

2020 Census

Data Quality Releases:

Post-Enumeration Survey *and* Demographic Analysis

Informational Webinar

March 3, 2022

Questions?



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Dial ***1 for the Operator**

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Outline

1. Demographic Analysis (DA)

- DA Introduction
- What will be released on March 10
- Other DA releases

2. Post-Enumeration Survey (PES)

- PES Introduction
- What will be released on March 10
- Upcoming PES releases

The Upcoming Release of Estimates of Coverage in the 2020 Census

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Demographic Analysis

March 3, 2022

What is Demographic Analysis?

- Demographic Analysis is a method that the Census Bureau uses to evaluate the quality of the decennial census.
- We produced national estimates of the population as of April 1, 2020, by age, sex, DA race categories, and Hispanic origin.
- Estimates are developed using current and historical vital records, data on international migration, and Medicare records.
- The population estimates are used to develop estimates of net coverage error at the national level by demographic detail.

Demographic Analysis Method

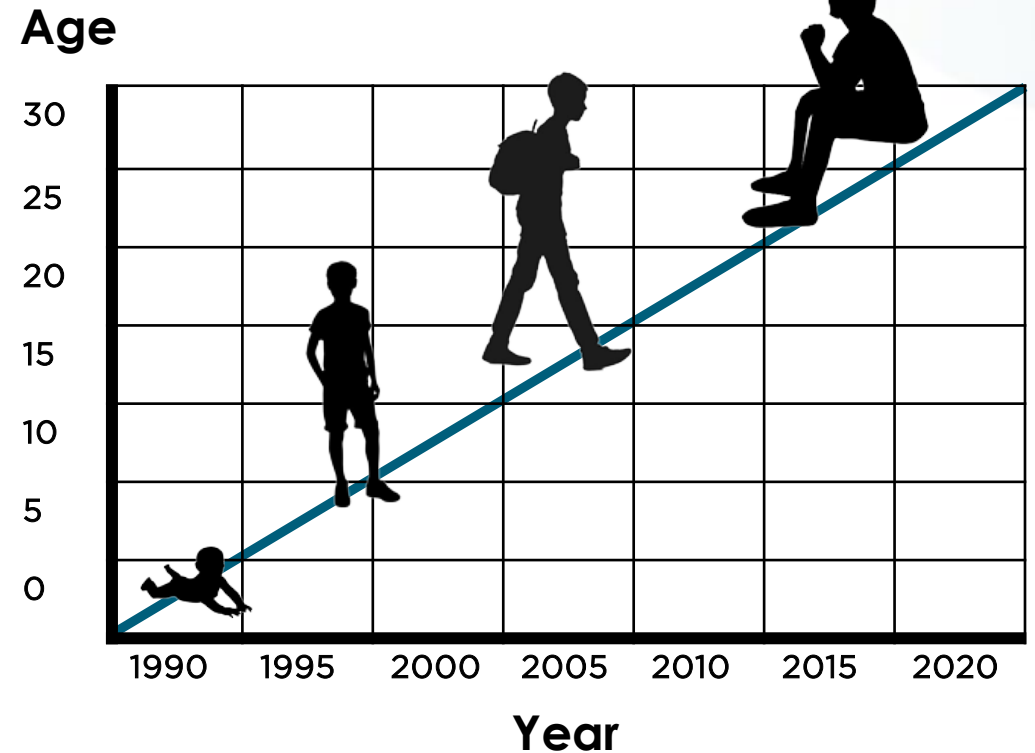
Population = **Births** - **Deaths** + **Immigration** - **Emigration**

- Birth records are the foundation of the DA estimates.
- Death records.
- Data on international migration.
- Medicare enrollment records.
- Other data.

Demographic Analysis Method *(continued)*

Example: Males aged 29

- In 1990–1991, there were 2.1 million male births in the United States.
- From 1990–2020, there were 68,000 deaths to that cohort.
- By April 1, 2020, there were an additional 355,000 males added to that cohort due to net international migration.
- We estimate that there should be approximately 2.4 million males in the 2020 Census that are aged 29.



