

Chapter 5

Census Coverage Differentials by Age



Abstract People pass through different family situations and living arrangements as they age and many of these changes over a lifetime are related to changes in the likelihood of being missed in the Census. In this Chapter, some of the biggest differences in Census coverage by age are examined and some ideas about why people are missed or overcounted are explored. Young children age 0–4 had the highest net undercount rate and highest omissions rate of any age group in the 2010 Census. The college-age population (age 18–24) and elderly people (over age 60) had net overcounts.

5.1 Introduction

In the 2010 Census, some age groups had net undercounts, some had net overcounts, and many age groups experienced little net coverage error. In this Chapter, the focus is on the age groups that had the largest net undercounts and net overcounts. In addition to looking at the net undercounts and overcounts of age groups, omissions rates are also examined.

The initial analysis in this Chapter relies heavily on Demographic Analysis (DA) estimates. I believe the strengths of DA methodology make it a particularly good technique for discussing Census coverage by age for at least four reasons. First, DA data on age is more detailed than that from Dual-Systems Estimates (DSE). Data are available by single year of age from DA but only for large age/sex groups from DSE. Second, DA estimates have been produced since 1950, so there is more historical data. Third, in the decade prior to the 2010 Census, staff at the Census Bureau investigated several issues related to the production of DA estimates (Robinson 2010; Bhaskar et al. 2010; Devine et al. 2010). The increased input, review, and examination enhance the reliability of the 2010 DA estimates. Fourth, DSE estimates for the youngest ages greatly underestimate the net undercount (O'Hare et al. 2016) so that data series cannot be used to examine the whole age spectrum.

5.2 Census Net Undercounts by Age

Figure 5.1 shows net coverage in the 2010 Census by five-year age groups based on DA. Data in Fig. 5.1 indicate a high net undercount for young children, a high net overcount for people in their late teens and early twenties and a high net overcount for people over age 60. For other age groups the net coverage is close to zero (less than 1%). Therefore, I focus on three groups, age 0–4, 18–24 and 60 and older in the remainder of this Chapter.

Perhaps the most surprising finding shown in Fig. 5.1 is the high net undercount of young children. In the words of former Census Bureau Director Groves (2010, p. 1).

It’s often a surprise to many people when they learn that children tend to be undercounted in the US Censuses. Most can imagine various types of adults who fail to participate in Censuses, but don’t immediately think of children being missed.

Moreover, the survey research literature shows that households with children generally respond to surveys at higher rates than those without children (Groves and Couper 1998; Brick and Williams 2012). Groves and Couper (1998, p. 138) offer this succinct summary of the relationship between children in the household and cooperation in survey research, “Without exception, every study that has examined response or cooperation finds positive effects of the presence of children in the household.”

Nonetheless, Fig. 5.1 shows the population age 0–4 had the highest net undercount (4.6%) of any age group in the 2010 Census. There was a somewhat smaller net undercount (2.2%) for age 5–9. No other age group had a net undercount rate of more than 0.7%. The net undercount of young children is not only the largest net undercount of any age group, it is the largest Census coverage error in either direction (i.e. net undercounts or net overcounts). The high net undercount of young children

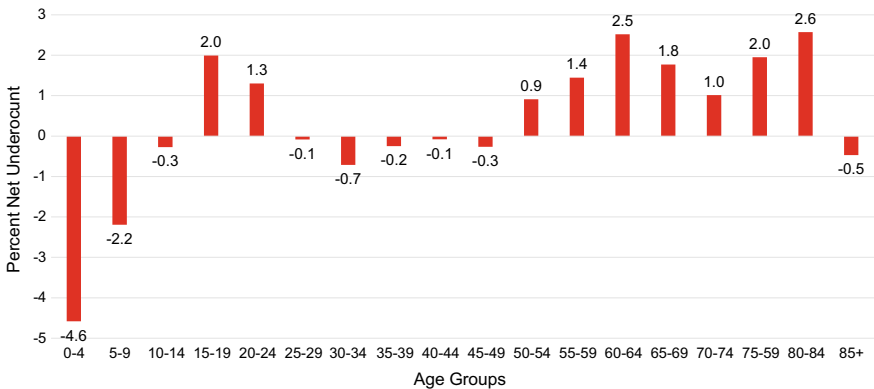


Fig. 5.1 Net undercount rates in 2010 census by five-year age groups. *Source* U.S. Census Bureau, May 2012 DA Release

