

Census 2020—Counting Under Adversity

PRELIMINARY ASSESSMENT OF ASPECTS OF CENSUS QUALITY VIA DEMOGRAPHIC ANALYSIS

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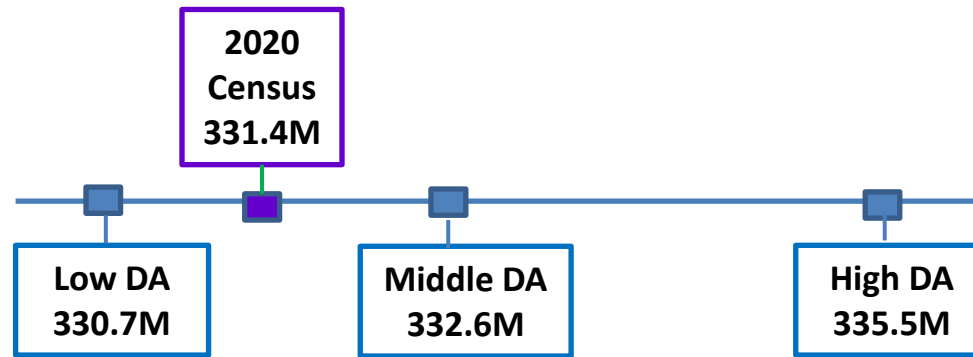
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Revised 10-16-21

2020 > Perfect Storm > Quality??

- 2020 Census confronted COVID-19 pandemic, natural disasters, attempted politicization
- Great credit due Census Bureau for completing the census and taking the time to fix anomalies in the data
- Yet, quality concerns remain—net undercount?
- Won't know until Post-Enumeration Survey (PES) and full Demographic Analysis (DA) completed
- Meanwhile, straws in the wind—top-line DA result and an analysis of census tract self-response rates
- Bottom line—Apparently higher Black net undercount rates

2020 Total Population Looks Low



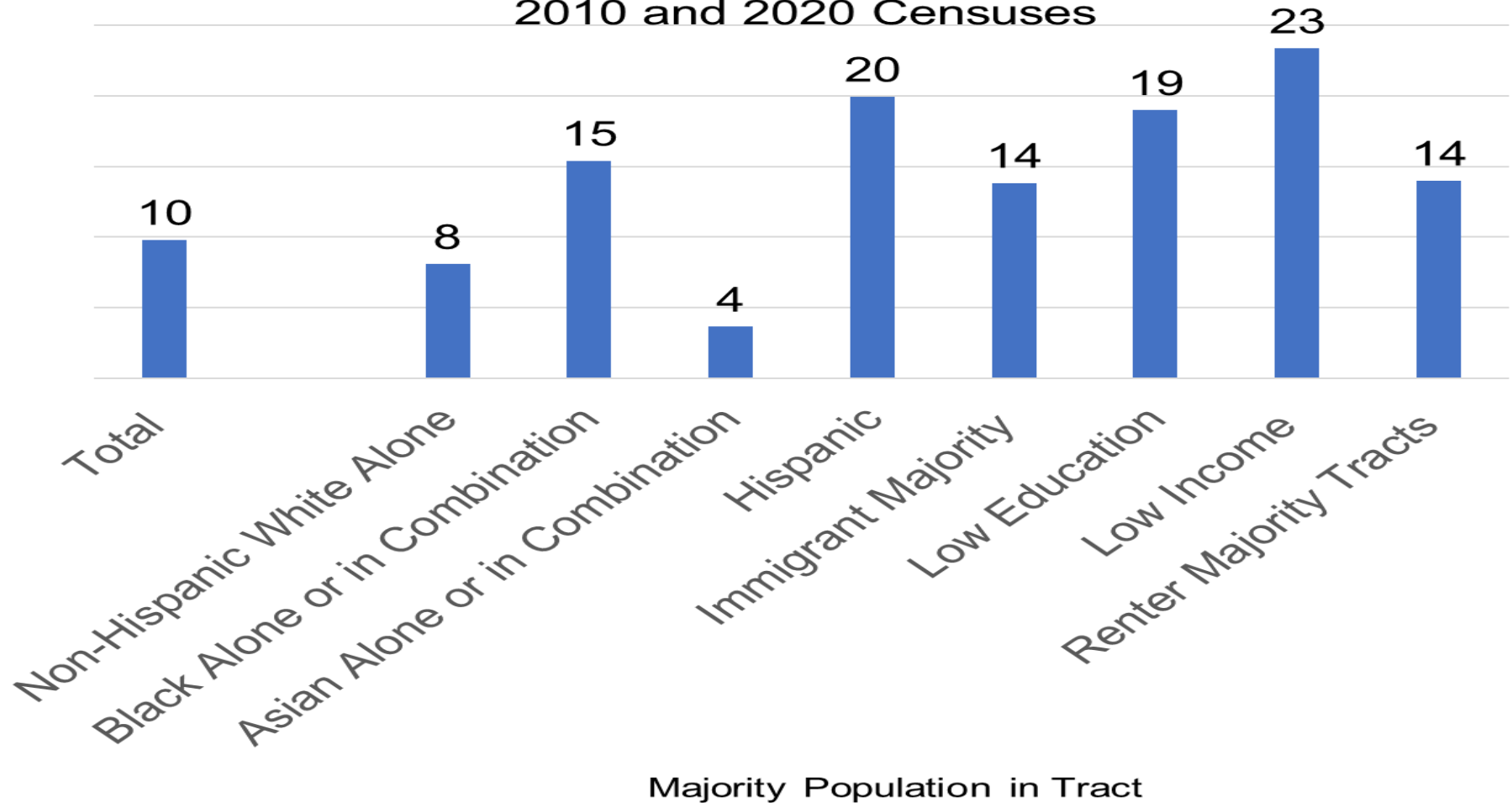
The 2020 Census total population count falls toward the low end of the DA estimates—the **Low DA series** suggests an overcount (0.21) and the **Middle DA series** an undercount (-0.36)

