

Methods Used by the Census Bureau to Measure the Accuracy of the 2020 Census Count

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Why is a Good Census Count Important?

- **Reapportionment**
Constitutional mandate to ensure appropriate delegation size for each state in the House of Representatives
- **Redistricting**
Drawing Political Districts
Based on data that reflect the actual population of our neighborhoods
- **Allocating Federal Funds**
Money for programs and services that contain a population component -- more than 2.8 trillion dollars annually (as of FY 2021)
- **Local Planning**
Foundation for Emergency management, school construction...and our public health response to epidemiological crises



How Do we Know Whether a Census Count is a Good Count?

Demographers calculate census “coverage” or the **completeness** of a census enumeration in two ways:

1. Demographic Analysis (DA)
2. Post Enumeration Survey (PES)



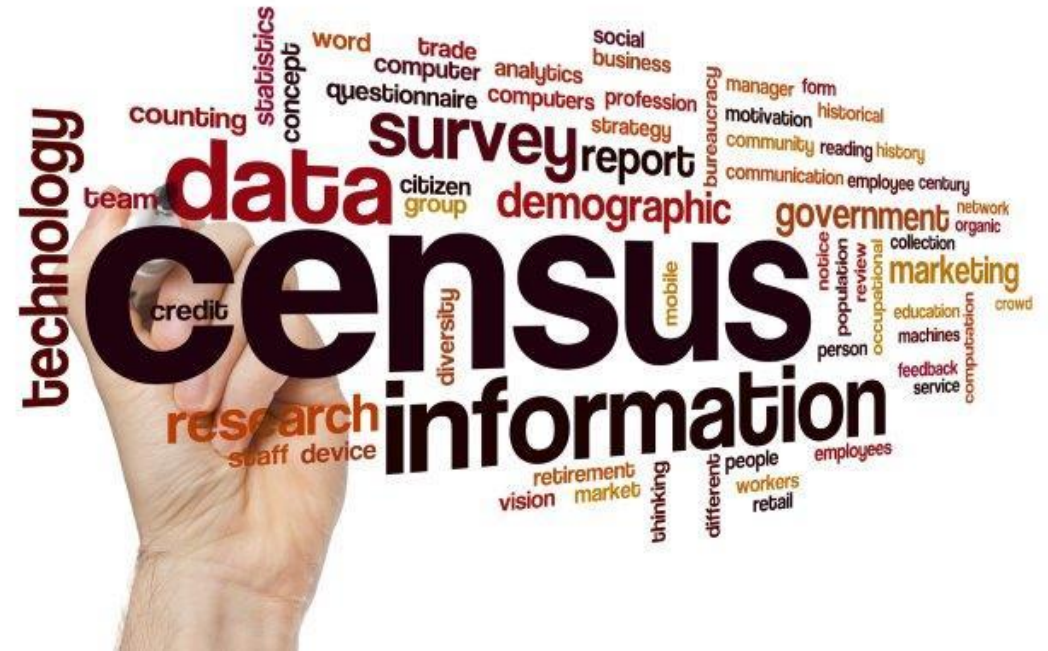
1. Demographic Analysis (DA)

- Uses current and historical vital records, data on international migration, and Medicare enrollment to produce an independent population count
- Results are compared to the census counts to evaluate “net coverage error”



Demographic Analysis (DA)

- **Frequency:** Conducted every 10 years just prior to the release of the census count for apportionment
- **Geographic Detail:** National only
- **Subgroup Detail:** Single years of age, sex, limited race (black/non-black) and Hispanic origin for ages 0-29



Building the Demographic Analysis (DA) Count			
United States			
April 1, 2020 (Middle Series)			
		Number	
Total Population (000s)		332,601	
	Births	288,908	
	Deaths	(22,412)	
	International Migrants	44,256	
	Medicare Enrollees	21,849	
Source: U.S. Census Bureau. Population Division,			
	2020 Census Demographic Analysis		

