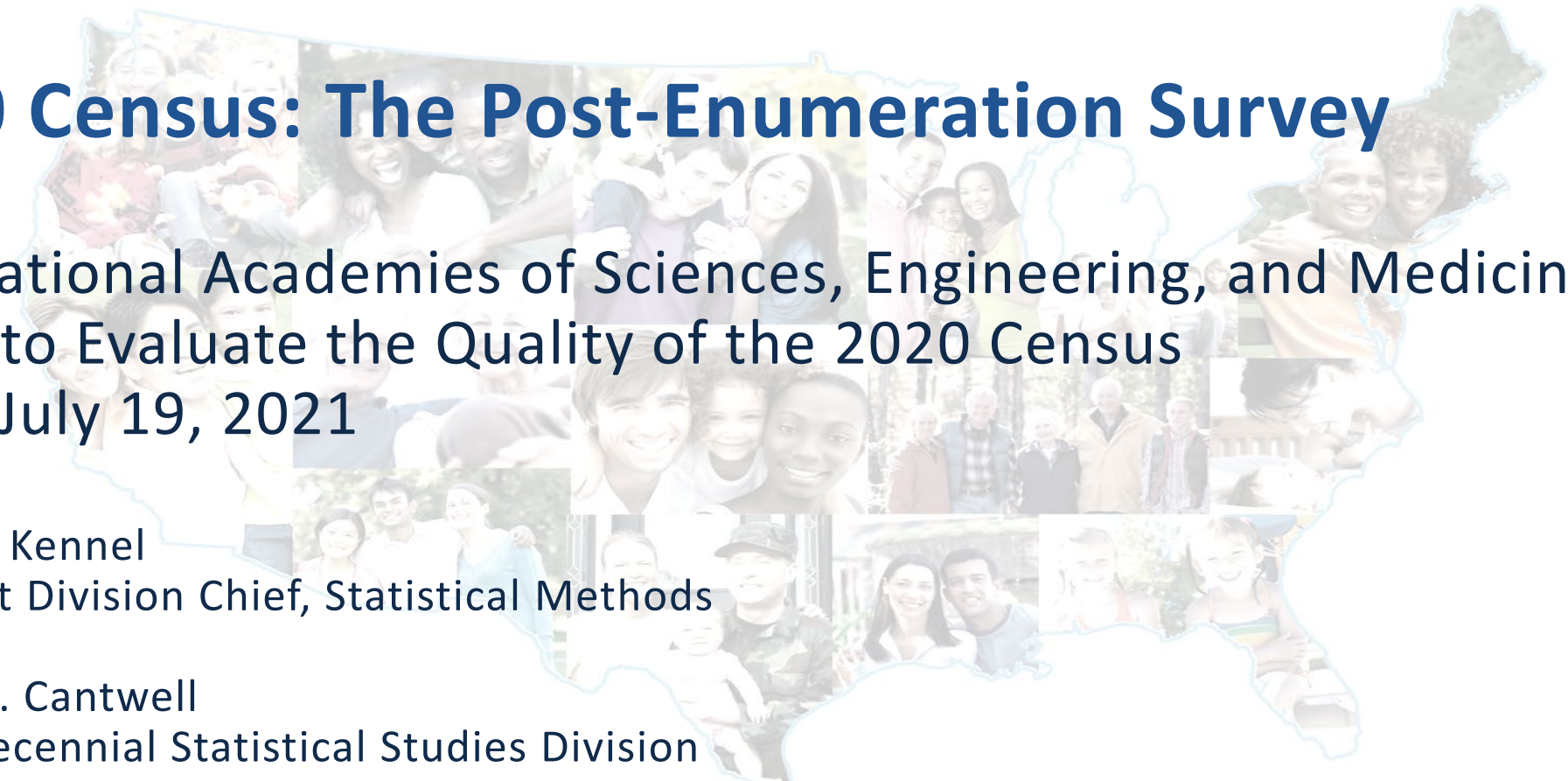




2020 Census: The Post-Enumeration Survey

The National Academies of Sciences, Engineering, and Medicine:
Panel to Evaluate the Quality of the 2020 Census
Date: July 19, 2021

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Outline

1. Measuring census quality and estimating the accuracy of the census count
2. Design of the 2020 Post-Enumeration Survey
3. Reports

Measuring Census Quality and Estimating the Accuracy of the Census Count

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Measuring Census Quality

- Census process indicators
- Assessments and evaluations of census operations
- Demographic Analysis (DA) and other methods
- Post-Enumeration Survey (PES)

What is a Post-Enumeration Survey?

