# The 2020 Demographic Analysis Program

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# Census Coverage

- “Count everyone once, only once, and in the right place”
- Coverage error occurs when groups are overcounted or undercounted in the census
- Census Bureau uses two methods to estimate coverage:
  - Demographic Analysis (DA)
  - Post-Enumeration Survey (PES)

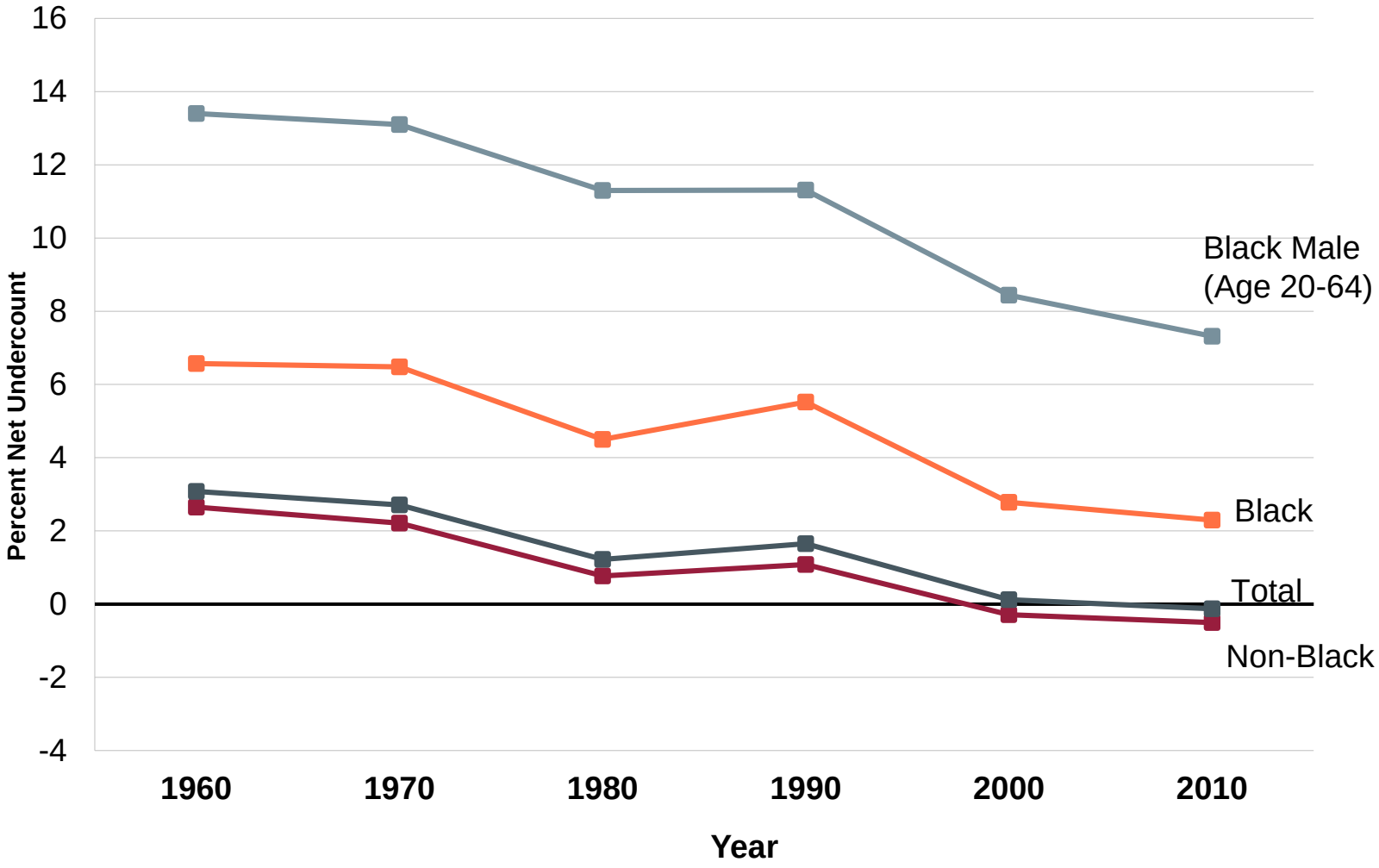
# Demographic Analysis

- The U.S. Census Bureau has used DA to measure net undercount and overcount in each decennial census since 1960
- DA techniques build an estimate of the size and composition of the population based on historical data on births, deaths, and international migration
- National-level estimates by age, sex, race, and Hispanic origin