United States®
Census
2020

331,449,281

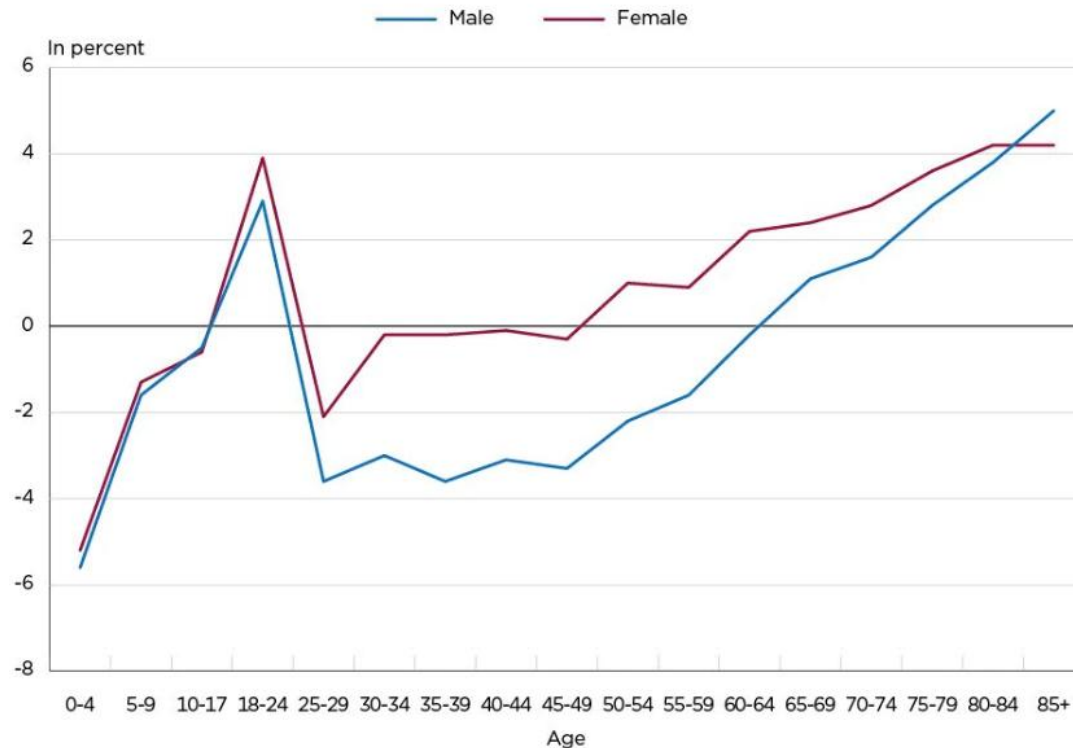
2020 and 2010 Census Coverage Results: DA

Year	DA Net Coverage Error (percents)
2010 Census	0.13
2020 Census	-0.35

Source: U.S. Census Bureau, 2010 and 2020 Demographic Analysis Estimates, Middle Series.

According to DA, the 2020 Census had a net undercount of 0.35 percent, compared with a net overcount of 0.13 percent in 2010.