- For 2010, the **Middle DA series** indicated a slight overcount (0.13)

Note: DA estimates for April 1, 2020, released December 15, 2020, [National Demographic Analysis Tables: 2020 \(census.gov\)](https://www.census.gov/demographics/tables/2020/)

2020-2010 Self-Response Rates—Census Tracts

Percent of Tracts Where the Self-Response Rate Decreased by 10 Percentage Points or More Between 2010 and 2020 Censuses



Note: Denominator = all addresses, including occupied, vacant, and nonresidential
Source: O'Hare (2021)

Demographic Analysis (DA)—Methods

- Based on decades of analysis of censuses/admin records
- 2020 Census DA estimates—
 - ✓ For people born in 1945 or later, develop best estimates by age, sex, and race, by—
 - Adding births
 - Subtracting deaths
 - Adding estimates of net international migration (based on various sources, including ACS)
 - ✓ For people 75+, use Medicare enrollment (adjusted for people not covered; birth records have gaps for older people)
- DA estimates are [largely] *independent* of the census

Demographic Analysis (DA)—Availability

- Availability of DA estimates
 - ✓ National level (estimates of interstate migration not accurate enough for subnational estimates)
 - ✓ Single years of age
 - ✓ Sex
 - ✓ Black/non-Black (separate estimates for Black alone and Black alone or in combination) (birth/death record identification for other races/ethnicities not complete enough to support estimates)
 - ✓ In 2020, experimental DA estimates for Hispanics ages 0-29 (ages 0-19 in 2010)
- Range of DA estimates (begun in 2010 to reflect uncertainty, particularly for international migration)

Estimating Net Undercount for Black Alone/and in Combination— Problem of “Some Other Race Alone”

Population Group	2020 Census	2010 Census
Total	100.0%	100.0%
Black Alone	12.4	12.6
Black Alone or in Combination	14.2	13.6
Some Other Race Alone	8.4	6.2

- Cannot compare census counts shown above for Black people with DA estimates without first allocating ***Some Other Race Alone*** to race groups
- Census produces “Modified Race” file—based on race of person with same Hispanic origin as the person reporting Some Other Race Alone
- Population Estimates also need Modified Race for Whites, Blacks, Asians, AIAN, and NHOPI (not needed for Hispanics)
- Modified Race not yet available

2020—Simulation Method for “Modified Race” [necessary to compare census to DA]

Black Alone, All Ages

- 2010 Modified estimate = 103.4% of 2010 Census
- Some Other Race Alone increased by 35% from 2010 to 2020
- $3.4\% * 1.35 = 4.6\%$; Citro rounded up (to be generous) to a factor of 5%
- Therefore, 2020 Modified estimate = 2020 Census count * 1.05