# Benefits of DA

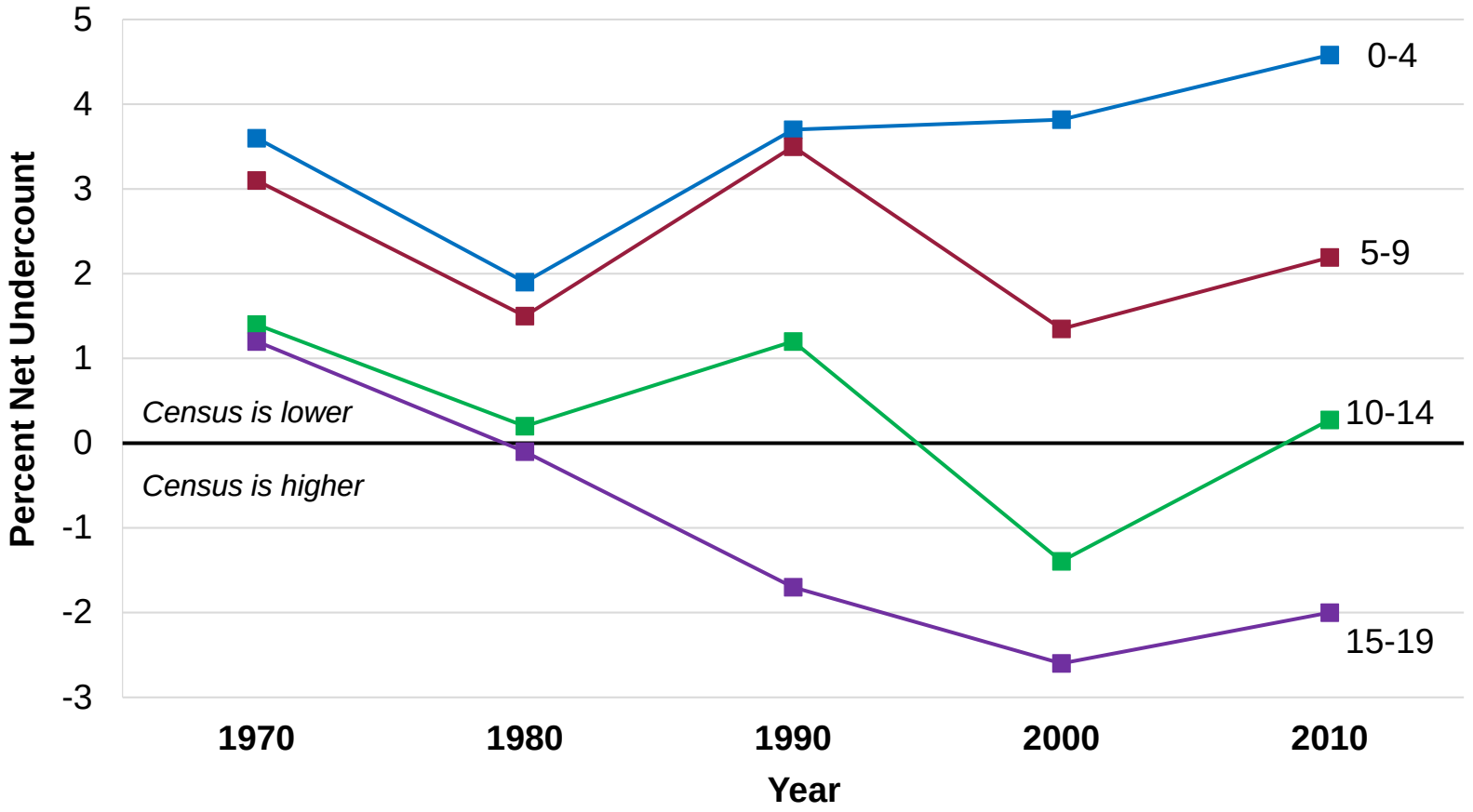
- The DA estimates are independent of the census that is being evaluated
- DA is a relatively inexpensive and non-intrusive evaluation of the decennial census
- DA sex ratios are used by the PES program to adjust for correlation bias in the dual system estimates
- DA highlights specific populations that are undercounted in the census (e.g., Black males and young children)