2020 Demographic Analysis Middle Series Net Coverage Error Estimates for Selected Age Groups by Sex: April 1, 2020

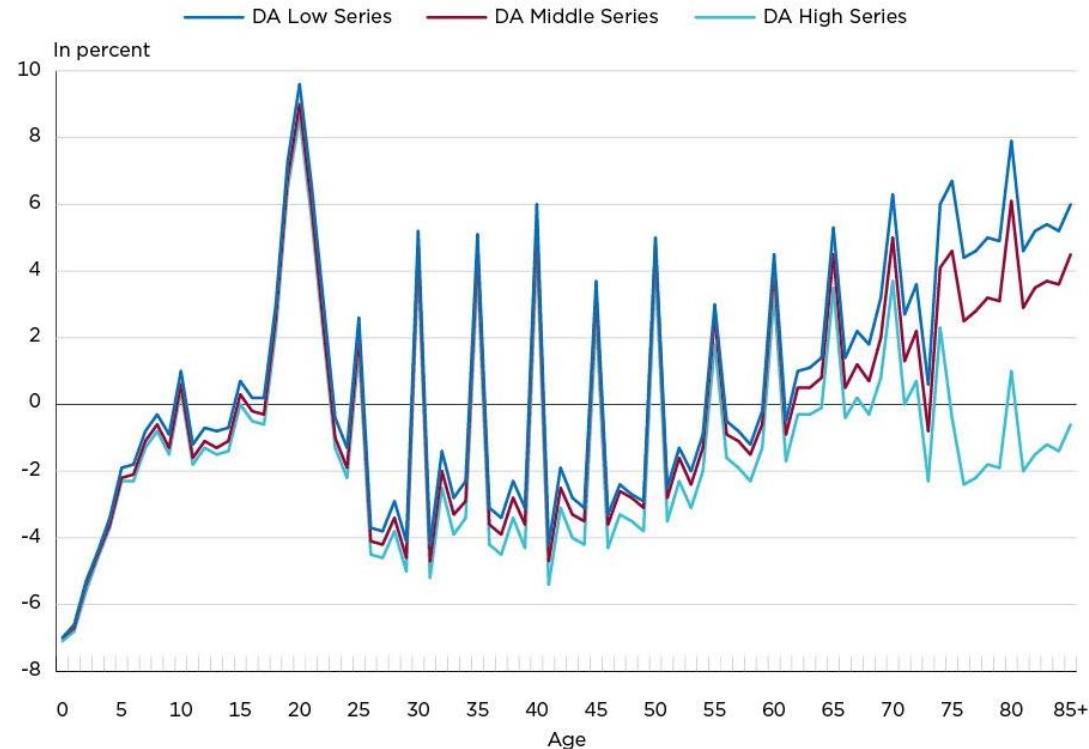


Note: The U.S. Census Bureau reviewed this data product for unauthorized disclosure of confidential information and has approved the disclosure avoidance practices applied to this release.
Source: U.S. Census Bureau, Population Division, 2020 Demographic Analysis (December 2020 release), and 2020 Census special tabulation (DRB Approval Number: CBDRB-FY22-DSEP-001).

- If the census count exactly matched the DA count, all points on the line would be at zero, indicating no difference.
- **Net undercounts in the census fall below the line**, as is the case with those 0-4 years of age
- **Net overcounts in the census are above the line**, as with those 18-24 years and those in the oldest ages.

What are the reasons for these undercounts and overcounts?

Demographic Analysis Net Coverage Error Estimates by Single Year of Age and Series: April 1, 2020



Note: The U.S. Census Bureau reviewed this data product for unauthorized disclosure of confidential information and has approved the disclosure avoidance practices applied to this release.

Source: U.S. Census Bureau, Population Division, 2020 Demographic Analysis (December 2020 release), and 2020 Census special tabulation (DRB Approval Number: CBDRB-FY22-DSEP-001).

- This chart compares the DA count to the Census count by **single years of age**.
- **Net undercounts in the census are below the line.**
- **Points above the line represents overcounts.**
- **Age heaping** - high overcounts in the census at ages ending in 0 and 5. ***Reflects the tendency of respondents to round age.***
- was much higher than in previous censuses.

Why do you think age heaping was higher in the 2020 census?

2. Post-Enumeration Survey

- Independently enumerating a sample of blocks in the census and comparing those results with the same blocks in the decennial census
- Interviews are conducted with all housing units in each of the PES blocks and occupants are matched to their respective records in the decennial census



Post-Enumeration Survey (PES)

- Household population only
(323,200,000 census count in 2020)
- Based on a sample of blocks, which makes it subject to sampling error
- Big Advantage: PES estimates are available at subnational levels -- each of the 50 states and DC for 2020

Census Coverage Estimates for People in the United States by State and Census Operations

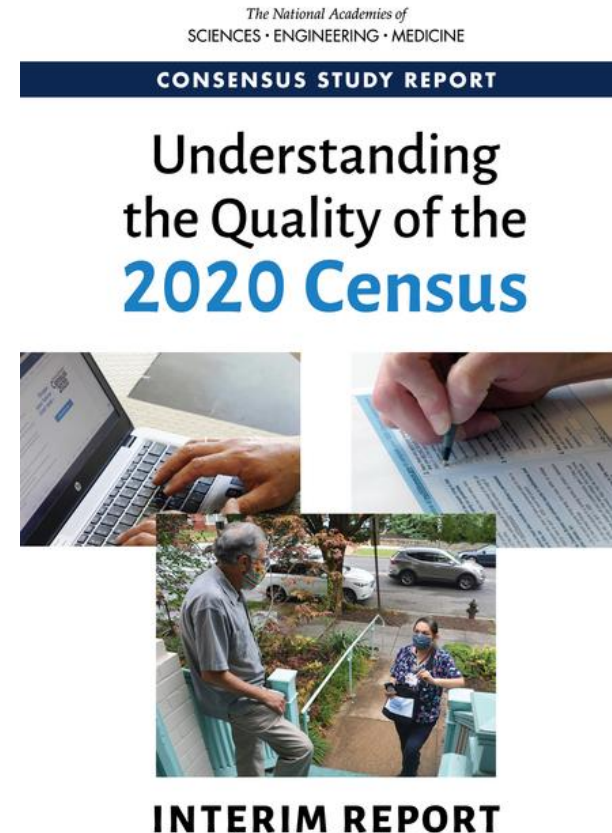
2020 Post-Enumeration Survey Estimation Report

Courtney Hill, Krista Heim, Jinhee Hong, and Nam Phan
Issued May 2022
PES20-G-02



PES Method in 4 Steps

1. **Prior to the beginning of the 2020 census**, the Census Bureau creates an independent list of addresses (on 10,000 blocks nationwide)
2. **Immediately after the census**, field staff interview housing units in these blocks, asking residents where they lived on April 1, 2020, about 161,000 housing units in total



PES Methods (continued)