has been noted in several recent publications (O'Hare 2014a, b, 2015; U.S. Census Bureau 2014).

Consistent with much of the other literature on Census undercounts, among young children, racial and ethnic minorities had higher net undercounts. Based on the 2010 Census DA release, there was a net undercount of 6.3% for Black Alone or in Combination age 0–4 and 7.5% for Hispanics age 0–4 (O'Hare 2015). It should be noted that a couple of recent studies (King et al. 2018; Jensen et al. 2018) suggest that the net undercount of young children might not be quite as high as earlier estimates indicate but nonetheless is still higher than any other age group, by far. These new studies are more in the nature of experimental estimates rather than official estimates.

The high net undercount of young children is not a new issue. Difficulty in enumerating young children accurately has been noted historically (Hacker 2013; Adams and Kasakoff 1991; U.S. Census Bureau 1944). More than 100 years ago, Young (1901, p. 21) stated, "Experience has shown that it is extremely difficult to ascertain the true number of children in any population by simple enumeration." The passage below is from a Census Bureau report following the 1940 Census, (U.S. Census Bureau 1944, p. 32) "Underenumeration of children under 5 years old, particularly infants under one year old, has been uniformly observed in the United States Census and in the Censuses of England and Wales and of various countries of continental Europe." The results of the 2010 U.S. Census suggest this situation has not changed much since then.

Why do young children have such a high net undercount rate? It is widely believed that there is not just one cause for the high net undercount of young children in the Census but there are many causes. With respect to the high net undercount of young children, the Census Bureau Task Force on the Undercount of Young Children (U.S. Census Bureau 2014) concluded, "The task force is convinced that there is no single cause for this undercount." O'Hare (2015, Chap. 7) discusses several potential ideas about why young children have a high net undercount in the Census. Over the past few years, the Census Bureau has engaged in several studies to learn more about the undercount of young children and they have produced a summary of the results (O'Hare et al. forthcoming).

Any explanation of why young children have such a high net undercount must not only explain why young children are missed, but why they are missed at a much higher rate than older children or adults. In some prior analysis, all children age 0–17 have been grouped together. For example, in the 1990 DSE results (U.S. Census Bureau 2001) all children under age 18 were treated as one group. But children (age 0–17) are not homogenous with respect to the risk of being missed in the Census.

Results from the 2010 Census shown in Fig. 5.2 indicate the net undercount is much higher for those age 0–4 than those age 14–17 (the population age 14–17 actually had a net overcount). When young children are grouped with older children it is difficult to discern why younger children are missed and older children overcounted.

Figure 5.2 shows there is almost a perfect correlation between age and Census coverage. What is responsible for this relationship between age and Census coverage? I am not aware of any theory or evidence that has been put forward to explain this strong statistical relationship.

