2020 Census Coverage Results From the Post-Enumeration Survey

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2022 California State Data Center Meeting

October 19, 2022

Outline

1. Overview of the Post-Enumeration Survey
2. Net coverage error for people
3. Components of coverage for people
4. State results for California
5. Coverage results for housing units
6. Coverage results for Puerto Rico
7. Overcoming challenges

2020 Census Coverage From the Post-Enumeration Survey

Overview of the Post-Enumeration Survey

October 19, 2022

What is the Post-Enumeration Survey (PES)?

Goal

- To measure coverage of people and housing units in the decennial census.
- To measure net coverage error and components of coverage.
- No intent to adjust the census counts.

How are the data used?

- To assess the success of the current census.
- To provide information to improve the coverage of future censuses.

How is coverage estimated?

- Conduct a survey in sample blocks—independently of the census.
- Match people in the PES independent survey with enumerations in the census to determine who was missed or counted in error.

History

- Used in the U.S. census with different designs and formats since 1950.

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Universe for Person Estimates

	2020 Demographic Analysis (middle series)	2020 Post-Enumeration Survey
Includes household population	Yes	Yes
Includes people living in group quarters (such as college dorms, nursing homes, prisons, …)	Yes	No
Includes people living in Remote Alaska areas	Yes	No
Census count	331,400,000	323,200,000
Estimated population size	332,600,000	323,900,000

Totals rounded to the nearest 100,000.

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Net Coverage Error Estimates for People in the 50 States and the District of Columbia

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Estimated Net Coverage Error Rate

Estimated Net Coverage Error   =

(Census Count – PES Estimate) / PES Estimate * 100

- The PES population estimates are treated as the benchmark when calculating the PES net coverage error estimates.

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Coverage of the Census

In millions

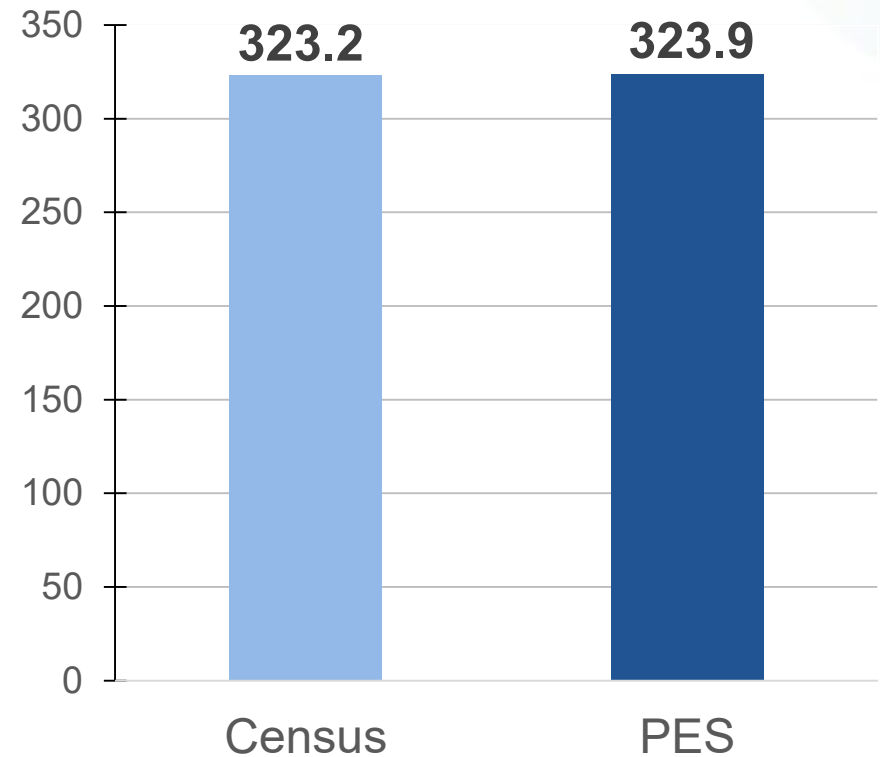|	
Census count of the population	**323,200,000**
Estimate of the population from the PES	**323,900,000**
Net coverage error	**-782,000**
Percent net coverage error	**-0.24 %**

Note: Numbers do not sum to a total due to rounding.

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U.S. Total Percent Net Coverage Error: 1990 to 2020
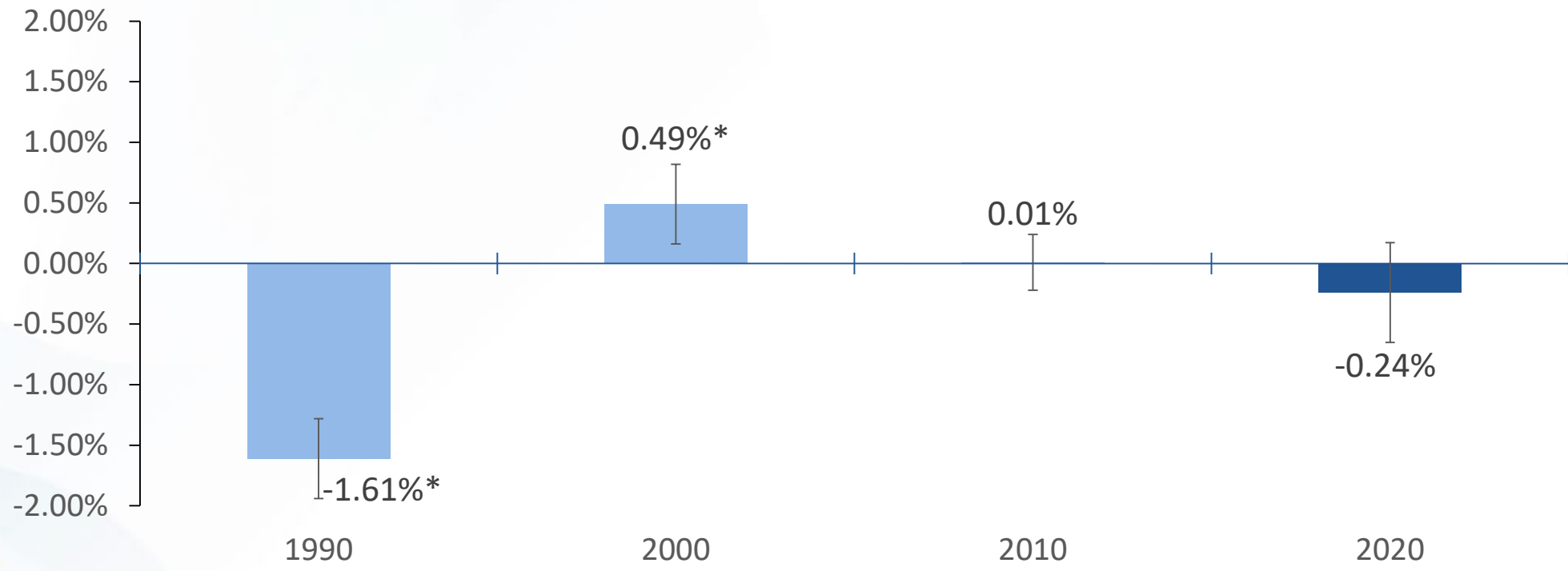
2.00%
1.50%
1.00%
0.50%
0.00%
-0.50%
-1.00%
-1.50%
-2.00%

0.49%*

0.01%

-0.24%

-1.61%*

1990   2000   2010   2020

*Net coverage error is statistically significantly different from 0.