Black Alone or in Combination, All Ages

- 2010 Modified estimate = 102.9% of 2010 Census
- Some Other Race Alone (as above) increased by 35% from 2010 to 2020
- $2.9\% * 1.35 = 3.9\%$; Citro rounded up (to be generous) to a factor of 5%
- Therefore, 2020 Modified estimate = 2020 Census count * 1.05

Black Alone, Under Age 18

- 2010 Modified estimate = 104.4% of 2010 Census
- Some Other Race Alone, Under Age 18, increased by 25% from 2010 to 2020
- $4.4\% * 1.25 = 5.5\%$; Citro rounded up to a factor of 6%
- Therefore, 2020 Modified estimate = 2020 Census count * 1.06

Black Alone or in Combination, Under Age 18—Same factor (1.06) as for Black Alone

2020 Data Quality—Black Alone and in Combination *Simulated* Estimates of Net Undercount

Population Group	2020 Census	2020 Census Modified	2020 DA (Low-Mid-High)	Estimated Net Undercount	
				2020 (Low-Mid-High) [net undercount in red]	2010
Total	331.4	331.4	330.7- 332.6- 335.5	0.22%- 0.35%- 1.21%	0.13%
Black Alone	41.1	43.2	44.6 – 45.5 – 46.5	3.24%- 5.20%- 7.25%	2.30%
Black Alone or in Combination	46.9	49.3	49.1 – 50.3 – 51.5	0.28%- 2.05%- 4.36%	1.10%
Some Other Race Alone	27.9	N.A.	N.A.	N.A.	N.A.

Numbers in millions (net undercount estimates based on unrounded data); 2010 net undercount estimates based on middle DA series; 2020 Census Modified estimates *simulated* by C.F. Citro as shown on previous slide

2020 Data Quality—Children Under Age 18

Simulated Estimates of Net Undercount

Population Group <18	2020 Census	2020 Census Modified	2020 DA (Low-Mid-High)	<u>Estimated Net Undercount</u>	
				2020 (Low-Mid-High)	2010 [net undercount in red]
Total	73.1	73.1	74.4 – 74.7 – 74.8	1.77%- 2.08%- 2.28%	1.68%
Black Alone	10.2	10.8	11.1 – 11.4 – 11.8	2.74%- 5.77%- 8.64%	0.63%
Black Alone or in Combination	12.8	13.6	13.7 – 14.2 – 14.7	0.50%- 4.18%- 7.60%	1.50%
Some Other Race Alone	8.0	N.A.	N.A.	N.A.	N.A.
Hispanic	18.8	N.A.	18.0 – 19.6 – 20.8	4.12%- 4.09%- 9.52%	2.08%

Numbers in millions (net undercount estimates based on unrounded data); 2010 net undercount estimates based on middle DA series; 2020 Census Modified estimates for under age 18 *simulated* by C.F. Citro as shown on earlier slide

—CAUTION—

**Estimates based on assumption
that 2010 Modified Race
conversion is good proxy for 2020**

Research Note with explanation and sources for Total
Population and Population Ages 0-17 available separately

PRELIMINARY ASSESSMENT OF ASPECTS OF 2020 CENSUS QUALITY VIA DEMOGRAPHIC ANALYSIS

Constance F. Citro¹
October 16, 2021

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Acknowledgements: The author thanks Howard Hogan, Eric Jensen, William O’Hare, and David Van Riper, for review and input. Any errors are the author’s alone.

Abstract: This research note describes how the author simulated “Modified Race” for 2020 and estimated apparently high net undercount rates in the 2020 census for the Black population compared to estimates of the April 1, 2020, population using demographic analysis.

Quality Concerns for the 2020 Census

Users of census data have worried that the quality of the 2020 census might be impaired given the extraordinarily difficult circumstances under which it was conducted. This perfect storm included the COVID-19 pandemic, which necessitated delays in data collection operations, post-collection processing, and release of data products, and natural disasters (wildfires, hurricanes) that made data collection even more difficult in parts of the country. In addition, the Census Bureau had to contend with attempts by the previous administration to force it to release state counts for reapportionment by the original deadline of December 31, 2020, despite the COVID-induced delays, and to estimate citizens and undocumented immigrants, despite the difficulties and inappropriateness of doing so.