Goal

- Measure coverage of people and housing units in the decennial census
- 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 United States census since 1950

Net Coverage Error

Net census coverage error (defined as) = Census count – True population size

Negative net coverage error → **fewer** people are included in the census than are in the true population; called an **undercount**

Positive net coverage error → **more** people are included in the census than are in the true population; called an **overcount**

Note: In the past documentation of PES results, we defined the net undercount using the opposite of the difference above. Here, and when providing results from 2020, we will use the definition above.

Net Undercount of U.S. Household Population

Year	Census Count	Net Coverage Error	Percent Coverage Error
2010	300,700,000	36,000	0.01 %
2000	273,600,000	1,332,000*	0.49 %*
1990	248,700,000	– 3,994,000*	– 1.61 %*

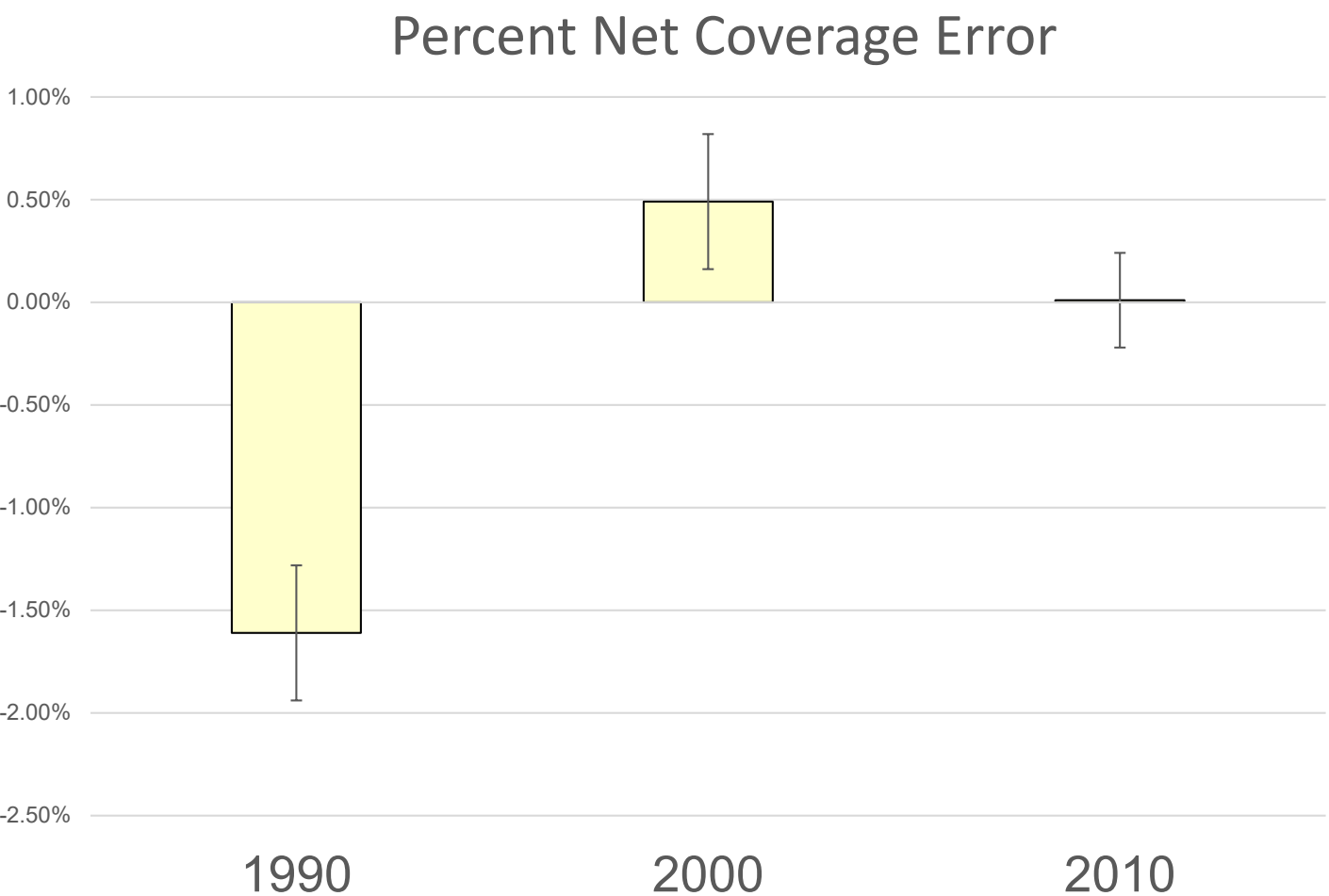
* Statistically different from zero

Census counts for 1990, 2000, and 2010 exclude Remote Alaska.