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Post-Enumeration Survey

Percent Net Coverage Error by Race and Hispanic Origin: 2010 and 2020

Race or Hispanic Origin	2010	2020
Total	0.01	-0.24
Race alone or in combination		
White	0.54*	0.66*
Non-Hispanic White alone	0.83*	1.64*
Black or African American	-2.06*	-3.30*
Asian	0.00	2.62*
American Indian or Alaska Native	-0.15*	-0.91*
On Reservation	-4.88*	-5.64*
American Indian Areas Off Reservation	3.86	3.06
Balance of the United States	0.05	-0.86*
Native Hawaiian or Other Pacific Islander	-1.02*	1.28*
Some Other Race	-1.63*	-4.34*
Hispanic or Latino	-1.54*	-4.99*

*Net coverage error is statistically significantly different from 0.

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Percent Net Coverage Error by Race and Hispanic Origin: 2010 and 2020

Race or Hispanic Origin	2010	2020	Is there a significant difference between 2020 and 2010?
Total	0.01	-0.24	
Race alone or in combination			
White	0.54*	0.66*	No
Non-Hispanic White alone	**0.83***	**1.64***	**Yes**
Black or African American	-2.06*	-3.30*	No
Asian	**0.00**	**2.62***	**Yes**
American Indian or Alaska Native	-0.15*	-0.91*	No
On Reservation	-4.88*	-5.64*	No
American Indian Areas Off Reservation	3.86	3.06	No
Balance of the United States	0.05	-0.86*	No
Native Hawaiian or Other Pacific Islander	-1.02*	1.28*	No
Some Other Race	**-1.63***	**-4.34***	**Yes**
Hispanic or Latino	**-1.54***	**-4.99***	**Yes**

*Net coverage error is statistically significantly different from 0.

Percent Net Coverage Error by Age for Children: 1990 to 2020

Age	1990	2000	2010	2020
0-4	-3.18*	0.46	-0.72*	-2.79*
5-9			0.33	-0.10
10-17		1.32*	0.97*	-0.21

*Net coverage error is statistically significantly different from 0.

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Percent Net Coverage Error by Age and Sex for Adults: 1990 to 2020

Age and sex	1990	2000	2010	2020
18-to-29 males	-3.30*	-1.12*	-1.21*	-2.25*
18-to-29 females	-2.83*	1.39*	0.28	-0.98*
30-to-49 males	-1.89*	-2.01*	-3.57*	-3.05*
30-to-49 females	-0.88*	0.60*	0.42*	0.10
50-and-over males	0.59*	0.80*	0.32*	0.55*
50-and-over females	1.24*	2.53*	2.35*	2.63*

*Net coverage error is statistically significantly different from 0.

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Percent Net Coverage Error by Age and Sex: Post-Enumeration Survey (PES) and Demographic Analysis (DA)

Age and sex	2020 PES		DA low	DA middle	DA high
0 to 4	-2.8*		-5.3	-5.4	-5.5
5 to 9	-0.1		-1.2	-1.4	-1.6
10 to 17	-0.2		-0.2	-0.6	-0.8
18-to-29 males	-2.3*		0.7	0.1	-0.3
18-to-29 females	-1.0*		1.8	1.3	0.9
30-to-49 males	-3.1*		-2.8	-3.2	-3.9
30-to-49 females	0.1		0.3	-0.2	-0.8
50+ males	0.6*		1.1	0.2	-1.4
50+ females	2.6*		3.1	2.2	0.5

*Net coverage error is statistically significantly different from 0.