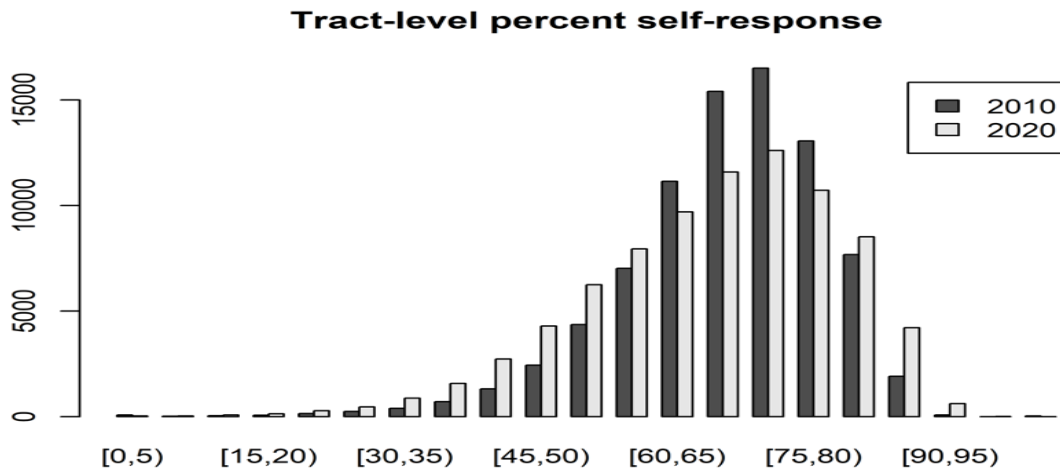
In the teeth of these challenges, the Census Bureau is to be congratulated on completing the census and releasing data products for reapportionment and redistricting of congressional and state legislative seats. Yet concerns about the quality of the data remain. We do not yet have much information with which to assess quality, but there are some straws in the wind. The total population, 331.4 million, is at the low end of the demographic analysis (DA) estimates released in December 2020, which range from 330.7 million to 335.5 million.² In addition, an analysis of census tract self-response rates suggests a two-tailed experience in 2020 compared to 2010 (see Figure 1) with implications for quality. There were more census tracts in 2020 than in 2010 with very high self-response rates, presumably in areas in which almost everyone had

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²[National Demographic Analysis Tables: 2020 \(census.gov\)](https://www.census.gov/data/tables/2020/national-demographic-analysis/)

highspeed broadband. Conversely, there were more census tracts in 2020 than in 2010 with very low self-response rates. Research from previous censuses shows that enumerations obtained by self-response are of higher quality (in terms of accuracy and completeness of coverage) than those obtained by other means (see Keller and Fox, 2012, Section 4.6; Mule, 2012, Section 8; National Research Council, 2004, App. D)

FIGURE 1: Self-Response Rates for Census Tract Quintiles, 2020 and 2010 Censuses



Source: ASA Task Force on 2020 Census Quality (2020, App. 2, Figure 1)

Notes: Denominator is all addresses (a preferable denominator would be occupied households, but self-response rates are not available on that basis).

O’Hare (2021) analyzed census tracts that experienced substantial declines in self-response rates. He reported that, on average, about 8,000 or 10 percent of census tracts had self-response rates in 2020 that were 10 percentage points or more below their rates in 2010.³ Classifying tracts by characteristics of the majority of residents (using American Community Survey [ACS] data), 23% of majority low-income census tracts had declines in self-response rates of at least 10 percentage points, followed by 20% of majority Hispanic tracts, 19% of majority low education tracts, 15% of majority Black alone or in combination tracts; and 14% of majority immigrant tracts and majority renter tracts. Presumably, many of these characteristics overlap.

2020 Demographic Analysis (DA)

These straws in the wind led me to explore what light DA might shed on the matter, while we wait for 2020 net undercount estimates to be produced from the 2020 Post-Enumeration Survey Program (PES).⁴ DA is generally considered as close to a gold standard as is possible for estimates of the population as of April 1 of a census year. The current DA program is based on

³About 4,000 tracts had self-response rates in 2020 that were 10 percentage points or more above their rates in 2010. See also O’Hare and Lee (2021) for analyses of self-response rates.