# DA Estimates of Percent Net Undercount: 1960 to 2010




Note: Positive values indicate an undercount.
Source: U.S. Census Bureau, Demographic Analysis Program, special tabulation.

# DA Estimates of Percent Net Undercount by Select Age Groups: 1970 to 2010




Note: Positive values indicate an undercount.
Source: U.S. Census Bureau, Demographic Analysis Program, special tabulation.

# DA Method

- Cohort component method

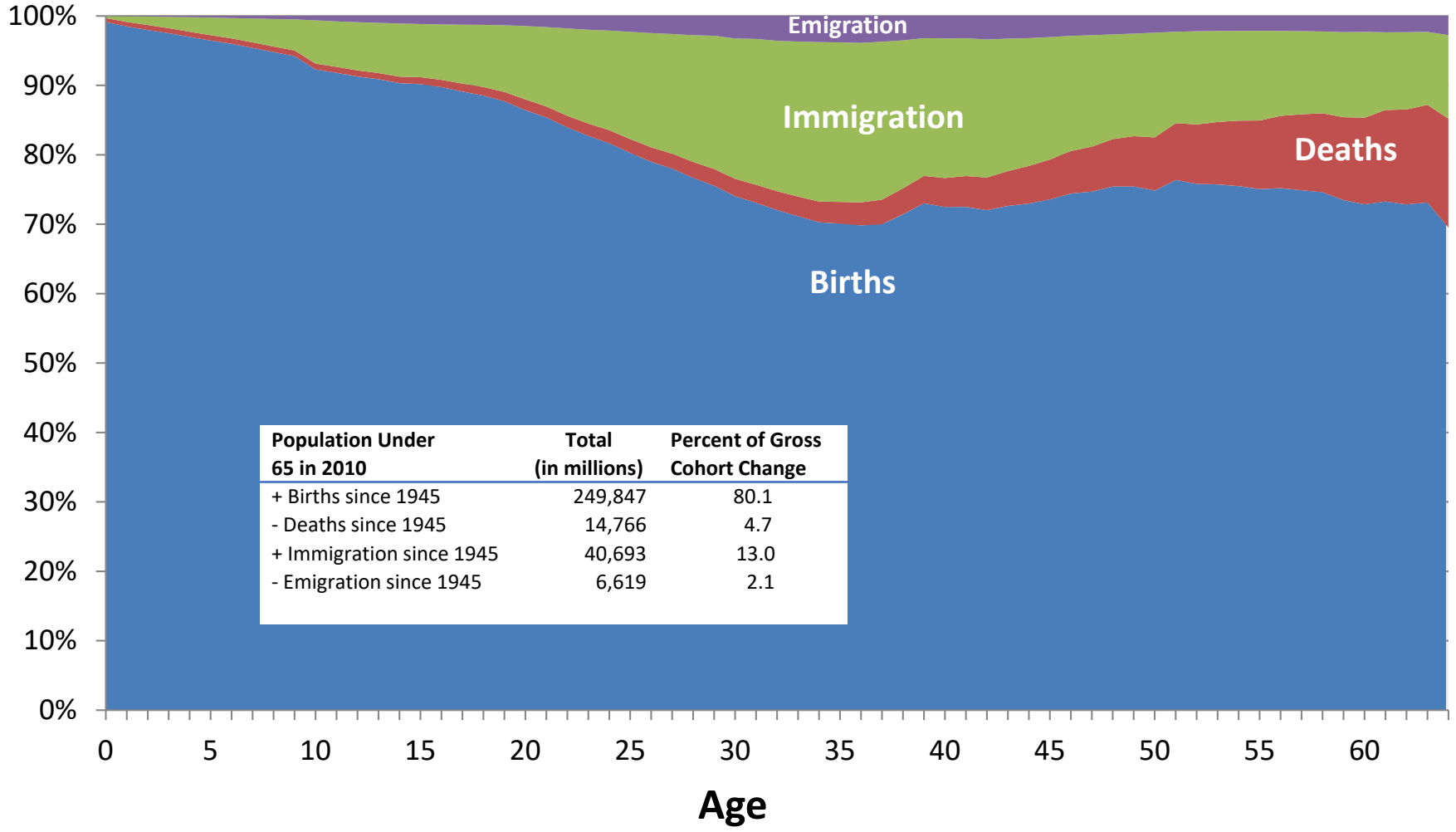
$$Pop_{total} = \sum_{i=1935}^{2020} Pop_i = \sum_{i=1935}^{2020} (Births_i - Deaths_i + Immig_i - Emig_i)$$