3. **Information collected for the housing unit and occupants** is matched to 2020 Census data to determine whether people were or were not counted
4. **An estimate of the total U.S. population** is derived after matching and field follow-up to resolve unmatched cases



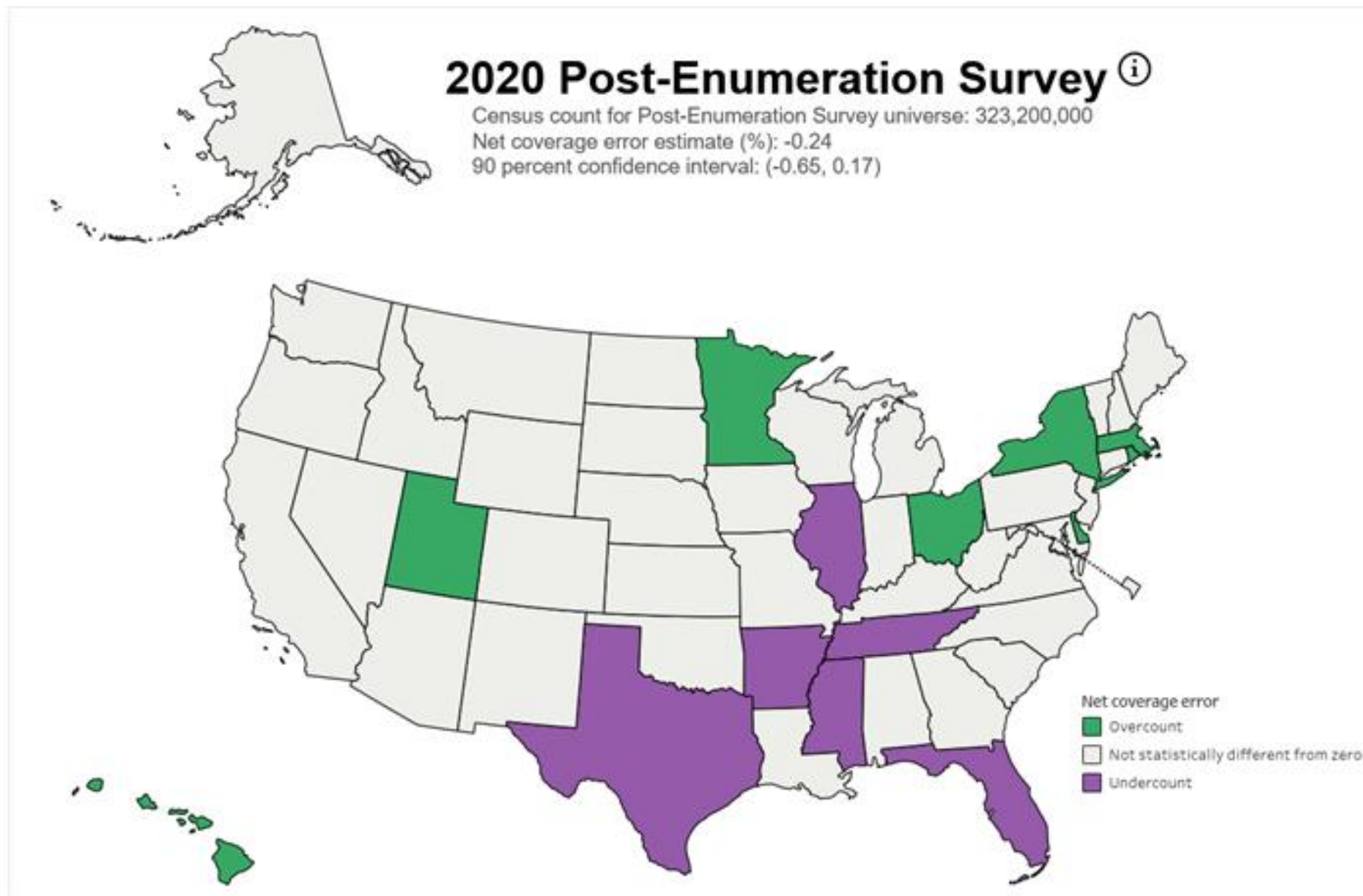
2020 Census Coverage Results: PES

Year	PES (percents)	
	Net coverage error	Standard error
2010 Census	0.01	0.14
2020 Census	-0.24	0.25

Overall differences between the PES and the Census were not significantly different from zero in both 2010 and 2020.