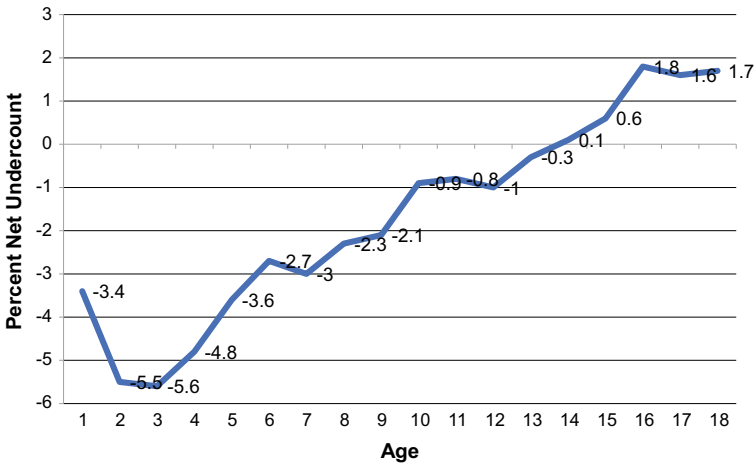


Fig. 5.2 2010 census net undercount rates by single year of age: 0–17. *Source* U.S. Census Bureau, May 2012 DA Release

One factor related to the high net undercount of young children that is increasingly clear is the fact that young children are more highly concentrated than older children in the kinds of households and families that are more difficult to enumerate. Table 5.1 shows the percent of young children (age 0–4) compared to older children (age 10–17) in each of 14 situations thought to be related to being missed in the Census. In nearly every situation, young children are more highly concentrated than older children.

Recent research by Fernandez et al. (2018) shows that among children under age 5, the odds of being missed in the Census are higher for:

- Grandchildren
- Children living in single-parent families
- Children in large (7 or more people) households
- Children in poverty
- Children in households where no adult completed college
- Children in households where one or more persons are unemployed
- Children in immigrant households (half or the people are foreign born)
- Children in households where no one speaks English “well” or better.

Fernandez and her colleagues found that, by and large, these factors hold for Non-Hispanic Whites, Hispanics, and Non-Hispanic Blacks.

Research by Fernandez et al. (2018) also shows that one of the factors that is most closely associated with young children being missed in the Census is whether they were counted in the self-response or Non-Response Followup phase of the Census. Based on logistic regression analysis, Fernandez et al. (2018) show that if young children are not included in the self-response phase of the Census, they are 74% more likely to be missed. This research suggests that the Census Bureau should enhance training among 2020 Census enumerators with respect to making sure

Table 5.1 Hard-to-count characteristics of children by age

	Percent of age group with this characteristics		Difference (0–4 minus 10–17)
	Age 0–4	Age 10–17	
Age of household 18-29 ^a	29	3	26
Renter ^a	44	32	12
Not in single detached unit ^b	38	26	12
Household receives cash public assistance or SNAP ^b	31	23	9
Different address one year ago ^b	25	12	13
Complex household ^a	40	33	6
Below poverty ^b	25	19	6
Enumerator completed response ^a	31	27	5
Living in a single parent in poverty ^b	17	13	4
Grandchild of householder ^b	11	5	6
Not Biological or adopted child ^b	16	15	2
Large (6 plus person) household ^a	23	22	1
Households with limited English ^b	26	27	-1
Not born in US ^b	2	7	-5

^aSource 2010 Census, U.S. Census Bureau (2017a)

^bSource U. S. Census Bureau (2017b)

all young children in a household are included on returned Census questionnaires. Recently the Census Bureau (2018) issued a short publication showing some of the main reasons young children are missed in the Census.

5.3 High Net Overcounts of College-Age Population

One group with a relatively high net overcount is the population age 15–24. The net overcount for age 15–19 was 2.0% and for those age 20–24 it was 1.3%. The overcount in this age group is typically attributed to young adults being counted in the home of their parents as well as another address such as a college dormitory or military barracks (Martin 2007). Figure 5.3 shows net undercounts for the population age 15–24 by single year of age and reveals that the net overcounts peaks around age 19 or 20, which is the age many young people are in college.