⁴Unfortunately, the 2020 PES is confronting similar challenges as the 2020 census—for example, the key P-sample interview was conducted during the winter 2020-2021 COVID surge and needed to be extended to boost the response rate.

decades of analysis of censuses and administrative records. The Census Bureau developed the 2020 census DA estimates that it released by age, sex, and race in December 2020 for two groups. For people born in 1945 or later when birth records were complete across the nation, the estimates reflect the addition of births over the decades, the subtraction of deaths, and the addition of estimates of net international migration (from various sources, including the ACS). For people ages 75 and over (born in 1945 and earlier), the Census Bureau developed DA estimates using Medicare enrollment data, adjusted for people not covered. This method is more accurate than using birth records given gaps in records for older people. DA estimates are largely independent of the census.⁵

DA estimates are limited to the nation as a whole because estimates of interstate migration are not sufficiently accurate to serve as a standard of comparison for census results. DA estimates are available by single years of age, sex, Black and non-Black (separate estimates for Black alone and Black alone or in combination). Estimates are not available for other race groups because of gaps in birth and death record identification of race. For 2020, experimental DA estimates are available for Hispanics ages 0-29 (estimates for ages 0-19 are available for 2010). Beginning with the 2010 census, the Census Bureau released a range of DA estimates to reflect uncertainty, particularly for the component of international migration.

The Problem of “Some Other Race Alone”

With the release of the 2020 census redistricting data file, it should be possible to compare DA estimates for the total population and people ages 0-17 and 18 and older for the Black alone and Black alone and in combination populations plus Hispanics ages 0-17. However, for race comparisons, the 2020 census data must be “modified”. Specifically, people who answered “some other race” and neither checked another category nor wrote in any specific race must have a specific race imputed for them. The reason is that the DA estimates derive from vital records and other sources that do not have a “some other race” category.

The Census Bureau therefore creates a “Modified Race” file to support DA and also its program of annual population estimates. For this file, the Census Bureau distributes the “Some Other Race Alone” category of responses to specific race groups.⁶ The methodology essentially searches for a donor—someone in the household or neighboring area who reported a specific race(s) and the same Hispanic origin (yes/no) as the person who reported simply “some other race” and assigns the race(s) of the donor to that person. The Census Bureau has not yet created a 2020 Modified Race file, in part due to a need to evaluate whether to wait for the privatized Demographic and Housing Characteristics file, which is at least a year away from release, or to use the Census Edited File and then privatize the output.

Simulating Modified Race for 2020 for the Black Population

The author sought to simulate what a Modified Race file might look like for Black alone and Black alone and in combination for 2020. This entailed simulating the allocation of race(s) to

⁵The 2020 DA methodology is described here: [2020da_methodology.pdf \(census.gov\)](https://www.census.gov/2020da_methodology.pdf)

⁶The “Modified Race” methodology used in 2010 is described here: [mrsf2010.pdf \(census.gov\)](https://www.census.gov/mrsf2010.pdf)

people in the Some Other Race Alone category, which grew from 6.2 percent of the population in 2010 to 8.4 percent of the population in 2020.⁷

A simplistic approach (in the interests of transparency) that seemed likely to underestimate rather than overestimate net undercount (in the interests of avoiding sensationalism) seemed sensible, given that there is no public access to the underlying census data to use the Census Bureau's method. Essentially, the author's method used factors from examining the allocation of race to the Some Other Race Alone population in the 2010 census, adjusted upwards to account for the greater proportion of Some Other Race Alone in 2020, and adjusted further upwards to reduce the chances of overestimating the net undercount. Specifically:

Black Alone, All Ages

- Divide 2010 Modified estimate by 2010 Census estimate = 1.034
- Ascertain increase in Some Other Race Alone from 2010 to 2020 = 35%
- Multiply $0.034 * 1.35 = 0.046$
- Round up to 0.05 (author's decision)
- Calculate 2020 Modified estimate = 2020 Census count * 1.05

Black Alone or in Combination, All Ages

- Divide 2010 Modified estimate by 2010 Census estimate = 1.029
- Multiply $0.029 * 1.35 = 0.039$
- Round up to 0.05 (author's decision)
- Calculate 2020 Modified estimate = 2020 Census count * 1.05

Black Alone, Under Age 18

- Divide 2020 Modified estimate by 2010 Census estimate = 1.044
- Ascertain increase in Some Other Race Alone, Under Age 18, from 2010 to 2020 = 25%
- Multiply $0.044 * 1.25 = 0.055$
- Round up to 0.06 (author's decision)
- Calculate 2020 Modified estimate = 2020 Census count * 1.06

Black Alone or in Combination, Under Age 18—Same factor (1.06) as for Black Alone

Results

Tables 1 and 2 show the author's simulated net undercount estimates in 2020 for all ages and people under age 18, respectively. To illustrate uncertainty, the tables show estimates for the low, middle, and high DA series. Each table for comparison contains published net undercount estimates for 2010 based on the middle DA series for that census. See Tables A-1 and A-2 for complete source notes.