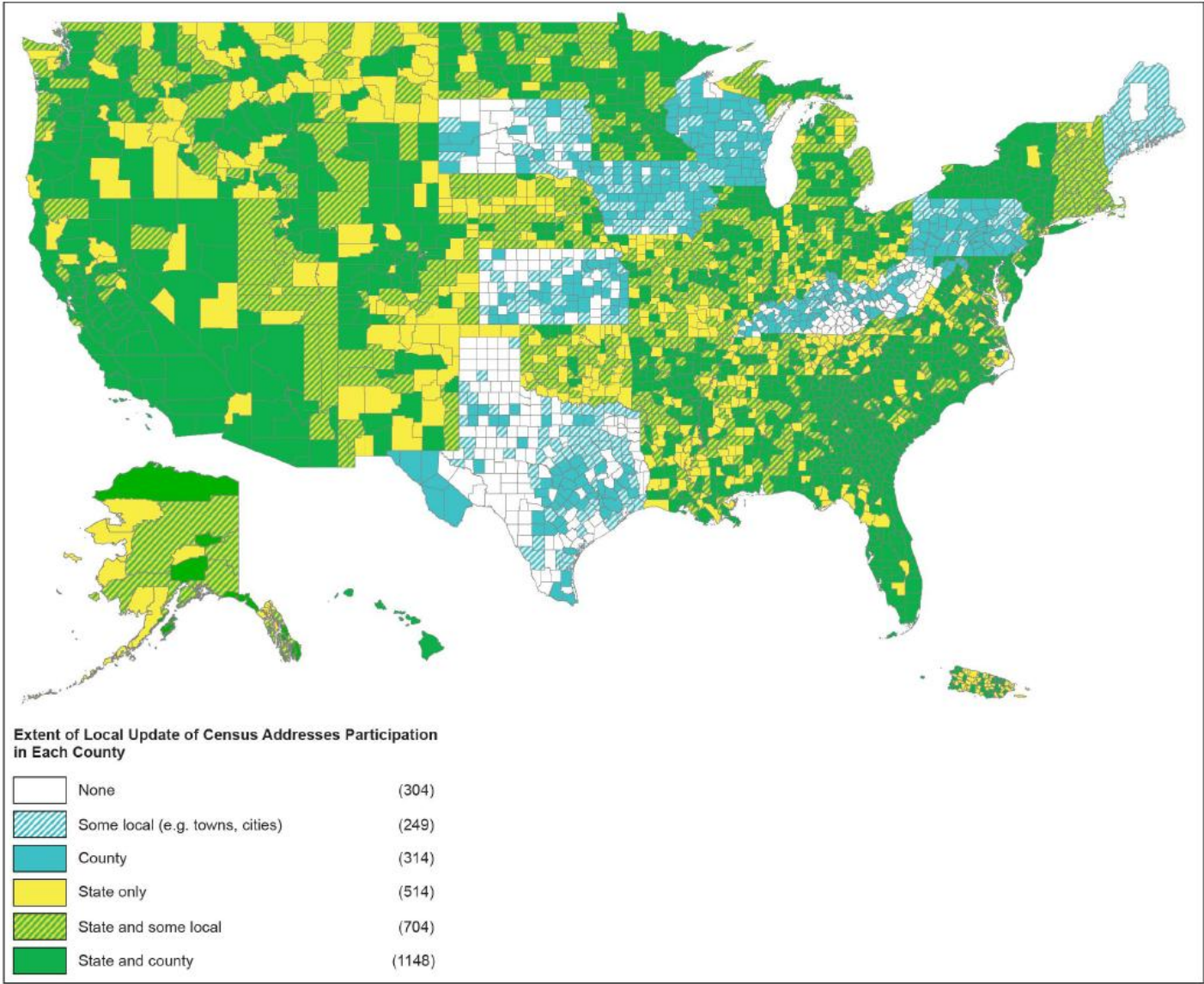
Differences for geographic areas and population subgroups are another matter.

Source: U.S. Census Bureau, 2010 and 2020 Post-Enumeration Surveys and Demographic Analysis Estimates.



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Figure 3: Degree of Local Update of Census Addresses (LUCA) Participation Varied across the Country



Source: GAO analysis of Census Bureau data. | GAO-20-17

Note: If a county government responded, this map does not indicate whether local governments within that county also participated. Additionally, counties without county governments or that had consolidated their county governments with other local governments appear as having participated at the "some local," instead of "county," level.