Percent Net Coverage Error for People by Tenure: 1990 to 2020

Owner:
- 1990: -0.04%
- 2000: 1.25%*
- 2010: 0.57%*
- 2020: 0.43%*

Renter:
- 1990: -4.51%*
- 2000: -1.14%*
- 2010: -1.09%*
- 2020: -1.48%*

Legend:
- 1990
- 2000
- 2010
- 2020

*Net coverage error is statistically significantly different from 0.
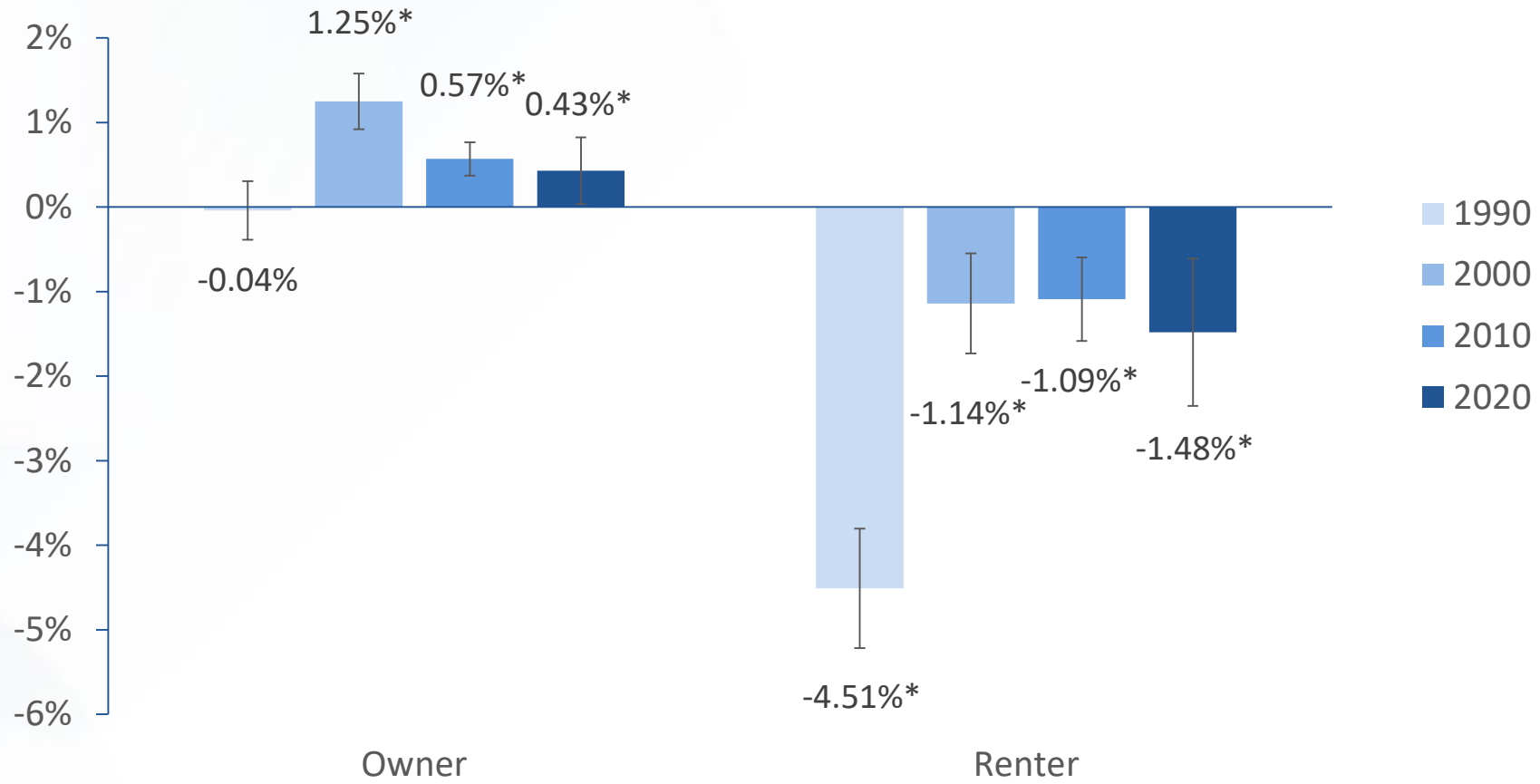
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Summary of Net Coverage Error

- **At the national level, net coverage error was not statistically significant from 0.**
  - The magnitude of the percent net coverage error for 2020 was estimated to be -0.24%.
  - At the national level, we estimated a net coverage error of -782,000 people in the census.

- **Many demographic groups that were undercounted (or overcounted) in the 2010 Census were also undercounted (or overcounted) in the 2020 Census.**

- **The 2020 Census continued to undercount some race and ethnic groups while overcounting others.**

- **The 2020 Census also undercounted young children.**

- **The census continued to undercount renters.**
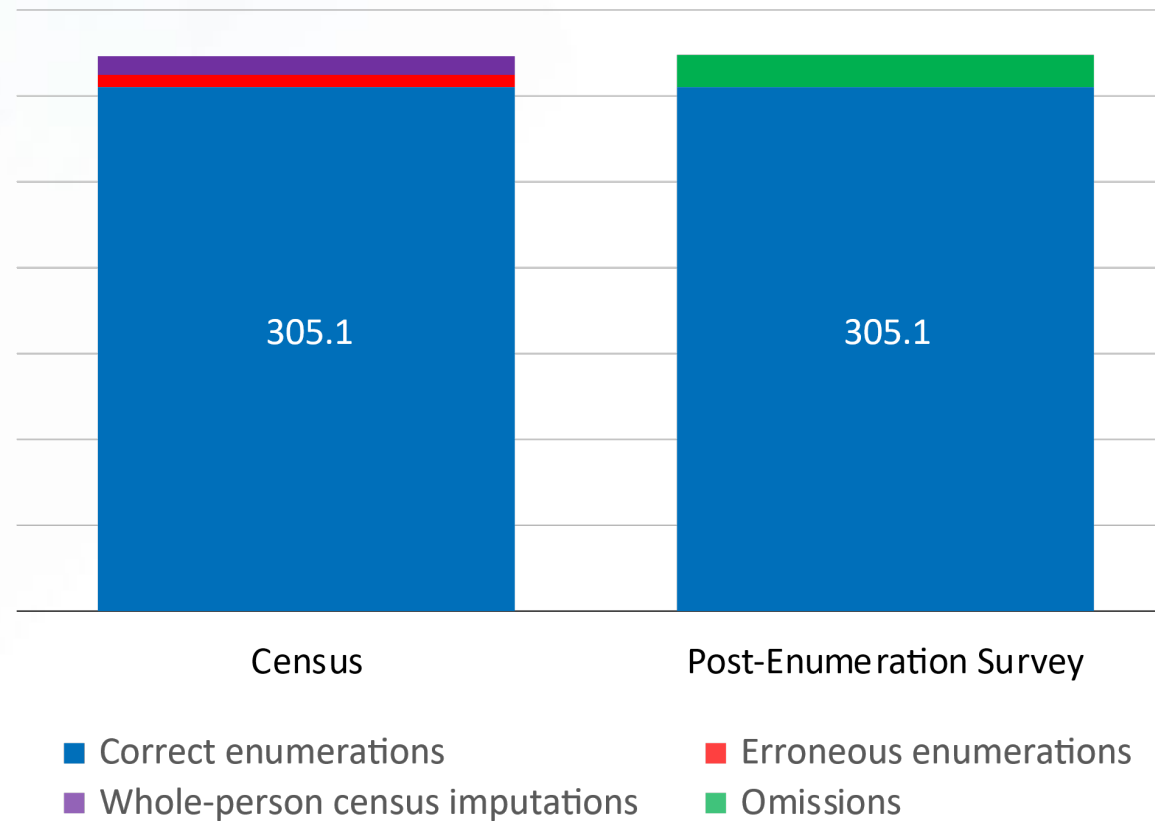
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2020 Census Coverage Results From the Post-Enumeration Survey