The author's simulated estimates suggest that Black alone and Black alone and in combination populations may have been undercounted at higher rates than in 2010. Similarly, her estimates suggest that Black alone and Black alone and in combination children may have been seriously undercounted. Hispanic children were also likely seriously undercounted (and at a higher rate than in 2010), although this conclusion is far from certain. While Hispanic estimates from the

⁷See: [Improved Race and Ethnicity Measures Reveal U.S. Population Is Much More Multiracial \(census.gov\)](https://www.census.gov/newsroom/releases/2021/20210810-improved-race-ethnicity-measures-reveal-u-s-population-is-much-more-multiracial.html)

census do not require adjustment of any kind (Modified Race is not applicable), the DA estimates themselves show a wide range. The low DA estimate actually produces an estimated net *overcount* of Hispanic children. The reason is the significant uncertainty surrounding estimates of net immigration, which are key to the DA estimates for Hispanics.

The author would like nothing better than to have her estimates replaced by official Census Bureau estimates that indicate less undercount than shown in Tables 1 and 2. She hopes that the Census Bureau will move expeditiously to create a 2020 Census Modified Race file.

TABLE 1: Simulated Net Undercount Estimates for Total Population in the 2020 Census

Population Group	2020 Census	2020 Census Modified	2020 DA (Low-Mid-High)	<u>Estimated Net Undercount</u> 2020 (Low-Mid-High) 2010 [net undercount in red]	
Total	331.4	331.4	330.7- 332.6- 335.5	0.22% - 0.35% - 1.21%	0.13%
Black Alone	41.1	43.2	44.6 – 45.5 – 46.5	3.24% - 5.20% - 7.25%	2.30%
Black Alone or in Combination	46.9	49.3	49.1 – 50.3 – 51.5	0.28% - 2.05% - 4.36%	1.10%
Some Other Race Alone	27.9	N.A.	N.A.	N.A.	N.A.

TABLE 2: Simulated Net Undercount Estimates for Children Under Age 18 in the 2020 Census

Population Group <18	2020 Census	2020 Census Modified	2020 DA (Low-Mid-High)	<u>Estimated Net Undercount</u> 2020 (Low-Mid-High) 2010 [net undercount in red]	
Total	73.1	73.1	74.4 – 74.7 – 74.8	1.77% - 2.08% - 2.28%	1.68%
Black Alone	10.2	10.8	11.1 – 11.4 – 11.8	2.74% - 5.77% - 8.64%	0.63%
Black Alone or in Combination	12.8	13.6	13.7 – 14.2 – 14.7	0.50% - 4.18% - 7.60%	1.50%
Some Other Race Alone	8.0	N.A.	N.A.	N.A.	N.A.
Hispanic	18.8	N.A.	18.0 – 19.6 – 20.8	4.12% - 4.09% - 9.52%	2.08%

Numbers in millions (net undercount estimates based on unrounded data); 2010 net undercount estimates based on middle DA series; 2020 Census Modified estimates simulated by author.

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TABLE A-1 Preliminary Comparisons—2020 Census and 2020 Demographic Analysis (DA), All Ages

Characteristic	2020 Census (millions)	2020 DA (low-middle-high) (millions)	%Net Coverage Error (red = net undercount)	2020 Pop. Estimate (mils.) (April - July)	2010 Middle DA - % Net Coverage Error
	(1)	(2)	(3)	(4)	(5)
(1) Total Pop	331.4	330.7 – 332.6 – 335.5	0.22% – 0.35% – 1.21%	329.4 – 329.5	0.13%
(2) Black Alone	41.1	NA	NA	NA	NA
(3) All Other	290.3	NA	NA	NA	NA
(4) Black Alone or in Combination	46.9	NA	NA	NA	NA
(5) All Other	284.5	NA	NA	NA	NA
(6) Black Alone Modified (simulated)	43.2	44.6 – 45.5 – 46.5	3.24% – 5.20% – 7.25%	44.5 – 46.3	2.30%
(7) All Other Modified	288.3	286.1 – 287.1 – 289.0	0.76% – 0.42% – 0.24%	284.9 – 283.2	0.50%
(8) Black Alone or in Combination Modified (simulated)	49.3	49.1 – 50.3 – 51.5	0.28% – 2.05% – 4.36%	48.8 – 48.9	1.10%
(9) All Other Modified	282.2	281.6 – 282.3 – 284.0	0.21% – 0.04% – 0.64%	280.6 – 280.6	0.33%