Demographic Analysis Method *(continued)*

- **DA estimates for the total population are only available at the national level.**
 - Birth records tell us where a person was born, but good data are not available to determine where that person was living on Census Day.
 - We plan to produce experimental state and county estimates for the population aged 0-4 later this year.

Demographic Analysis Method *(continued)*

Net Coverage Error =

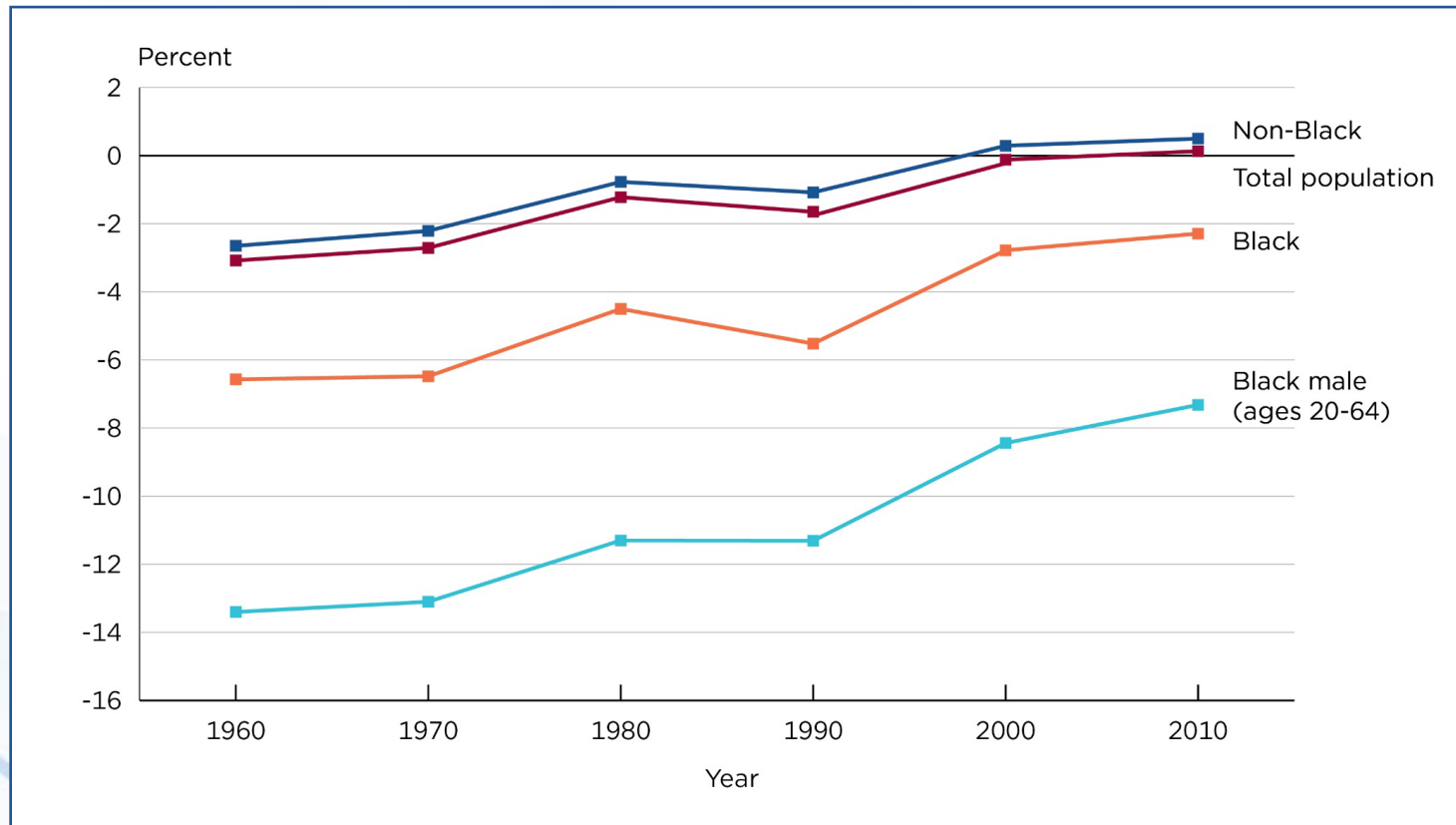
$$100 * (\text{Census Count} - \text{DA Estimate}) / \text{DA Estimate}$$