Net Coverage Error Rates (Percents) for the Population by Race/Hispanic Origin					
United States					
2020 Census					
		2020	SE	2010	SE
Total (Household Population)		-0.24	0.25	0.01	0.14
White Non-Hispanic		*1.64	0.21	*0.83	0.15
Black or African American AOIC		*-3.30	0.61	*-2.06	0.50
Asian AIOC		*2.62	0.77	0.00	0.52
American Indian AOIC on Reservations		*-5.64	2.72	*-4.88	2.37
Hispanic or Latino		*-4.99	0.53	*-1.54	0.33
*Percent net coverage error is significantly different from zero					
AOIC=alone or in combination					
Source: Khubba, S, K. Heim, and J. Hong. (2022) "2020 Post-Enumeration Survey Estimation Report," PES20-G-01, U.S. Census Bureau, March					

Key Metrics	2010 Census	2020 Census	Change/ Importance	Comments
Self-response rate (overall)	66% of all housing units	67% of all housing units	Similar	Yields the highest quality information. Does not adjust for vacant housing units that were -- by definition -- unable to self-respond
In-person interview with household member (NRFU)	75.7% of occupied NRFU households	55.5% of occupied NRFU households	Big Decline	Interviews with Household members are considered to be of high quality
Administrative records used for enumeration	Not used	18.4% of occupied NRFU housing units	New method that reduces the need for proxy enumerations; cost-savings	Administrative Records can vary dramatically in quality, especially for undercounted groups
Proxy-response share (NRFU)	24.7% of occupied NRFU households	26.1% of occupied NRFU households	Roughly the same	Proxy responses are considered to be of poorer quality
Item nonresponse - imputation	Lower	Higher for all items (e.g., age, race, sex)	Raises concerns about data quality	Tied to the absence of interviews with household members, especially the head of household

Methods Used in the 2010 and 2020 Censuses: Key Metrics

Sources: National Academies of Sciences, Engineering, and Medicine. 2023. Assessing the 2020 Census: Final Report. Washington, DC: The National Academies Press. <https://doi.org/10.17226/27150>. U.S. Census Bureau Quality Metrics: <https://www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/process/data-quality.html>. U.S. Census Bureau 2010 CPEX Report: https://www.census.gov/content/dam/Census/library/publications/2012/dec/2010_cpex_190.pdf

