hawk County, Iowa	1,604	2.3	42.3	32.1	1,498	2.2	38.6	25.4
Calvert County, Maryland	1,879	4.3	26.7	38.8	1,880	4.3	32.1	48.0
Hampden County, Massachusetts	7,539	2.9	37.7	39.1	7,884	3.0	38.1	40.4
Madison County, Mississippi	1,961	4.9	50.2	43.6	1,337	3.4	33.7	41.3
Flathead/Lake Counties, MT	1,197	2.0	47.7	34.0	1,104	1.8	48.6	64.7
Douglas County, Nebraska	6,025	2.4	47.6	36.6	6,296	2.5	44.8	31.2
Bronx County, New York	43,827	6.6	43.3	43.7	40,728	6.1	42.3	40.6
Rockland County, New York	6,100	3.7	19.2	42.5	5,983	3.7	19.5	49.4
Franklin County, Ohio	17,163	3.0	48.9	38.2	16,051	2.8	47.0	36.1
Multnomah County, Oregon	9,705	2.6	39.6	30.6	10,015	2.7	35.0	32.8
Schuylkill County, Pennsylvania	2,184	2.3	39.2	39.0	1,850	2.0	36.2	31.6
Sevier County, Tennessee	1,358	3.1	52.7	37.6	1,447	3.3	54.2	64.3
Fort Bend/Harris Counties, TX	100,746	5.2	42.6	38.9	91,704	4.7	47.2	26.5
Starr/Zapata Counties, TX	2,853	9.6	42.7	34.7	3,053	10.2	61.1	40.6
Yakima County, Washington	5,480	4.8	43.4	30.7	4,076	3.6	38.9	26.6

1. Only the data from the 21 ACS sites that were publically released were used here.
2. Percent based on all grandparents living with grandchildren.
3. Percent based on all grandparents responsible for coresident grandchildren.
Source: U.S. Census Bureau, Census 2000, Summary File 3, American Community Survey (ACS) 2000 detailed tables.

sites, although none of these comparisons are statistically significant (Table 3). For example, in San Francisco County, CA (one of the larger sites), the census estimated that 4.0 percent of the population aged 30 and over were living with grandparents, compared with 3.6 percent from 2000 ACS. Whereas, in Madison County, MS, (one of the smaller sites) census estimated 4.9 percent of the population aged 30 and over were living with grandchildren compared with 3.4 percent from 2000 ACS. For grandparents responsible for grandchildren in Madison County the two surveys seem to portray a very different story. Based on the census data coresident grandparents were much more likely to be responsible for grandchildren than based on the 2000 ACS data (50.2 and 33.7 percent, respectively). For the longest duration category of responsible 5 years or more, Census 2000 estimated 43.6 percent of coresident grandparents responsible for 5 years or more compared with 41.3 percent based on the 2000 ACS.

5. Possible Explanations for Differences in Estimates

Table 4 illustrates that despite identical wording of the grandparent questions on both surveys, other design and implementation factors contributed to variable survey estimates. Differences exist with respect to sample size, time frame, collection type, training and experience of Field Representatives (FRs), use of proxy data, nonresponse follow-up methods, item nonresponse follow-up and the edit and imputation procedures.

Table 4. Possible Reasons for Differences in Census 2000 and 2000 ACS Grandparent Data

	Census 2000	2000 ACS
Questions	same	same
Sample size	approximately 17 percent of households	0.8 percent of households
Time frame	April 1, 2000	monthly cycles over 12 months in 2000
Mode of Collection	Higher mail response rate	more NRFU
FR Training and experience	new, temporary employees who administer the survey during Census year	more experienced FRs who administer the survey over and over
Proxy responses	allowed people who were not household members to respond	Did not use proxy data
Computerized/Paper Non-Response Follow-Up (NRFU) Data Collection	FR filled out paper form	FR used computerized (CATI/CAPI) instrument
Item non-response follow-up	No	Yes
Edits and imputation	more detailed relationship categories and age in months	less detailed age and relationship data

5a. Difference in Sample Sizes

Census 2000 sampled approximately 1-in-6 households, compared with about 0.8 percent of households for the 2000 ACS. However, even while using a smaller sample, comparisons of the 2000 ACS with Census 2000 percentages of grandparents living with grandchildren indicate that the 2000 ACS did very well in producing similar patterns of data for the Nation and large states. Although many of the estimates are statistically different, the differences (of only 1 or 2 percent) are often not meaningful for users of data on grandparent caregivers. Since, larger areas (with bigger samples) have estimates that are closer to Census 2000 than smaller areas, the 2000 ACS will be even better when we survey 250,000 addresses per month beginning in 2004 for the fully implemented American Community Survey.