Census counts for 2000 and 2010 exclude Group Quarters population.

Census count for 1990 included people in housing units and in noninstitutional and nonmilitary Group Quarters.

U.S. Total Percent Net Coverage Error in 1990, 2000, and 2010



Note: Vertical line crossing edge of error bar indicates 90% confidence interval.

Components of Census Coverage in 2010 for the U.S. Household Population (in Thousands)

Component of Census Coverage	Estimate	Standard Error	Percent	Standard Error
Census Count	300,700	0	100.0	
Correct enumerations	284,700	199	94.7	0.1
Erroneous enumerations	10,040	199	3.3	0.1
Due to duplication	8,521	194	2.8	0.1
For other reasons	1,520	45	0.5	< 0.1
Whole-Person Census Imputations	5,993	0	2.0	0
Estimate of Population	300,700	429	100.0	
Correct enumerations	284,700	199	94.7	0.1
Omissions	16,000	440	5.3	0.1
Net Coverage Error	36	429	0.01	0.1

Design of the 2020 Post-Enumeration Survey

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2020 Post-Enumeration Survey Universe

Household Population and Housing Units

Excludes

- Group Quarters and Group Quarters Population
- Remote Alaska

Sample Sizes

First sample: Blocks

- Selected 9,800 blocks in 50 states and District of Columbia
- Selected 400 blocks in Puerto Rico

PES listing

- 510,000 housing units in 50 states and District of Columbia
- 18,000 housing units in Puerto Rico

After subsampling (Expected)

- 180,000 housing units in 50 states and District of Columbia
- 8,000 housing units in Puerto Rico

Two Enumerations in Sample Areas

Capture (Enumeration sample, E sample)

- A sample of census records (enumerations) in the same blocks, called E Sample
- Measure correct enumerations in the census
- Determine if enumeration is correct or erroneous; duplicate? correct location?

Recapture (PES sample, population sample, P sample)

- A sample of blocks, independent of the census, in the PES, called P Sample; interview people in units
- Match people in P Sample to the census

How PES Estimates are Created: Dual-System Estimation

		Enumerated in PES?	
		YES	NO
Enumerated in Census?	YES	Found in Both	Missing in PES Found in Census
	NO	Missing in Census Found in PES	Missing in Both

Reports

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Tentative Person Tabulations from PES; Three Major Groups

- Demographic or housing unit characteristics
 - Age Group
 - Age Group by Sex
 - Sex
 - Race and Hispanic Origin (alone or in-combination and mutually exclusive groups)
 - Relationship to Householder
 - Tenure (owner or renter)
- Geographic areas (states)
 - Region
 - State
- Census operations
 - Coverage Improvement Universe
 - GSS Partnership County
 - In-File Address Canvassing Outcome
 - Nonresponse Followup Respondent Type
 - Nonresponse Followup Workload
 - Response Mode
 - Response Rate Decile
 - Type of Enumeration Area

Schedule to Release Coverage Reports and Tables

First Quarter 2022

- National demographic estimates of net coverage of people
- National demographic estimates of components of coverage for people

Tables can be downloaded from the Census Bureau website

Summer 2022

- State coverage estimates for people
- More detailed national coverage estimates for people
- All housing unit coverage estimates
- Coverage estimates for Puerto Rico

Schedule to Release Methodology Reports

First Quarter 2022

- Source and Accuracy Statement: Person

Summer 2022

- Estimation Design
- Estimation Methods: Characteristic Imputation
- Estimation Methods: Addressing Missing Data (status of match and correct enumeration)
- Estimation Methods: Estimation of Net Coverage
- Estimation Methods: Estimation of Components
- Source and Accuracy: Housing Unit