Components of Coverage Estimates for People in the 50 States and the District of Columbia
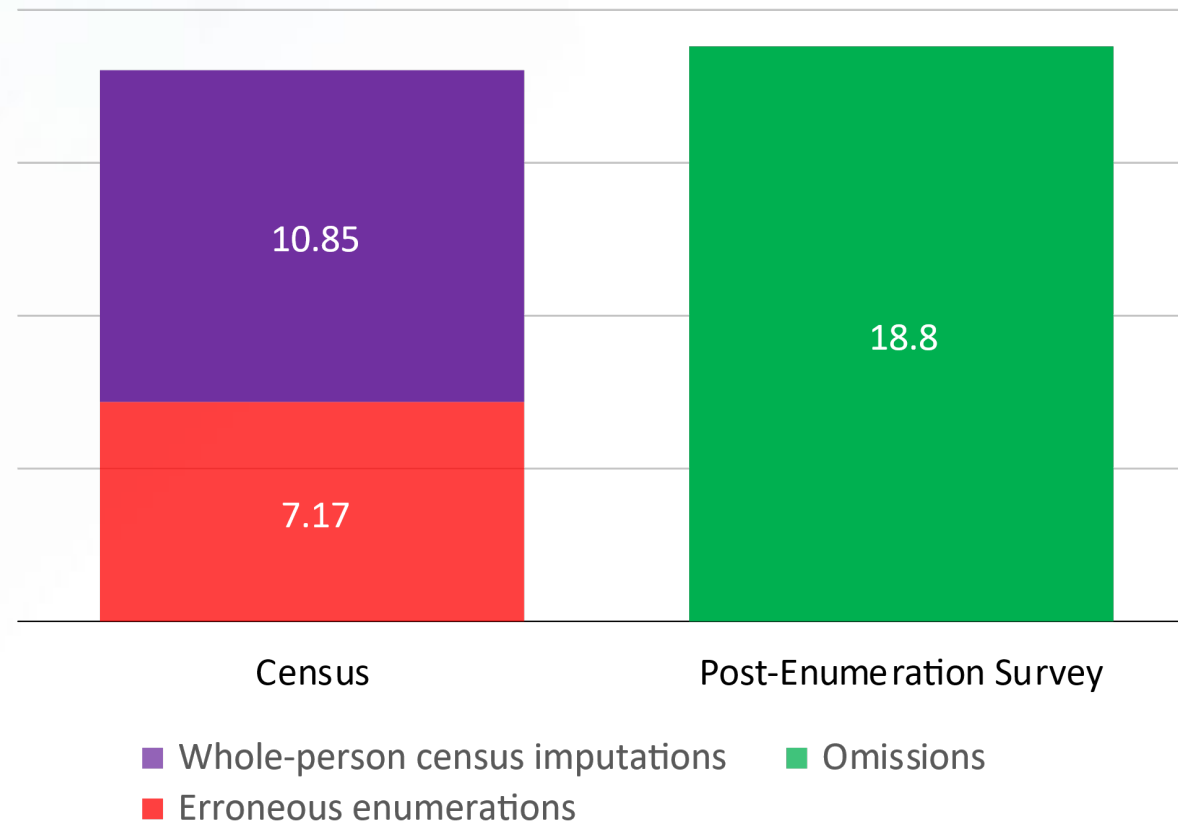
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Components of the Census Coverage in 2020 Level (In millions)

Census: 305.1
Post-Enumeration Survey: 305.1

Legend:
- Correct enumerations (blue)
- Erroneous enumerations (red)
- Whole-person census imputations (purple)
- Omissions (green)

Components of the Census Coverage in 2020 Level (In millions)

Components of Census Coverage: 2010 and 2020 (In thousands)

Component of census coverage	2010				2020			
	Estimate	Standard error	Percent	Standard error	Estimate	Standard error	Percent	Standard error
Census count	300,700	X	100.0	X	323,200	X	100.0	X
Correct enumerations	284,700	199	94.7	0.07	305,100	145	94.4	0.04
Erroneous enumerations	10,040	199	**3.3**	0.07	7,167	145	**2.2**	0.04
Due to duplication	8,251	194	**2.8**	0.06	5,170	129	**1.6**	0.04
For other reasons	1,520	45	**0.5**	0.01	1,997	88	**0.6**	0.03
Whole-person imputations	5,993	X	2.0	X	10,850	X	3.4	X

X Not applicable.

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Whole-Person Census Imputations
(In millions)

Whole-person census imputations	2000		2010		2020	
	Count	Percent	Count	Percent	Count	Percent
Total	5.77	2.1	5.99	2.0	10.85	3.4
Population count already known	4.60	1.7	4.83	1.6	8.99	2.8
Population count missing	1.17	0.4	1.16	0.4	1.86	0.6

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Percent Components of Census Coverage: Race (Alone or in Combination) and Hispanic Origin
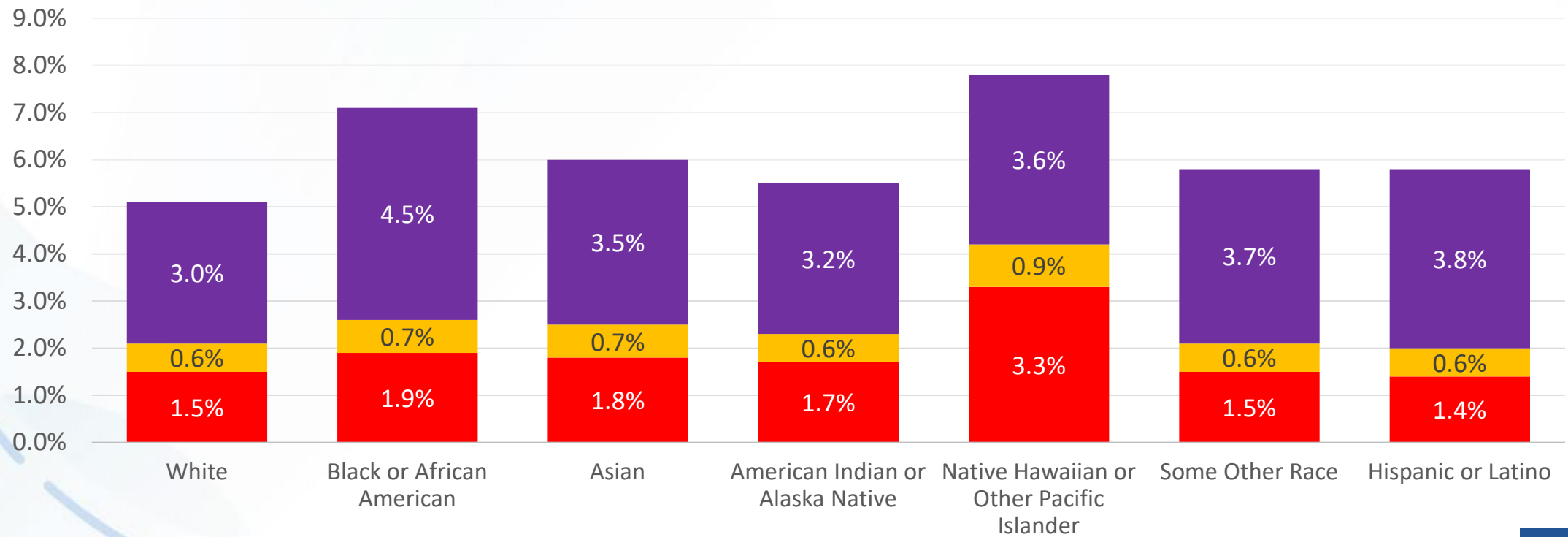
■ Erroneous enumerations due to duplication ■ Erroneous enumerations for other reasons ■ Whole-person census imputations