5b. Difference in Timing

Census 2000 was based on where people were living on April 1, 2000. The 2000 ACS, on the other hand, asked for the usual residence of household members within the last 2 months. The 2000 ACS was conducted throughout all 12 months, in monthly cycles.

5c. Difference in Mode of Response

Modal differences between Census and 2000 ACS grandparent data may shed more light on the analysis. The 2000 ACS had substantially lower percentages of grandparents responding to the survey by mail return than Census (explained in more detail below).

In the 2000 ACS, among the 5.6 million grandparents living with grandchildren, about 2.8 million responded by mail, 700,000 responded by CATI, and a 1-in-3 subsample of the remaining 2 million responded by CAPI. Nonresponse follow-up (referred to as NRFU hereafter) consisted of the CATI and CAPI data collection methods combined. Grandparents living with grandchildren had a mail response rate of 50.7 percent for 2000 ACS, compared with 92.1 percent for Census 2000. Only 7.9 percent of this Census data was collected by NRFU, compared with 49.3 percent in 2000 ACS. Furthermore, the 1-in-3 subsampling done for CAPI contributed to the large variances associated with grandparents' data in the 2000 ACS. Similar differences between Census 2000 and 2000 ACS grandparent data by mode exist for all three grandparent questions.

Differences in mode of response could be due

to a myriad of issues, such as publicity, having already returned a Census short form or other characteristics of grandparents. It is possible differences exist because these grandparents were disabled and couldn't answer the form or maybe they didn't speak English. Other characteristics associated with greater NRFU are poverty, low income, and low educational attainment. These are people who tend to be less willing or able to complete and return the survey. Plus, the census included much more media exposure that may have made a big difference in response rates, especially via mail. Personal characteristics or circumstances combined with the significant publicity of the census could lead to differences in response behavior.

For example, grandparents living with grandchildren in the 2000 ACS differ by certain characteristics and the mode of response. Disability status seems to have made a small but significant difference in mode of response. Coresident grandparents who spoke another language besides English in their home were significantly more likely to respond by NRFU as opposed to mail returns. The most striking characteristic, however, was that grandparents in poverty were 1.7 times less likely to respond by mail than NRFU.

5d. Difference in FR Training and Experience

Data from NRFU may tend to be more accurate from 2000 ACS because they used trained Field Representatives (FRs) and computers to get the data. For Census 2000 long form data, the FRs were short-term employees. In contrast, for the 2000 ACS the FRs were trained in small groups over a longer period of time, many were experienced interviewers who were conducting the survey over and over every month. This may lead to relatively fewer errors in the NRFU data collection in 2000 ACS compared to Census 2000. In addition, the 2000 ACS used computerized surveys on laptops and the census interviewers used paper forms, which could have increased the likelihood for interviewer error. However, the 2000 ACS NRFU only included a 1/3 subsample, so the variance for each estimate is larger. This plus the larger percentage of NRFU respondents in 2000 ACS accounts for the very large confidence intervals around estimates of grandparents living with grandchildren.

5e. Difference in Imputation Procedures

Imputation rates for Census 2000 and 2000 ACS are relatively small for grandparents living with grandchildren. The edit and imputation procedures in both surveys did not allow people to claim to be a coresident grandparent if there was no potential grandchild in the household. For grandparents living with grandchildren the imputation rate for the 2000 ACS was 4.6 percent (Table 5), compared with Census 2000 imputation rate of 6.0 percent. For the item asking if the coresident grandparents were responsible for their grandchildren, the imputation rates were higher: 17.6 percent in 2000 ACS for responsibility, compared with 15.3 percent in Census 2000. Finally, only grandparents who were identified as responsible for grandchildren were assessed for the duration of time responsible. The imputation rate for length of time responsible in the 2000 ACS was 19.7 percent, compared with 17.8 percent in Census 2000. It should be noted that in the majority of cases where the responsibility item was imputed, so was the duration of time item, accounting for the similarly high levels of imputation for both items in both surveys.

5f. Imputation Rates by Mode

Table 6 shows that 155 million weighted respondents age 30 and over responded by mail for Census 2000, compared with 101 million for the 2000 ACS. While the census did much better than the 2000

Table 5. Imputation Totals and Rates for Grandparent Response Items in the United States: Census 2000 and 2000 ACS

	Census 2000		2000 ACS	
	Number	Percent	Number	Percent
Total population age 30 and over--	158,881,037		158,752,748	
Imputed grandparents living with grandchildren	9,520,738	6.0	7,328,853	4.6
Living with grandchildren under 18 years--	5,771,671		5,581,784	
Imputed grandparents responsible for grandchildren	881,209	15.3	984,520	17.6
Grandparent responsible--	2,426,730		2,352,724	
Imputed length of time responsible	431,353	17.8	464,412	19.7

Source: U.S. Census Bureau, Census 2000 SF-3 special tabulations and 2000 ACS detailed tables.