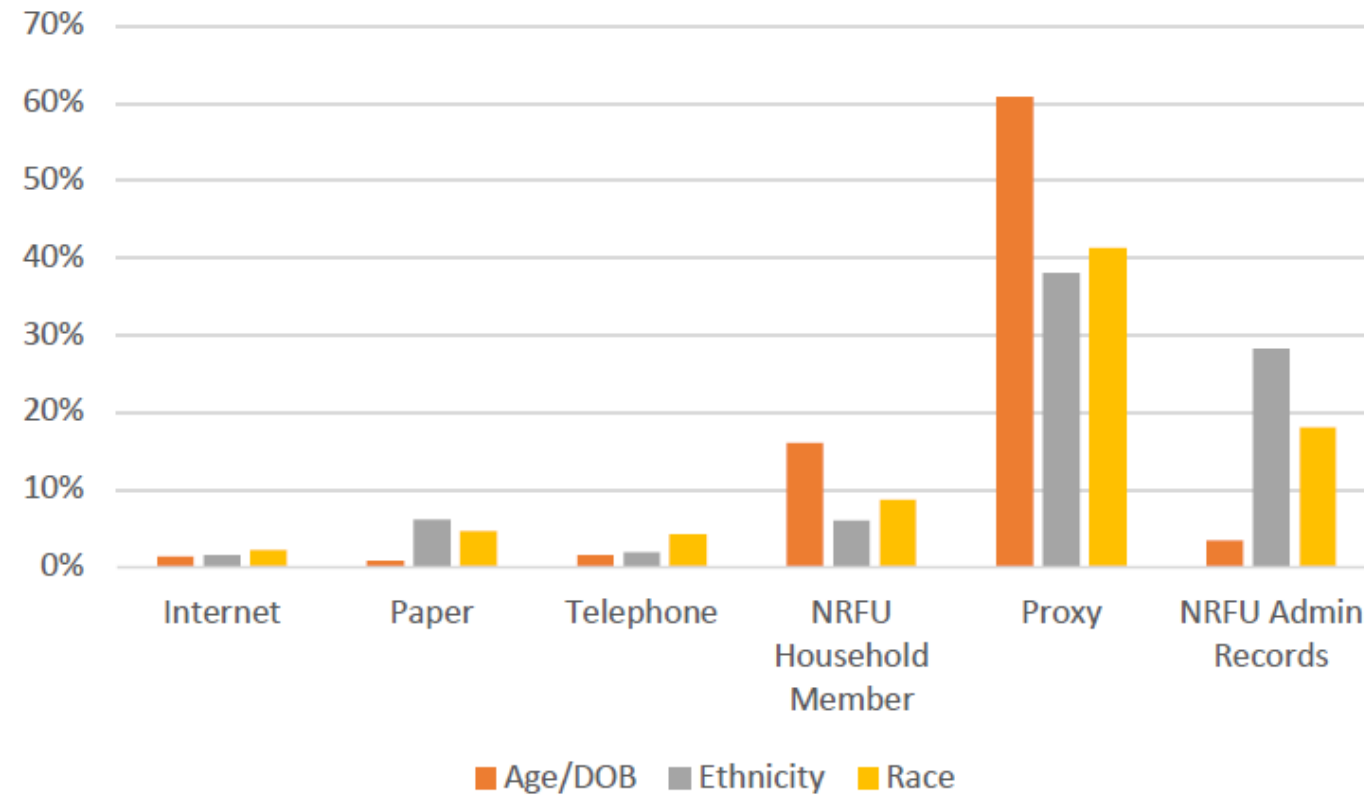


Figure 6.2 2020 Census percent of item nonresponse for age/date of birth, ethnicity, and race by Self-Response and Nonresponse Followup (NRFU) modalities.

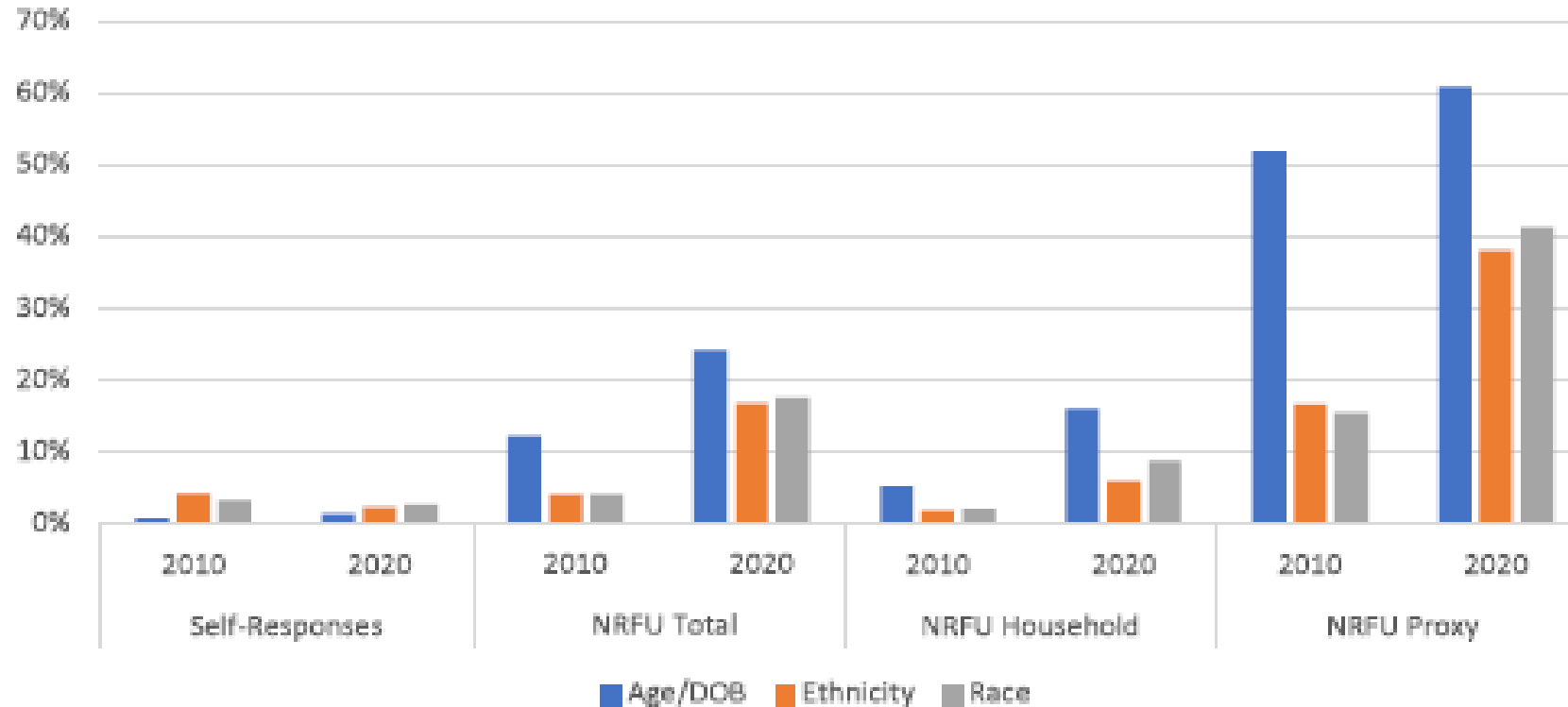


Figure 3.11 Item nonresponse rates for age/date of birth, ethnicity, and race, by type of response, 2010 and 2020 Censuses.