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

What Demographic Analysis Tells Us About the Quality of the 2020 Census Results

- DA can tell us about the net coverage error for specific age, sex, DA race, and Hispanic origin groups at the national level.
- Net coverage error combines undercounts and overcounts for the same group.
- The strength of DA is what it tells us about differential coverage for demographic groups either within the same census or over time.

Demographic Analysis Estimates of Net Coverage Error From 1960 to 2010



Note: Net coverage error is calculated as the percent difference between the census counts and the Demographic Analysis estimates.

Source: U.S. Census Bureau, Population Division, Demographic Analysis Program, Special Tabulation.

Strengths and Limitations

Strengths

- Administrative records-based estimate.
- Birth records.
- Methodology developed with external feedback.
- Coverage errors by single year of age.
- Historical patterns of differential coverage.

Limitations

- Only produces a net coverage error estimate.
- Only available at the national level.
- Race and Hispanic origin information is limited.
- International migration is difficult to estimate.

Demographic Analysis

What has been released? *And* **What will be released?**

March 3, 2022

What has been released?

2020 DA Population Estimates (Released on December 15, 2020)

- Three sets of DA population estimates by age, sex, DA race groups, and Hispanic origin.
 - Low, middle, and high series for each set to measure uncertainty.
 - Components of population change for all three sets and series.

2020 DA Net Coverage Error Estimates

- Net coverage error for the total population was released in April 2021 with the Apportionment data.
- Additional net coverage error estimate by select age groups and Hispanic origin released in November 2021 using the Redistricting data.

Census Counts, Demographic Analysis (DA) Estimates of the Resident Population, and Net Coverage Error: April 1, 2020, and April 1, 2010

(Population in thousands. Net coverage error in percent)

Measure	2020 Census	2020 DA series			2010 Census	2010 DA series				
		Low	Middle	High		Low	Low middle	Middle ¹	High middle	High
Population.	331,449	330,730	332,601	335,514	308,746	305,684	307,415	308,346	310,038	312,713
Net coverage error ² . .	X	0.22	-0.35	-1.21	X	1.00	0.43	0.13	-0.42	-1.27

X Not applicable.

¹ The 2010 middle estimate comes from the May 2012 revision to the DA estimates. The other 2010 DA estimates were part of the original December 2010 release.

² Calculated as (Census count - DA estimate)/DA estimate * 100.

Source: U.S. Census Bureau, 2020 and 2010 Censuses, and 2020 and 2010 Demographic Analysis.

Net Coverage Error Estimates for Select Population Groups

(Net coverage error in percent)

Population group	2020 DA Series		
	Low	Middle	High
Total population	0.22	-0.35	-1.21
Population under 18 years	-1.77	-2.08	-2.28
Population 18 years and older	0.79	0.16	-0.90
Hispanic or Latino population under 18 years	3.95	-4.25	-9.67

Source: 2020 Census Public Law Redistricting Data File (P.L. 94-171) Summary File and 2020 Demographic Analysis.

What has been released?

2020 DA Net Coverage Error Estimates.

(Additional DA net coverage error estimates will be released on March 10, 2022)

- Single year of age and sex.
- Age groups.
- Age groups consistent with those released by the Post-Enumeration Survey (PES).
- We are using a special tabulation of the 2020 Census with confidentiality protections applied using the 2020 Census Disclosure Avoidance System (DRB clearance number CBDRB-FY22-DSEP-001).

Estimates by race and Hispanic origin will be made available at a later date.

- Modified Face File.

Experimental estimates will also be released at a later date.

- More race and Hispanic origin detail.
- State and county estimates for the population aged 0 to 4.