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Questions

Additional Material

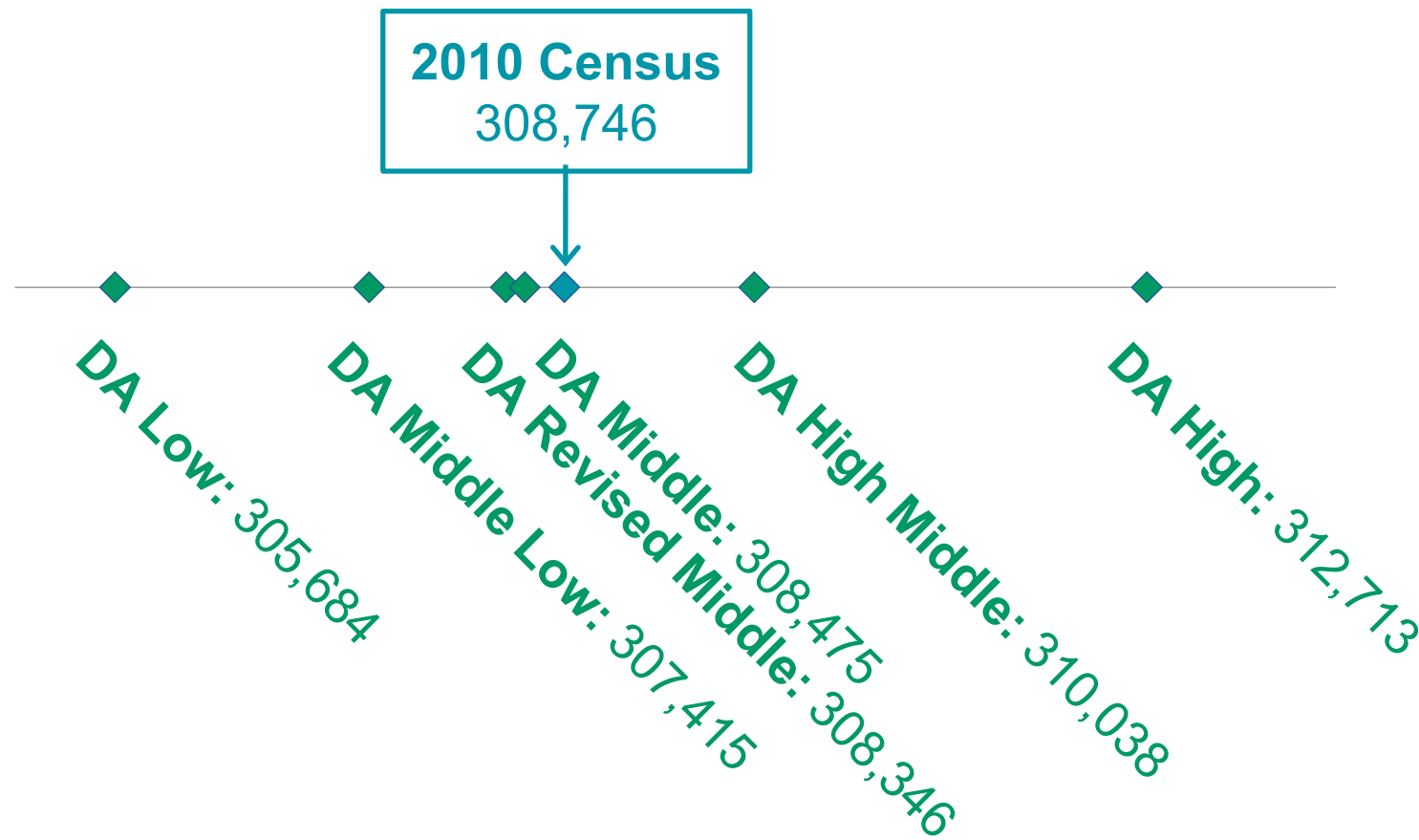
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Coverage Measurement in the Past

- Demographic analysis for decades
- Coverage measurement surveys
 - 1980 Post-Enumeration Program
 - 1990 Post-Enumeration Survey
 - 2000 Accuracy and Coverage Evaluation
 - 2010 Census Coverage Measurement survey

2010 Census and Demographic Analysis (in Thousands)



Current version of Dual System Estimator (DSE)

$$\widehat{TOT}_D = \sum_{j \in D} \left[\pi_{dd,j} \pi_{ce,j} / \pi_{m,j} \right]$$

Where

$\pi_{dd,j}$ is the predicted probability census case j is data-defined

$\pi_{cd,j}$ is the predicted probability that the census case is a correct enumeration

$\pi_{m,j}$ is the predicted probability that the census case was matched
 j is a census enumeration, and

D is the estimation domain (total, tenure status, age/sex groupings, etc.).

END