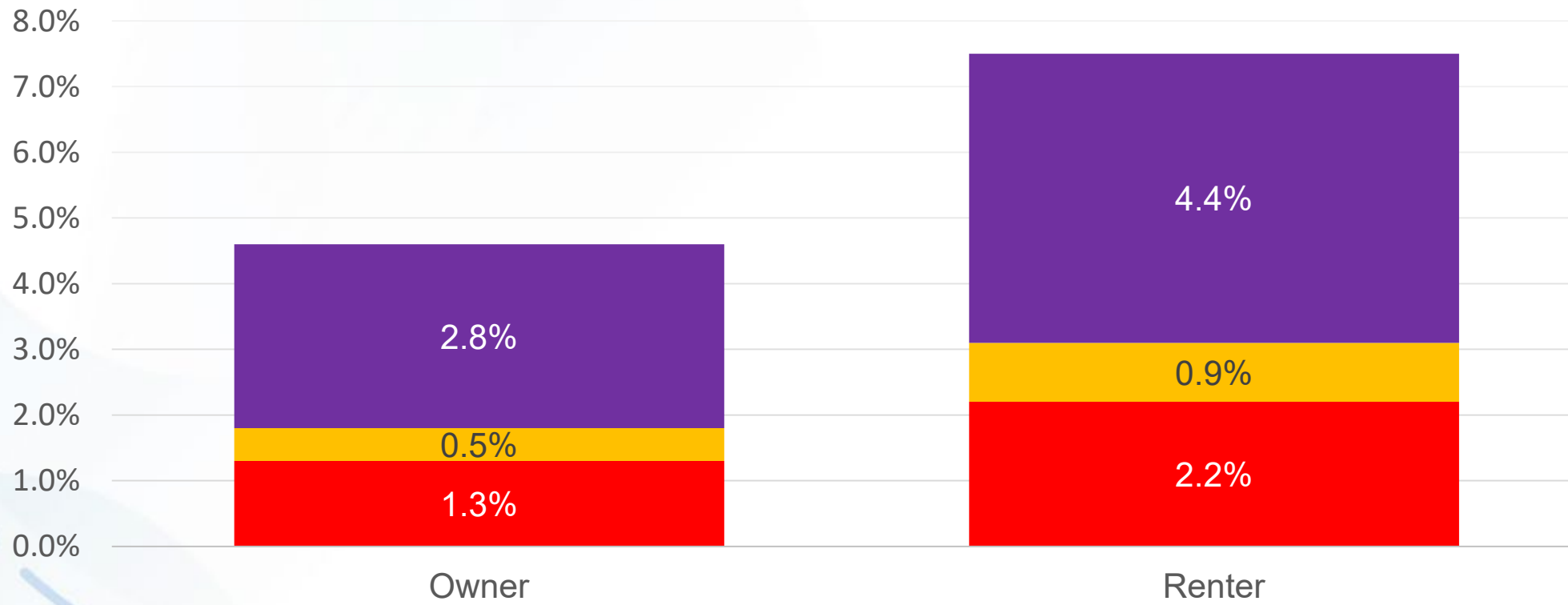# Percent Components of Census Coverage: Tenure

Legend: ■ Erroneous enumerations due to duplication ■ Erroneous enumerations for other reasons ■ Whole-person census imputations

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Percent Components of Census Coverage: Relationship to Householder
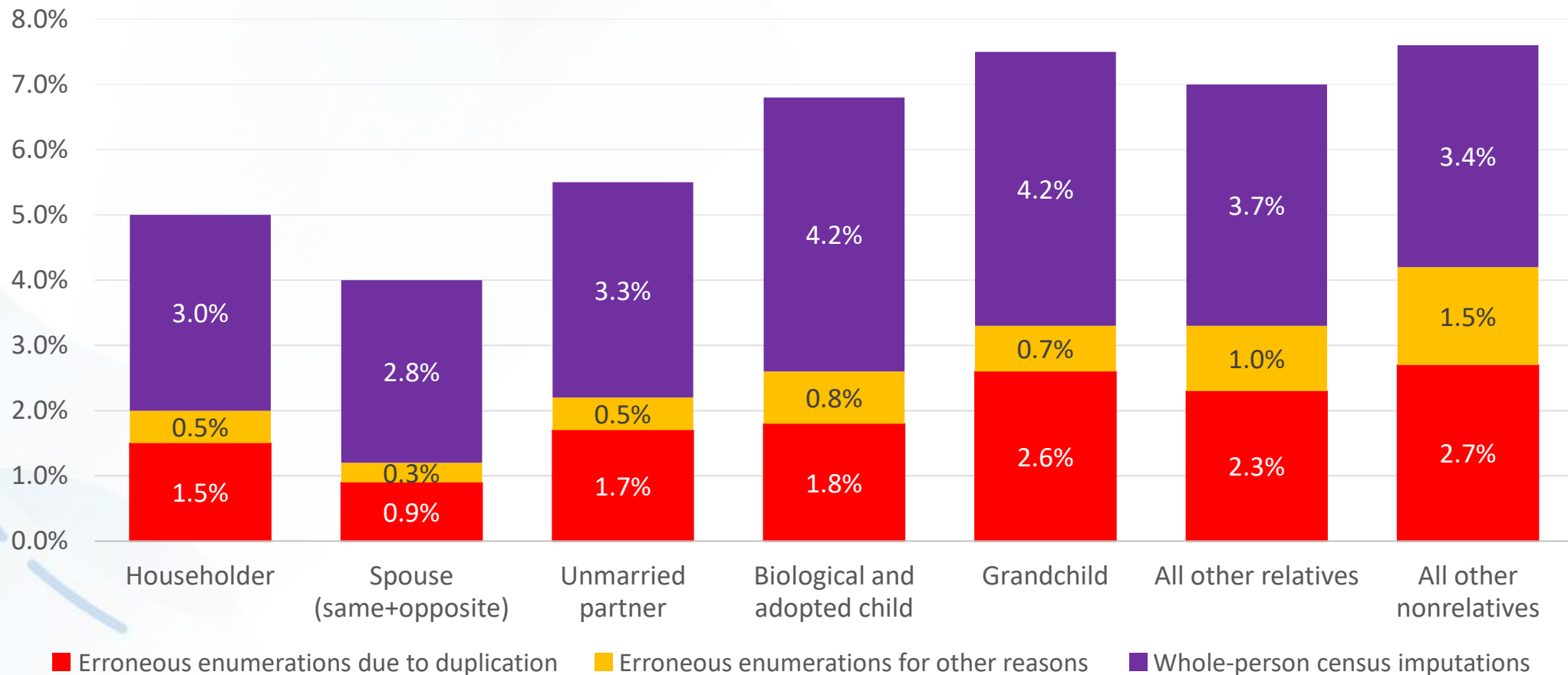
National Components of the Post-Enumeration Survey (PES) Estimate