2020 Census

Data Quality Releases:

Post-Enumeration Survey

March 3, 2022

What is the PES?

Goal

- To measure coverage of people and housing units in the decennial census.
- To measure net coverage error rates 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 with different designs and formats since 1950.

Universe for Person Estimates

- PES estimates census coverage for the household population living outside Remote Alaska areas.
- DA includes people living in group quarters and in Remote Alaska areas.

	2010 Demographic Analysis (Mid-Series)	2010 Post- Enumeration Survey
Census Count	308,746,000	300,703,000
Estimated True Population Count	308,346,000	300,667,000

Estimated Percent Net Coverage Error

$$\text{Percent net census coverage error} = 100 \times \frac{\text{Census Count} - \text{PES Population Size}}{\text{PES Population Size}}$$

Negative percent net coverage error → **fewer** people are included in the census than are in the PES population; called **percent net undercount**.

Positive percent net coverage error → **more** people are included in the census than are in the PES population; called **percent net 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.

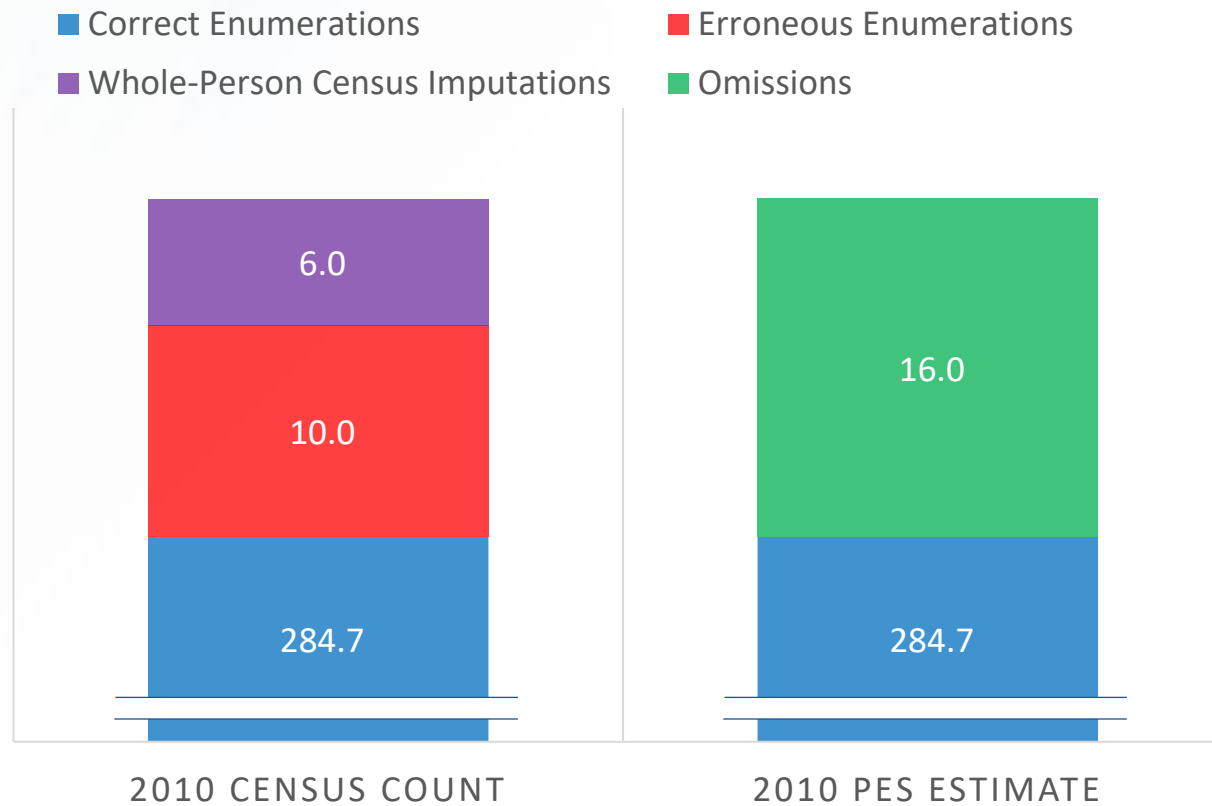
What has been released?