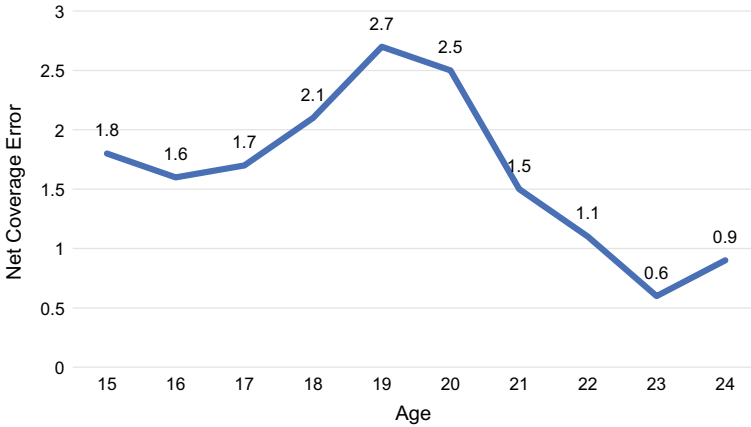


Fig. 5.3 2010 census net coverage error by single year of age: 15–24. *Source* U.S. Census Bureau, May 2012 DA Release

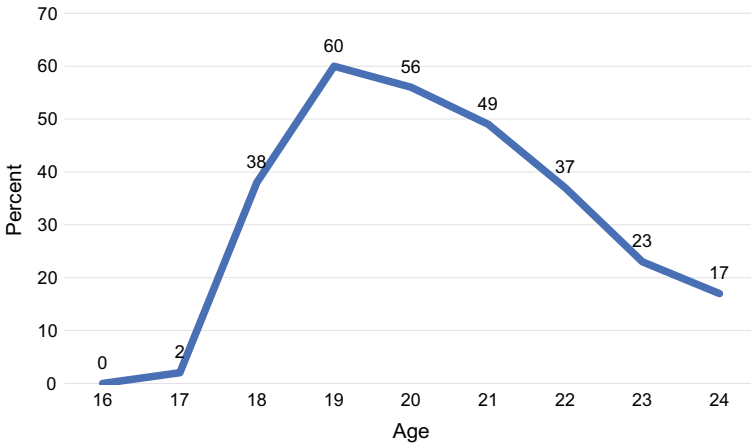


Fig. 5.4 Percent of population in colleges by age: 16–24. *Source* U.S. Census Bureau, American Community Survey

Figure 5.4 shows the percent of people attending college by single year of age from 16–24 based on data from the Census Bureau’s American Community Survey. Figure 5.4 shows college attendance peaking at age 19, 20, and 21, the exact same ages as the higher net overcounts. Note that the ACS question just asked about college attendance, it does not differentiate those who leave home to go to college from those who live at home and attend college.

The 2010 Census Coverage Followup operation, showed relatively large duplication errors for people in college and people in jail (U.S. Census Bureau 2012, Table 24.) People age 18–24 are over-represented in both groups.

5.4 Net Overcounts of Elderly Population

The second age group that had a substantial Census net overcount is the population age 60 and over. The overcount for this group may be attributed to retirees with two (or more) homes and to a lesser extent older people in nursing homes or other long-term care facilities. Like young adults, some of these people are counted in more than one place. Williams (2012, p. 8) provides one example of a Census overcount, “A husband and wife, for example, might own a vacation home and fill out a questionnaire there as well as their usual residence.” The 2010 Census Coverage Followup operation, showed relatively large duplication errors for people in nursing homes (U.S. Census Bureau 2012, Table 24).

In an analysis following the 2000 Census, the Census Bureau focused on people who had been included in the Census more than once (U.S. Census Bureau 2002). In a key table, they show that people over age 50 are much more likely than younger groups to be duplicated in a different state, which suggests they were being counted in more than one home such as a winter home in Florida and a summer home in Michigan. This idea is bolstered by trends from 1950 to 2010 shown in Sect. 5.6.

5.5 Omissions in the 2010 Census

Recall that the net Census undercount rate is a balance between people omitted and those included erroneously (mostly double counted) and whole-person imputations. The omissions rate captures the share of a group missed in the Census. DSE is the only method that shows omissions rates.