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NOTES:

“Modified” refers to the reallocation of Some Other Race Alone, which respondents could check in the 2020 (and 2010) census, to the specific race categories used by Demographic Analysis and Population Estimates (hence, rows 2-5 are NA for cols. 2-5). To date, modified race estimates have not been released by the Census Bureau for the 2020 census. The estimates shown for Black Alone Modified and Black Alone or in Combination Modified in col. 1, rows 6, 8, were developed by the author. See [mrsf2010.pdf \(census.gov\)](#) for the methodology used in 2010 to create Modified Race, which essentially used the race of someone in the same household or neighborhood who had the same Hispanic origin as the person who checked Some Other Race Alone.

“All Other” estimates (col. 1, rows 3, 5, 7, 9) were obtained by subtraction of the relevant Black category from col. 1, row 1. The Census Bureau cautions against comparisons of 2010 and 2020 race estimates because of changes in data capture and coding for race (and ethnicity in 2020)—see [Improved Race and Ethnicity Measures Reveal U.S. Population Is Much More Multiracial \(census.gov\)](#).

SOURCES:

- General: Obtained or simulated by Constance Citro; Howard Hogan verified numbers from Census sources; William O’Hare provided useful review comments; the Census Bureau reviewed the simulation method for “Modified” and indicated it was “reasonable” but not certain.
- Col. 1: Black Alone and Black Alone or in Combination (rows 2,4): [2020 Census Redistricting: Supplementary Tables](#), Table 1, Population by Race: 2010 and 2020.
- Col. 1: Black Alone Modified (row 6): simulated by: (1) dividing 2010 Black Alone Modified by 2010 Black Alone (from [Modified Race Data 2010 \(census.gov\)](#), Table 1, Summary of Modified Race and Census 2010 Race Distributions for the United States [cell D9 / cell B9 = 103.4%]); (2) increasing 103.4% to 105% to (generously) account for 35% increase in percent Some Other Race Alone from 2010 to 2020 (6.2% to 8.4% from [Improved Race and Ethnicity Measures Reveal U.S. Population Is Much More Multiracial \(census.gov\)](#)); and (3) applying 105% to row 2.
- Col. 1: Black Alone or in Combination Modified (row 8): simulated using same procedure as for Black Alone Modified (from [Modified Race Data 2010 \(census.gov\)](#), Table 1 [(sum of cells D9, 17, 21, 22, 23) / (sum of cells B9, 17, 21, 22, 23, 29) = 102.9%]), increasing 102.9% (generously) to 105%, and applying to row 4.
- Col. 2: [National Demographic Analysis Tables: 2020 \(census.gov\)](#), Tables 1, 1A, 1B.
- Col. 3: 1.0 minus [Col. 1 / Col. 2 (low – high)] in percents (calculations performed in thousands, not the millions shown in cols. 1, 2).
- Col. 4: [National Population by Characteristics: 2010-2020 \(census.gov\)](#) (vintage 2020 population estimates): April (from Table for January–June 2020); July (from Table for July–December 2020). Total population from column E; Black Alone = sum of column J for males and column K for females; Black Alone or in Combination = sum of column V for males and column W for females. April and July shown, given COVID-19 impacts on the 2020 census schedule. Note that all population estimates are based on Modified Race.
- Col. 5: [National Demographic Analysis Tables: 2010 \(Revised\) \(census.gov\)](#), Table 3, Total Resident Population by Age and Race: April 1, 2010 (contains revised DA middle series estimates and [modified] 2010 census counts).

TABLE A-2 Preliminary Comparisons—2020 Census and 2020 DA, Children Under Age 18

Characteristic	2020 Census (millions)	2020 DA (low-high) (millions)	%Net Coverage Error (red = net undercount)	2020 Pop. Ests. (mils.) (April)	2010 Middle DA – % Net Coverage Error
	(1)	(2)	(3)	(4)	(5)
(1) Total <18	73.1	74.4 – 74.7 – 74.8	1.77% – 2.08% – 2.28%	72.9	1.68%
(2) Black Alone	10.2	NA	NA	NA	NA
(3) Black Alone or in Combination	12.8	NA	NA	NA	NA
(4) Black Alone Modified (simulated)	10.8	11.1 – 11.4 – 11.8	2.74% – 5.77% – 8.64%	11.1	0.63%
(5) Black Alone or in Combination Modified (simulated)	13.6	13.7 – 14.2 – 14.7	0.50% – 4.18% – 7.60%	13.4	1.50%
(6) Hispanic	18.8	18.0 – 19.6 – 20.8	4.12% – 4.09% – 9.52%	18.6	2.08%