ACS in getting people to respond by mail, the computer assisted NRFU used in 2000 ACS enabled us to collect relevant data anyway. In Census 2000, only 3 million respondents age 30 and over did not return their Census form by mail and were therefore included in NRFU. Of this group, 13.3 percent (or about 431,000) responses for the question asking if grandparents lived with their own grandchildren under 18 were imputed. For 2000 ACS, 58 million people age 30 and over did not respond by mail. However, only 2 percent (or about 1 million) NRFU respondents in the 2000 ACS were imputed. The computerized instruments used to collect NRFU data for the 2000 ACS isolated the respondents who should have answered the first question those age 30 and over who had a child under 18 living in the same household. Census 2000 did not have the benefit of using this computer technology. The percent of responses imputed for the questions on responsibility and duration are similarly high, ranging from 14 to 23 percent from both surveys. The imputation methods employed in both surveys relied on age, relationship and household data to impose restrictions on responses that were impossible. Higher imputation rates indicate that the unedited data collected included more impossible responses. Since the imputation rates for the grandparent items are high for both surveys and for all modes of response, this suggests that the questions were confusing to respondents and interviewers alike

Table 6. Imputation Rates by Mode for Grandparents Response Items in the United States: Census 2000 and 2000 ACS

	Census 2000	2000 ACS
Total population age 30 and over	158,881,037	158,752,748
Total Imputed Grandparents living with grandchildren	9,520,738	7,328,853
Percent imputed	6.0	4.6
Mail[1]	154,921,909	100,802,781
Imputed - Mail	8,361,611	6,179,301
Percent imputed	5.4	6.1
Nonresponse follow-up[1]	3,229,635	57,949,967
Imputed - Nonresponse follow-up	430,812	1,149,552
Percent imputed	13.3	2.0
Total Grandparents living with own grandchildren under 18 years:	5,771,671	5,581,784
Total Imputed Grandparents responsible for grandchildren	881,209	984,520
Percent imputed	15.3	17.6
Mail[1]	5,265,235	2,829,745
Imputed - Mail	755,989	559,644
Percent imputed	14.4	19.8
Nonresponse follow-up[1]	453,546	2,752,039
Imputed - Nonresponse follow-up	72,327	424,876
Percent imputed	15.9	15.4
Total Grandparents responsible for own grandchildren	2,462,730	2,352,724
Total Imputed Duration of Grandparents responsible for grandchildren	431,353	464,412
Percent imputed	17.5	19.7
Mail[1]	2,259,431	1,170,727
Imputed - Mail	387,595	239,629
Percent imputed	17.2	20.5
Nonresponse follow-up[1]	159,479	1,181,997
Imputed - Nonresponse follow-up	35,938	224,783
Percent imputed	22.5	19.0

1. Census 2000 data by mode excludes 729,493 responses for the population age 30 and over and 52,893 responses where grandparents lived with grandchildren where mode was missing.
Source: U.S. Census Bureau, Census 2000 SF-3, special tabulations and 2000 ACS special tabulations.

5g. Interpretation of the questions

Although the technology used for NRFU in 2000 ACS was able to direct the inflow of potential grandparents to the question correctly, reducing interviewer and respondent error, people did not seem to understand what was being asked of them in the grandparent questions. People who had grandchildren living elsewhere may have responded in the affirmative to the co-residence question after skimming the question thinking it asked if they have <u>any</u> grandchildren. The wording of the questions on responsibility are vague. People may define "responsible for the care of grandchildren" differently. Some could have considered childcare for grandchildren who live elsewhere as "being responsible," while others may think of it in terms in financial responsibility. Further investigation needs to be done to evaluate these questions and potential ways to improve the wording of these questions aimed at this important group.

6. Conclusion

Census 2000 and 2000 ACS produced similar data on grandparent co-residence and care at the national level. Since larger sample sizes typically lead to smaller standard errors, the census estimates are considered to be more precise. However, an advantage of the ACS was that it released estimates within one year after the data were collected and was less burdensome on the public. Furthermore, the procedures implemented in 2000 ACS, such as FR training and experience, use of a computerized questionnaire, and item nonresponse follow-up may have improved upon the accuracy of the 2000 ACS data. In the future, when the American Community Survey is fully implemented and the sample increases, the 2000 ACS will do an even better job at providing census long form type data that will be less burdensome and more timely than the census long form was capable of providing.

High imputation rates in both surveys suggest that the questions on grandparent care may be confusing to respondents. Further research should be done to address the issue of question wording. One of the goals of the 2000 ACS was to produce information similar to the census with less money and less respondent burden. Given this analysis, the goal seems within reach.

References

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