In many ways the omissions rate is a more meaningful statistic because in the net undercount calculation, omissions can be cancelled out by erroneous inclusions or double counting. A net undercount of 0 could be the result of no one missed and no one double counted, or for example, 10% missed, and 10% double counted.

The omissions rates for the population age 0–9 published by the Census Bureau in 2012 are suspect because the DSE methodology only reflects a small portion of the net undercount of young children in the 2010 Census (O’Hare et al. 2016). DA estimated a net undercount of 4.6% for the population age 0–4 compared to only 0.7% for DSE. The difference is generally ascribed to correlation bias in the DSE methodology (O’Hare et al. 2016). Correlation bias refers to the fact that the kinds of people missed in the Census are also missed in the Post-Enumeration Survey.

However, recent research by the Census Bureau’s Task Force on the Undercount of Young Children provides updated estimates for omissions rates for several large age/sex groups by taking advantage of the strength of the DA and DSE methods (U.S. Census Bureau 2016). These improved estimates for omissions in the 2010 Census are provided in Table 5.2.

The updated omissions calculations are only available for a few age/sex groups and only for the population as a whole and not any race/Hispanic groups. The rates

Table 5.2 2010 Omissions by Age (Updated in 2016)

	Number of omissions (in 1000s)	Omission rate
Age 0–4	2172	10.3
Age 5–9	1517	7.3
Age 10–17	625	4.9
Males age 18–29	1883	7.9
Females age 18–29	1514	6.4
Males age 30–49	3012	7.3
Females age 30–49	1171	2.8
Males age 50+	1793	4.0
Females age 50	949	1.9
Total	15,636	5.2

U.S. Census Bureau (2016), Table 3

are similar to the omissions rates released by the Census Bureau in 2012 except for two groups. For young children, the updated omissions rates are much higher than the earlier omissions rate estimates from the Census Bureau. For young adults the omissions rate from the updated analysis is somewhat higher than the original DSE analysis.

Young children had the highest net undercount rate of any age group and Table 5.2 shows they had the highest omissions rate of any age group in the 2010 Census. The population age 0–4 had an omissions rate of 10.3% which translate into nearly 2.2 million young children omitted from the 2010 Census.

5.6 Trends Over Time

Examination of net Census coverage rates from 1950 to 2010 indicates a significant and steady reduction in the net undercount in the total population. However, when the overall trend is decomposed by age, a more complex story emerged.

Figure 5.5 shows net undercounts by five-year age groups in every Census since 1950. While this figure is somewhat complicated here are a couple of trends that are clear. The net undercount of young children is long-standing as it has been seen in every Census since 1950. The net undercount of young children varied between 1.4 and 6% between 1950 and 2010, although the net undercount of young children has increased substantially since 1980. In fact, the net undercount of young children in the 2010 Census is almost exactly the same as the net undercount of young children in the 1950 Census.

The net overcount of people age 60 and older has emerged over the past several decades. Figure 5.5 shows the net overcount for this age group was higher in 2010 than any other Census shown and the rates for the 2000 Census are not far behind