(In millions)

Component of PES Estimate	2010				2020			
	Estimate	Standard error	Percent	Standard error	Estimate	Standard error	Percent	Standard error
Estimate of Pop. From PES	300.7	0.43	100.0	X	323.9	0.82	100.0	X
Correct Enumerations	284.7	0.20	94.7	0.1	305.1	0.15	94.2	0.24
Omissions	16.0	0.44	5.3	0.1	18.8	0.82	5.8	0.24

X Not applicable.

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2010 and 2020 Census Omission Rates: Race (Alone or in Combination) and Hispanic Origin

Chart data:

Category	2010	2020
White	4.3%	4.5%
Black or African American	9.3%	10.2%
Asian	5.3%	3.5%
American Indian or Alaska Native	7.6%	6.4%
Native Hawaiian or Other Pacific Islander	7.9%	6.6%
Some Other Race	8.6%	9.9%
Hispanic or Latino	7.7%	10.5%
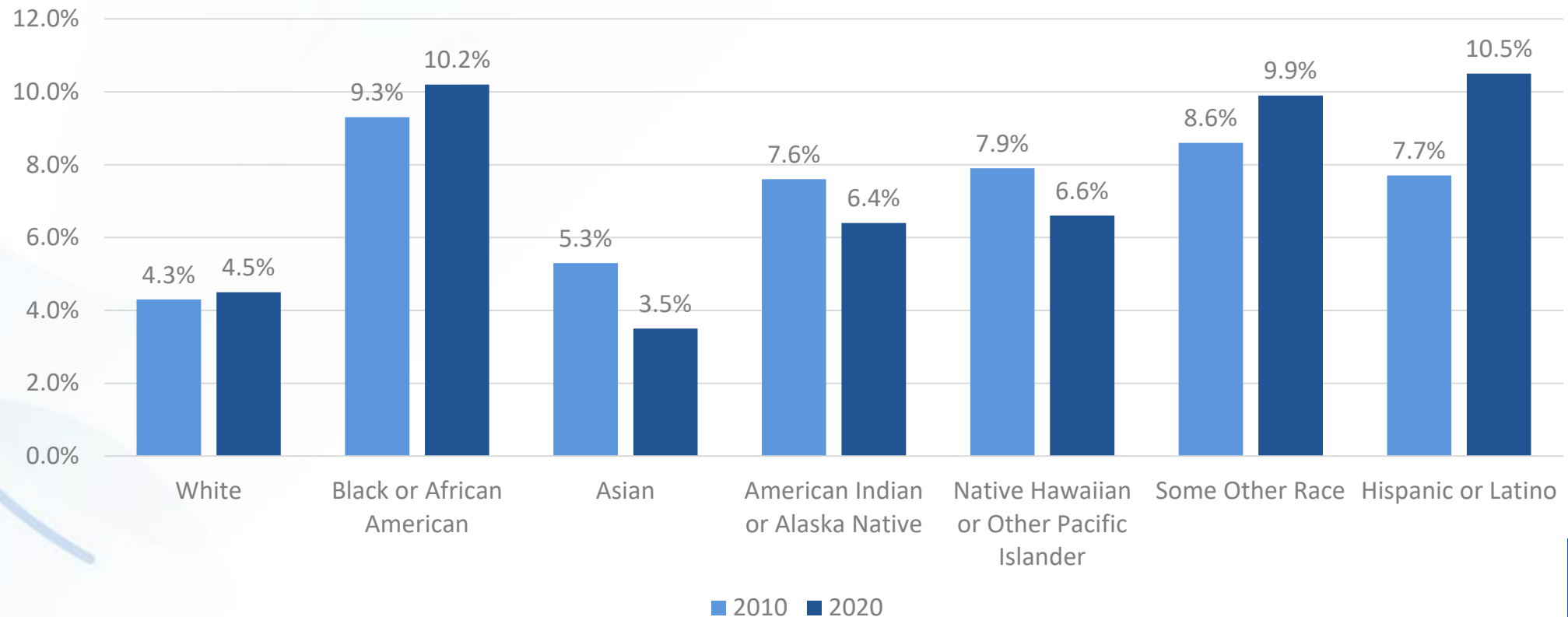
2010 and 2020 Census Omission Rates: Owners and Renters
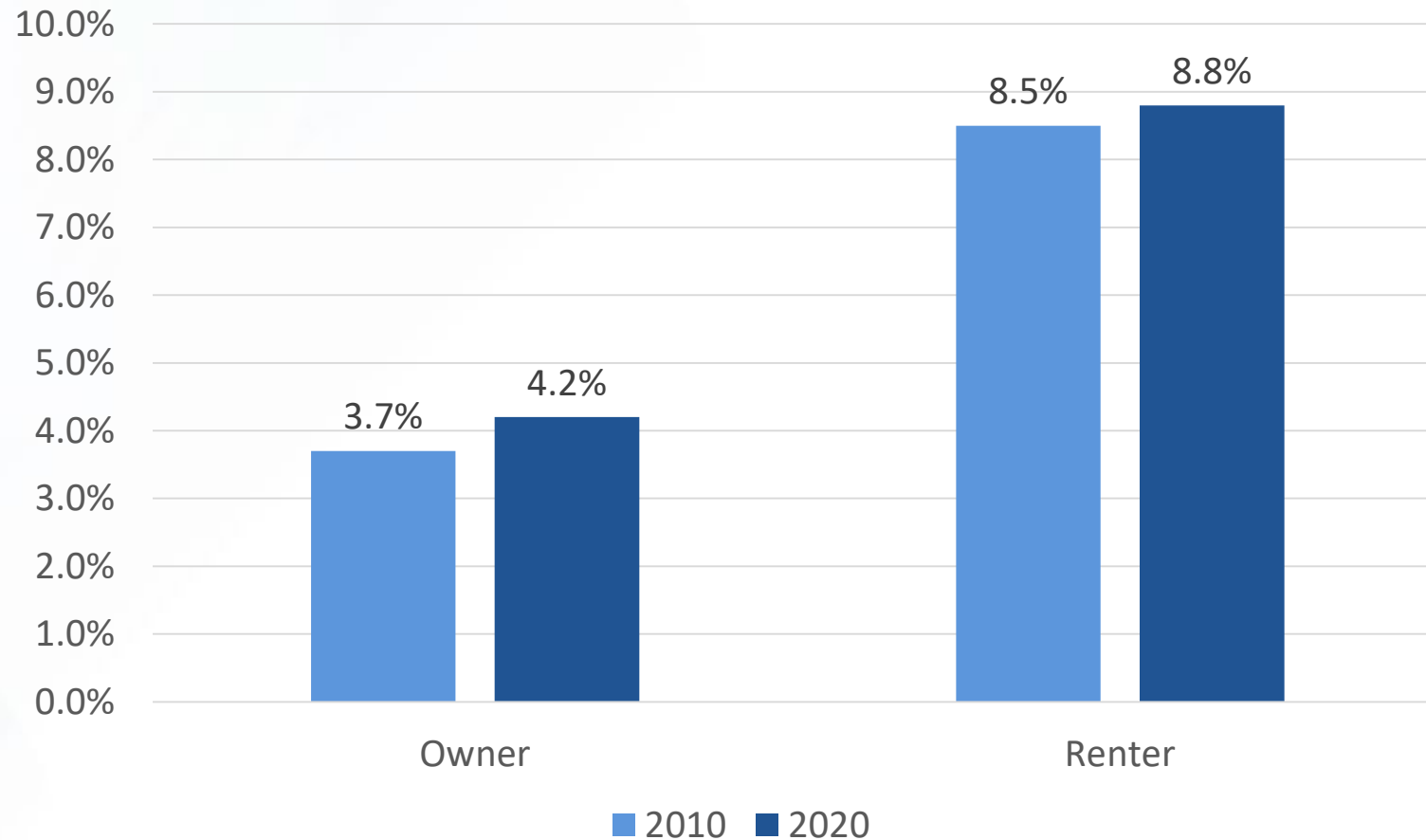
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2020 Census Coverage Results From the Post-Enumeration Survey