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NOTES:

“Modified” refers to the reallocation of Some Other Race Alone, which respondents could check in the 2020 (and 2010) census, to the specific race categories used by Demographic Analysis and Population Estimates (hence, rows 2, 3 are NA for cols. 2-5). To date, modified race estimates have not been released by the Census Bureau for the 2020 census. The estimates shown for Black Alone Modified and Black Alone or in Combination Modified in col. 1, rows 4 and 5, were developed by author. See [mrsf2010.pdf \(census.gov\)](#) for the methodology used in 2010 to create Modified Race, which essentially used the race of someone in the same household or neighborhood who had the same Hispanic origin as the person who checked Some Other Race Alone.

The Census Bureau cautions against comparisons of 2010 and 2020 race estimates because of changes in data capture and coding for race and ethnicity in 2020—see [Improved Race and Ethnicity Measures Reveal U.S. Population Is Much More Multiracial \(census.gov\)](#).

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- Col. 1, row 1: [U.S. Adult Population Grew Faster Than Nation's Total Population From 2010 to 2020 \(census.gov\)](https://www.census.gov).
- Col. 1, row 2: Black Alone under 18: [2020 Census Redistricting: Supplementary Tables](https://www.census.gov), Table 1, Population by Race: 2010 and 2020, times applicable percentage from Table 5, Percentage Distribution of Hispanic or Latino Origin and Race by Age Group: 2010 and 2020.
- Col. 1, row 3: Black Alone or in Combination under 18: Provided by David Van Riper by subtracting age 18 and over from total population for Black Alone or in Combination.
- Col. 1, row 4: Black Alone Modified under 18: simulated by: (1) dividing 2010 Black Alone Modified under 18 (from [National Demographic Analysis Tables: 2010 \(Revised\) \(census.gov\)](https://www.census.gov), Table 3, Total Resident Population by Age and Race: April 1, 2010), by 2010 Black Alone under 18 (from Social Explorer, Census 2010, Table 20A), to obtain increase from Alone to Modified for 2010 = 104.4%; (2) increasing 104.4% to 106% to account (generously) for 25% increase in Some Other Race Alone under 18 from 2010-2020 (from [2020 Census Redistricting: Supplementary Tables](https://www.census.gov), Table 1, times applicable percentage from Table 5, divided by Social Explorer, Census 2010, Table 32A); and (3) applying 106% to row 2.
- Col. 1, row 5: Black Alone or in Combination Modified; simulated using the same (generous) percentage (106%) as Black Alone Modified (col. 1, row 4) applied to col. 1, row 3.
- Col. 1, row 6: Hispanic: [2020 Census Redistricting: Supplementary Tables](https://www.census.gov), Table 1 times applicable percentage from Table 5 (see Col. 1, row 2: Black Alone).
- Col. 2: [National Demographic Analysis Tables: 2020 \(census.gov\)](https://www.census.gov), Tables 1, 1A, 1B, 1C.
- Col. 3: 1.0 minus [Col. 1 / Col. 2 (low – high)] in percents (calculations performed in thousands, not the millions shown in cols. 1, 2).
- Col. 4: [National Population by Characteristics: 2010-2020 \(census.gov\)](https://www.census.gov) (vintage 2020 population estimates): April (from Table for January–June 2020). Population under 18 from rows 3-20; by race: Total from column E; Black Alone Modified = sum of column J for males and column K for females; Black alone and in combination (Black Alone or in Combination Modified) = sum of column V for males and column W for females; Hispanic = sum of column BB for males and BC for females. April only, and not also July, shown because estimates almost the same.
- Col. 5, rows 1, 4, 5: Total, Black Alone Modified, and Black Alone or in Combination Modified: [National Demographic Analysis Tables: 2010 \(Revised\) \(census.gov\)](https://www.census.gov), Table 3, Total Resident Population by Age and Race: April 1, 2010 (contains revised DA middle series estimates and [modified] 2010 census counts).
- Col. 5, row 6: Hispanic: Calculated by William O'Hare.