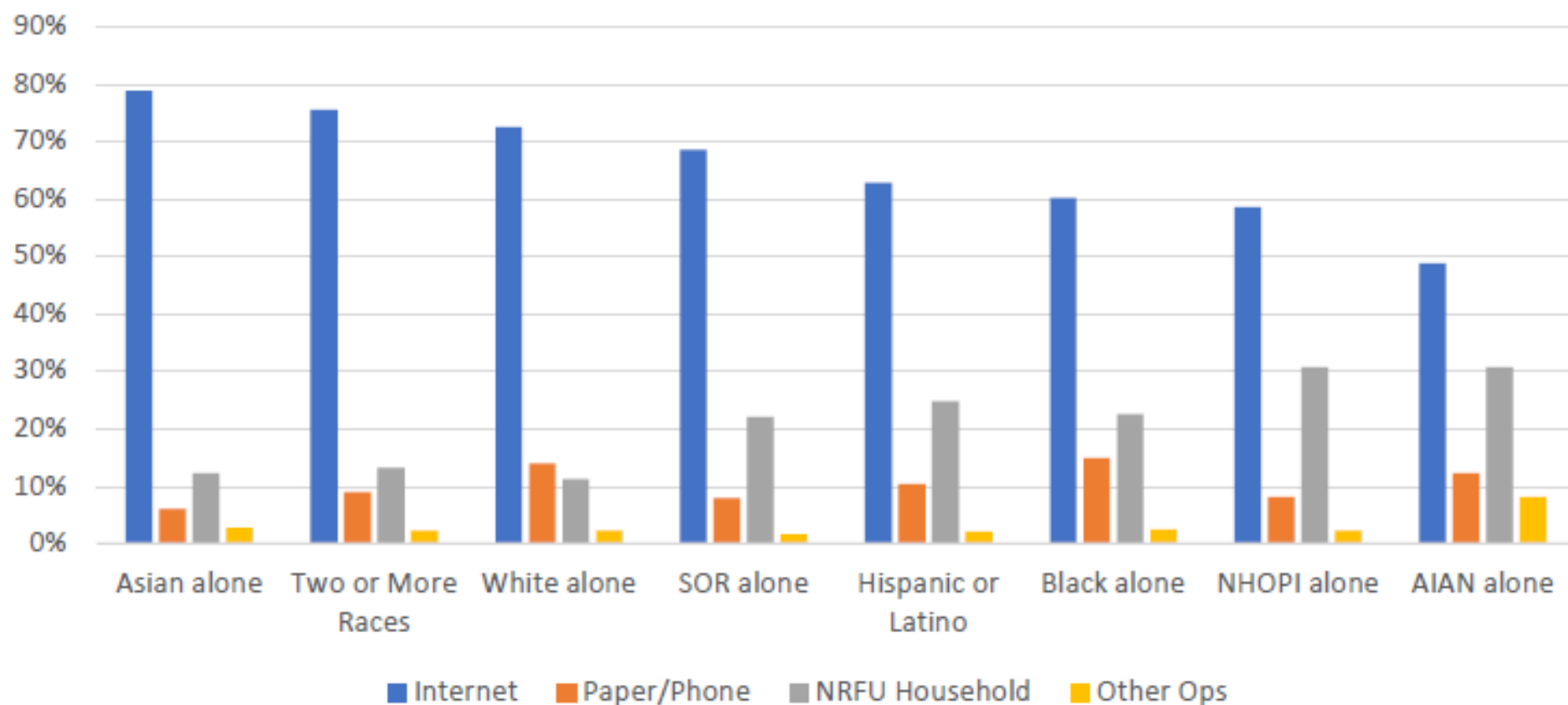


Figure 10.3 Percentage distribution of response modes for race and ethnic groups, 2020 Census.

Table 10.5 Percentage of People with at Least One Item Reported Who Had Ethnicity Imputed and Percentage Who Had Race Imputed, by Response Mode, 2010–2020 Censuses

Census/Response Mode	2010 Ethnicity	2020 Ethnicity	2010 Race	2020 Race
Total Population (%)	4.5	8.7	4.1	9.2
Self-Response	4.8	2.4	4.2	2.8
Enumerator Return	3.3	26.8	3.7	29.0
People in Group Quarters	25.7	46.2	19.0	32.9

NOTES: Total Population excludes whole-person imputations for which only the existence of a person is known and not any of their characteristics; Self-Response includes internet, paper, and telephone; Enumerator Returns include NRFU and other operations such as Update Enumerate, and (for 2020) exclude administrative records enumerations.



Thank you!