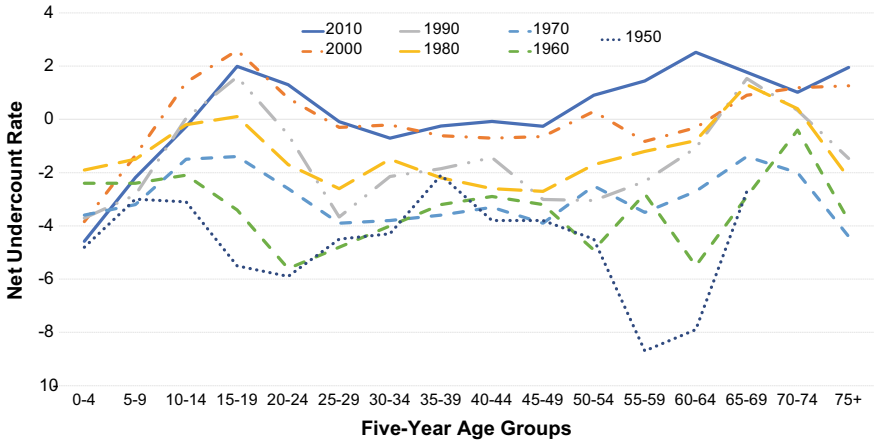


Fig. 5.5 Net census undercount rates by five-year age groups: 1950–2010

those of 2010. On the other hand, the net undercount rates for those age 60 and older in 1950, 1960, and 1970, are relatively low compared to the past two Censuses. This supports the idea that the overcount of the older population may be related to increases in dual home ownership for this age group which increased over this time period.

Figure 5.5 also shows that the coverage of college-aged people has changed over time. In 1950, 1960 and 1970, there was a net undercount for age 15–19 and 20–24, but in the 2000 and 2010 Census, there was a net overcount in these age groups. This is consistent with larger number of people in the young adult age group leaving the home of their parents in recent decades.

One important divergence in net census coverage trends since 1950 may not be clear from Fig. 5.5. Figure 5.6 shows net undercount rates for the adult population (age 18+) and the young child population (age 0–4) for each U.S. Decennial Census from 1950 to 2010. Figure 5.6 shows there are two very distinct periods between 1950 and 2010 related to the net undercount of young children. Between 1950 and 1980, the net undercount rates of both young children and adults improved and the differences between young children and adults were not large. Specifically, the net undercount rates for the adult population went from 3.8% undercount in 1950 to a 1.4% undercount in 1980. While the net undercount for young children fell from 4.7 to 1.4% in the same period.

Following the 1980 Census. The net undercount of young children and adults began diverging. The coverage rates for adults continued the improvement seen in the 1950–1980 period while the net undercount rates for young children increased following 1980. Specifically, the coverage rates for adults went from 1.4% net undercount in 1980 to a 0.7% overcount in 2010. The net undercount for young children increased from 1.4% in 1980 to 4.6% in 2010.

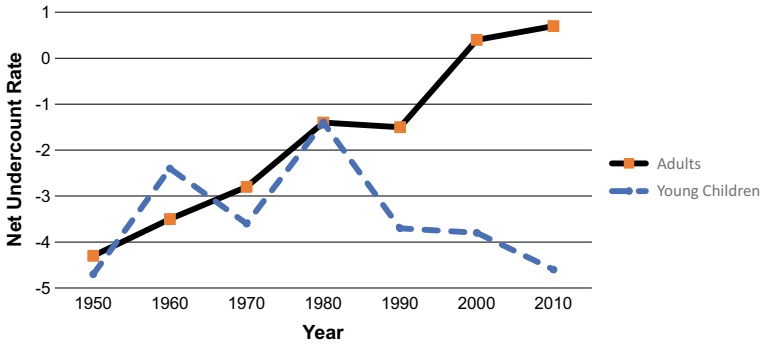


Fig. 5.6 Net undercount rates for young children (0–4) and adults (18+): 1950–2010. *Source* O’Hare (2014a, b)

5.7 Summary

Net undercounts and overcount as well as omissions rates vary by age. Young children age 0–4 had the highest net undercount rate and highest omissions rate of any age group in the 2010 Census. Young Hispanic children and young Black Alone or in Combination children had net undercount rates that are about 50% higher than the overall net undercount rate for this age group. One reason for the high net undercount rate of young children is the fact that they are concentrated in hard-to-count families and households.

The college age population (age 18–24) had a net overcount in the 2010 Census. The high net overcount is attributed to many young adults being counted at their parent’s home as well as another location such as college dormitory. This age group also had a relatively high omissions rate.

For the population age 60+, there was a relatively high net overcount in 2010. This is attributed to the fact that many people in this age group have two (or more) homes and are counted in both homes.

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