Census Coverage Estimates for People by State

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Key Findings for States

- **36 states and Washington, DC, did not have a statistically significant undercount or overcount.**

- **Eight states had a statistically significant overcount.**

- **Six states had a statistically significant undercount.**

- **Components of coverage can be found for every state in our report and tables released on May 19, 2022.**

*Note: While the Post-Enumeration Survey (PES) can measure estimated undercounts and overcounts in the census, it cannot answer **why** a particular state experienced one.*

2020 Post-Enumeration Survey ⓘ

Census count for Post-Enumeration Survey universe: 323,200,000
Net coverage error estimate (%): -0.24
90 percent confidence interval: (-0.65, 0.17)

Net coverage error

- 🟩 Overcount
- ⬜ Not statistically different from zero
- 🟪 Undercount
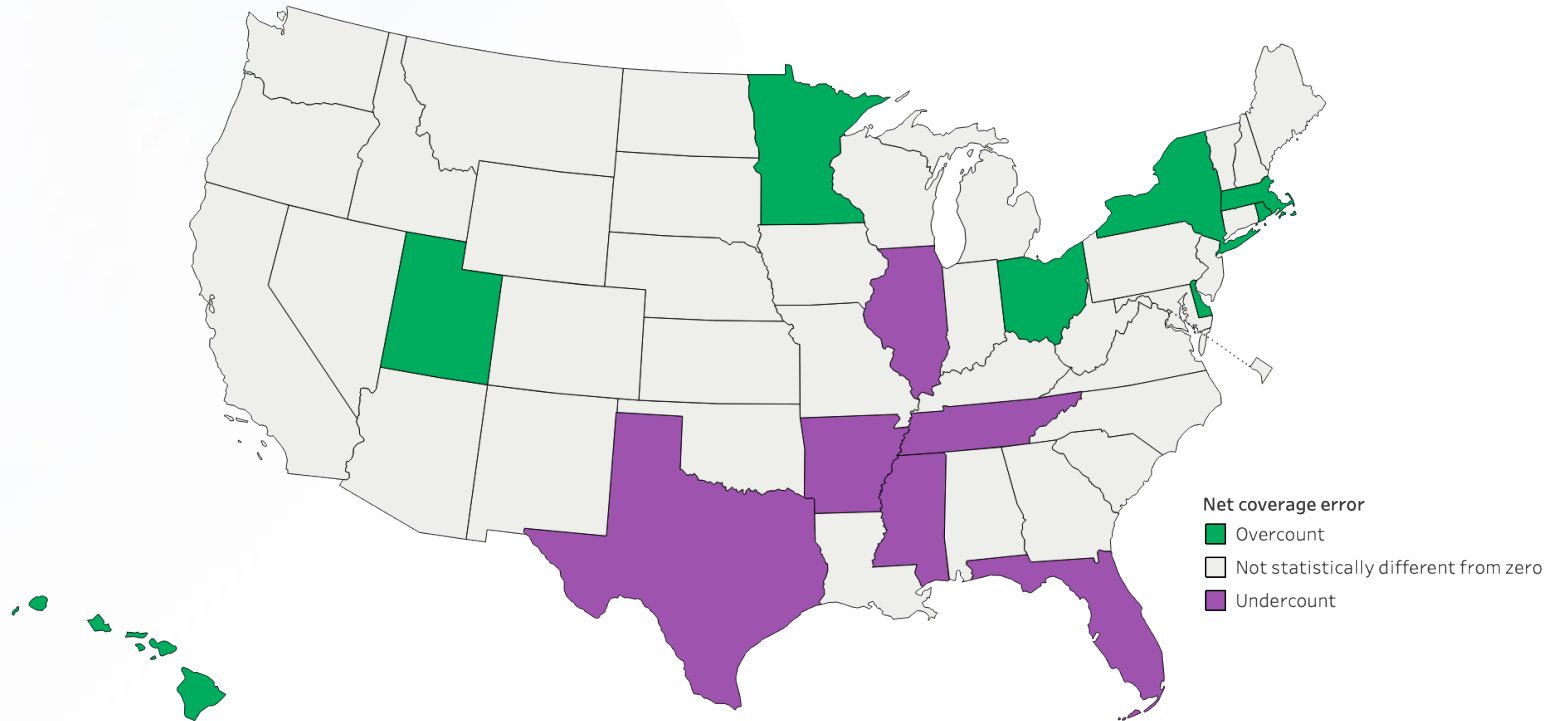
Note: Post-Enumeration Survey (PES) estimates are subject to sampling and nonsampling errors. The PES universe does not include people living in group quarters. More information regarding data collection, definitions, sampling error, nonsampling error, and estimation methodology is available at the Post-Enumeration Surveys site.