- **Components of census**
 - Correctly enumerated in the census.
 - Erroneously enumerated in the census.
 - Duplicates
 - Other erroneous enumerations
 - Whole-person census imputations.
- **Components of true population**
 - Correctly enumerated in the census.
 - Omissions.

Components of Coverage

(2010 Estimates in Millions)

2010 CENSUS COVERAGE



Bars are not
drawn to scale.

Strengths and Limitations of 2020 PES

Strengths

- Can produce estimates by characteristics collected in the census.
- Can produce estimates of components of coverage.
- Dual-System estimates are robust against some survey errors.

Limitations

- Sampling error.
- Response error, nonresponse error, matching error, and other errors.
- Universe excludes people in group quarters and Remote Alaska areas.
- No sub-state coverage estimates or coverage estimates by groups within states.

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.

PES Quality Design Features to Increase Data Quality

- A sample of all PES interviews were interviewed a second time (“reinterviewed”) for a quality check. If the quality check failed, the original data were corrected by the reinterviewers.
- For the clerical matching activities, a quality check was performed on a sample of work completed by each matcher, and corrections were made, when necessary.
- Large person follow-up workload to make sure we accurately identified matches, corrected enumerations and erroneous enumerations.
- Extended interview data collection period to increase response.
- Delayed start of field operations allowed us to avoid some of the nonresponse bias issues that many other surveys experienced early in the pandemic.
- Searched all census files for movers into the PES blocks.
- Performed nonresponse weighting and imputation to reduce nonresponse error.

Post-Enumeration Survey

What will be released on March 10?

March 3, 2022

PES Release 1: March 10, 2020

- 2020 Post-Enumeration Estimation Survey Report: National Census Coverage of People in the United States by Demographic Characteristics
- Source and Accuracy Statement for Person Estimates

*Note: Reports can be downloaded from the Post-Enumeration Survey website:
<<https://www.census.gov/programs-surveys/decennial-census/about/coverage-measurement/pes.html>>*

Tables can be downloaded from the Census Bureau website: <data.census.gov/cedsci/>

Tables Included in Release 1

Percent Net Coverage Error and Percentage Components of Coverage by

- Age Group
- Sex (for age 18+)
- Age Group by Sex
- Race (alone or in combination) and Hispanic Origin
- Tenure (owner or renter)

Percentage Components of Coverage by

- Relationship to Householder

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

Percent Net Coverage Error by Race and Hispanic Origin in 2010

Race or Hispanic Origin	Net Coverage Error Estimate (%)	Net Coverage Error Standard Error (%)
Total	0.01	0.14
Race alone or in combination with one or more other races		
White	0.54*	0.14
Non-Hispanic White Alone	0.83*	0.15
Black or African American	-2.06*	0.50
Asian	0.00	0.52
American Indian and Alaska Native	-0.15	0.71
On Reservation	-4.88*	2.37
American Indian Areas Off Reservation	3.86	2.99
Balance of the United States	0.05	0.58
Native Hawaiian and other Pacific Islander	-1.02	2.06
Some Other Race	-1.63*	0.31
Hispanic or Latino	-1.54*	0.33

Components of Coverage Percentages by Tenure in 2010

Tenure	Correct Enumerations	Erroneous Enumerations		Whole Person Census Imputations	Omissions
		Duplicates	Other Erroneous		
Total	94.7	2.8	0.5	2.0	5.3
Owner	95.7	2.4	0.4	1.5	3.7
Renter	92.5	3.7	0.7	3.0	8.5

Post-Enumeration Survey

Upcoming PES Releases

March 3, 2022

Coverage Reports and Tables

Summer 2022

- State coverage estimates for people.
- National coverage estimates for people by census operation.
- All housing unit coverage estimates.
- Coverage estimates for Puerto Rico.

Methodology Reports

Summer 2022

- Estimation Design
- Estimation Methods: Characteristic Imputation
- Estimation Methods: Addressing Missing Data
- Estimation Methods: Estimation of Net Coverage
- Estimation Methods: Estimation of Components
- Source and Accuracy Statement for Housing Unit Estimates

Similarities and Differences between DA and PES

Methodology

Demographic Analysis	Post-Enumeration Survey
Basic demographic accounting equation of population components of change (ages 0-74) and Medicare enrollment method (age 75 and older)	Dual-system estimation: the survey independently interviews people and then matches that information to the census results

Similarities and Differences between DA and PES

Population Universe

Demographic Analysis	Post-Enumeration Survey
Everyone living in the country (resident population)	Household population, excluding Remote Alaska areas (and, by definition, excluding group quarters)

Geographic Level

Demographic Analysis	Post-Enumeration Survey
National	National and state (state and Puerto Rico results scheduled for summer 2022)

Similarities and Differences between DA and PES

Demographic Characteristics

Demographic Analysis	Post-Enumeration Survey
<p>Age: Single year of age and age groups</p> <p>Sex: Male and female</p> <p>Race:</p> <ul style="list-style-type: none">• Black• Non-Black• Black alone or in combination• Non-Black alone or in combination <p>Hispanic origin: For the population ages 0 to 29</p> <p>Tenure: Not available</p>	<p>Age: Age groups</p> <p>Sex: Male and female</p> <p>Race (alone or in combination): All census categories</p> <p>Hispanic origin: For all ages combined</p> <p>Tenure: Owner and renter</p>

Questions?



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Resources

Post-Enumeration Survey (PES) Press Kit

FEBRUARY 10, 2021

The purpose of the Post-Enumeration Survey is to measure the accuracy of the census by independently surveying a sample of the population. The survey estimates the proportion of people and housing units potentially missed or counted erroneously in the census.

The first results from the PES are planned for release in the first quarter of 2022, with additional results to be released in the summer of 2022.

Webpages

- [Post-Enumeration Survey \(PES\) webpage](#)
- [Memorandum 2020.05: 2020 Census Detailed Operational Plan for the Post-Enumeration Survey \(PES\) Operations](#)
- [2020 Census Detailed Operational Plan for: Post-Enumeration Survey \(PES\) Operations](#)

2020 Demographic Analysis Estimates Press Kit

DECEMBER 01, 2020

The 2020 Demographic Analysis estimates include national-level estimates of the population by age, sex, race and Hispanic origin as of April 1, 2020. These estimates are developed from current and historical vital statistics – birth and death records, estimates of international migration, and Medicare records. The Demographic Analysis estimates are independent from the 2020 Census and will be used to calculate net coverage error, one of the two main ways the U.S. Census Bureau uses population estimates to measure coverage of the census.

Archived video:



- [Event Program](#) [<1.0 MB]
- [Presentation: 2020 Demographic Analysis - Online News Conference](#) [<1.0 MB]
- [Transcript: 2020 Demographic Analysis News Conference](#) [<1.0 MB]

Upcoming Census Bureau Releases

March 10

Post-Enumeration Survey/Demographic Analysis

- **March 10:** News Conference and Data Release
- **March 3:** Pre-Release Webinar
- [Press Kit](#)

March 17

American Community Survey 2016-2020 5-Year Data Release

- **March 17:** Data Release
- **March 15:** Embargo begins
- **March 10:** Pre-Release Webinar
- [Press Kit](#)

March 24

County, Puerto Rico Municipio, and Metropolitan and Micropolitan Statistical Area Population Estimates

- **March 24:** Data Release
- **March 22:** Embargo begins
- [Tip Sheet](#)

April 1

1950 Census Records Release

- **April 1:** NARA releases records
- **March 14:** Pre-Release Webinar (Census Bureau-hosted)
- [Press Kit](#)

For Further Information

Media:

Public Information Office

pio@census.gov

301-763-3030/877-861-2010 (U.S. and Canada only)

General Public:

Customer Service Center

1-800-923-8282 or

301-763-INFO (4636)

Press Kit:

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