Source: U.S. Census Bureau,
2020 Post-Enumeration Survey
(May 2022 release)

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States With an Undercount or Overcount

Undercount

| State | Net coverage error rate | |
	Rate	90 percent confidence interval
Arkansas	−5.04	−8.68 to −1.40
Florida	−3.48	−4.98 to −1.98
Illinois	−1.97	−3.43 to −0.51
Mississippi	−4.11	−6.79 to −1.43
Tennessee	−4.78	−7.26 to −2.30
Texas	−1.92	−3.27 to −0.57

Overcount

| State | Net coverage error rate | |
	Rate	90 percent confidence interval
Delaware	5.45	0.81 to 10.09
Hawaii	6.79	4.03 to 9.55
Massachusetts	2.24	0.50 to 3.98
Minnesota	3.84	2.24 to 5.44
New York	3.44	1.89 to 4.99
Ohio	1.49	0.39 to 2.59
Rhode Island	5.05	2.70 to 7.40
Utah	2.59	0.57 to 4.61

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Components of Census Coverage for California

Census Household Population Count: 38,620,000

Component of the census count	Percent	Standard error
Census count	100.0	X
Correct enumerations		
Same County	94.0	0.2
Different County	0.2	Z
Erroneous enumerations		
Wrong State	0.2	Z
Due to Duplication	1.4	0.1
For other reasons	0.6	0.1
Whole-person imputations	3.6	X

Component of the population estimate	Percent	Standard error
Dual-system estimate	100.0	X
Correct enumerations	94.7	0.6
Omissions	5.3	0.6

X Not applicable.
Z Represents or rounds to zero.

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2020 Census Coverage Results From the Post-Enumeration Survey

Census Coverage Esimates for **Housing Units** in the 50 States and the District of Columbia

October 19, 2022

2020 Census Coverage Highlights for Housing Units in the 50 States and the District of Columbia

- The PES estimate of housing units for the nation was not statistically different from the 2020 Census housing count.

- States

  o 41 states and the District of Columbia did not have a statistically significant undercount or overcount.

  o Seven states had a statistically significant overcount.

  o Two states had a statistically significant undercount.

Note: More graphs and tables can be found in the PES report.

Housing Unit Coverage Estimates

Component of Census Coverage	Estimate	Standard Error	Percent	Standard Error
Census Count	140,500,000	X	100.0	X
Correct enumerations	136,100,000	165,000	96.9	0.12
Erroneous enumerations	4,397,000	165,000	3.1	0.12
Due to duplication	1,903,000	118,000	1.4	0.08
For other reasons	2,494,000	110,000	1.8	0.08
Estimate of Housing from the PES	140,400,000	291,000	100.0	X
Correct enumerations	136,100,000	165,000	96.9	0.16
Omissions	4,338,000	235,000	3.1	0.16
Net Coverage Error	60,000	291,000	0.04	0.21

Housing Unit Coverage Estimates

Component of Census Coverage	Estimate	Standard Error	Percent	Standard Error
Census Count	140,500,000	X	100.0	X
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Census Count	140,500,000	X	100.0	X
Correct enumerations	136,100,000	165,000	96.9	0.12
Erroneous enumerations	4,397,000	165,000	3.1	0.12
Due to duplication	1,903,000	118,000	1.4	0.08
For other reasons	2,494,000	110,000	1.8	0.08
Estimate of Housing from the PES	140,400,000	291,000	100.0	X
Correct enumerations	136,100,000	165,000	96.9	0.16
Omissions	4,338,000	235,000	3.1	0.16
Net Coverage Error	60,000	291,000	0.04	0.21

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United States® Census 2020

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Housing Unit Coverage Estimates:
Percent Net Coverage Error by Occupancy

Year	Occupied	Vacant	Total
2020	0.33	-2.57	0.04
2010	-0.03	-4.80	-0.60
2000	-0.33	-3.37	-0.61
1990	-0.53	-4.71	-0.96

Gray: Net coverage error is not statistically significantly different from 0.

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Housing Unit Coverage Estimates:
States With an Undercount or Overcount

Undercount

State	Net coverage error rate	
	Rate	90 percent confidence interval
South Carolina	-2.46	-4.15 to -0.77
Vermont	-4.07	-7.67 to -0.47

Overcount

State	Net coverage error rate	
	Rate	90 percent confidence interval
Alabama	2.67	1.22 to 4.12
Massachusetts	1.40	0.48 to 2.32
New Jersey	2.53	1.18 to 3.88
New York	3.72	2.88 to 4.56
Ohio	1.24	0.50 to 1.98
Rhode Island	1.64	0.46 to 2.82
Utah	0.76	0.09 to 1.43

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Components of Census Coverage for California
Census Housing Unit Count: 14,390,000

Component of the census count	Percent	Standard error
Census count	100.0	X
Correct enumerations	97.4	0.5
Erroneous enumerations		
Due to Duplication	1.5	0.4
For other reasons	1.1	0.2

Component of the population estimate	Percent	Standard error
Dual-system estimate	100.0	X
Correct enumerations	97.5	0.7
Omissions	2.5	0.7

X Not applicable.

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2020 Census Coverage Results From the Post-Enumeration Survey

Census Coverage Estimates for Puerto Rico

October 19, 2022

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Highlights of 2020 Census Coverage in Puerto Rico

People

- **The PES estimated that the 2020 Census overcounted the population of Puerto Rico by 174,000. This represents a net coverage error rate of 5.7 percent.**

- **The PES estimated that the 2020 Census overcounted the number of people in owned housing units in Puerto Rico.**

- **The PES estimated statistically significant overcounts in Puerto Rico for people aged 30 years and older.**

Housing Units

- **The PES estimated that the 2020 Census housing unit count in Puerto Rico did not have a statistically significant net coverage error.**

Note: More graphs and tables can be found in the PES report.

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2020 Census Coverage Results From the Post-Enumeration Survey

Overcoming Challenges

October 19, 2022

Post-Enumeration Survey Challenges

- **Global pandemic.**

- **Delays to field work.**
  - Matching people who might not accurately report their census residence status.

- **Migration of many college students and others.**

- **Some respondents did not respond to questions needed to match the PES to the 2020 Census.**
  - Matching people to the census with increased item nonresponse.

2020 Census Coverage Results From the Post-Enumeration Survey

Thank you

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