Where Pop is population, Immig is immigration, and Emig is emigration

- Medicare method for the oldest age groups
- Net Coverage Error

$$\frac{100 * (census\ count\ - DA\ estimate)}{DA\ estimate}$$

# Contribution of Births, Deaths, Immigration and Emigration to Gross Cohort Change by Age in 2010




| Population Under 65 in 2010 | Total (in millions) | Percent of Gross Cohort Change |
|---|---|---|
| + Births since 1945 | 249,847 | 80.1 |
| - Deaths since 1945 | 14,766 | 4.7 |
| + Immigration since 1945 | 40,693 | 13.0 |
| - Emigration since 1945 | 6,619 | 2.1 |

Source: U.S. Census Bureau, 2010 Demographic Analysis (May 2012 DA Release).

# 2020 DA Program

- DA is a sub-operation under the Evaluations and Experiments Integrated Project Team (IPT)
- DA is conducted by staff in the Estimates and Projections Area of the Population Division
  - Similar input data to the official population estimates
  - However, DA is not built from the prior census counts
- Work with internal and external research partners to develop the methodology for the 2020 DA
  - Universities, research institutes, other federal agencies

# Research Partners

**Demographic Analysis**
Gregg Robinson, *U.S. Census Bureau (retired)*
Jason Devine, *U.S. Census Bureau*
Bill O'Hare, *O'Hare Data and Demographic Services, LLC*

**Births**
Brady Hamilton, *National Center for Health Statistics*
Luke Rogers, *U.S. Census Bureau*

**Mortality**
Irma Elo, *University of Pennsylvania*
Elizabeth Arias, *National Center for Health Statistics*
Jana Johnson, *University of Minnesota*

**Net International Migration**
Katharine Donato, *Georgetown University*
Jenny Van Hook, *Penn State University*
Bryan Baker, *Office of Immigration Statistics*
Jeff Passel, *Pew Research Center*
Jason Schachter, *U.S. Census Bureau*

**Aging**
Wan He, *U.S. Census Bureau*
Kirsten West, *U.S. Census Bureau (retired)*

**Race and Hispanic Origin**
Richard Alba, *City University of New York*
Carolyn Liebler, *University of Minnesota*
Roberto Ramirez, *U.S. Census Bureau*
Nicholas Jones, *U.S. Census Bureau*

# 2020 DA Program (cont.)

- For 2020, we plan to produce 6 series of estimates
  - Black alone / Non-Black
  - Black alone or in combination
  - Hispanic / Non-Hispanic
  - Extended Hispanic
  - Full race and Hispanic origin detail (0-17)
  - State and county estimates for young children

- A range of estimates—high, medium, and low—to measure variation in the estimates

| Proposed Series for the 2020 DA Estimates | | | |
|---|---|---|---|
| **Series** | **Type of Estimates** | **Characteristics** | **Cohorts** |
| Black alone / Non-Black | Official | Age, sex, race | 0-85+ |
| Black alone or in combination / Non-Black alone or in combination | Official | Age, sex, race | 0-39 |
| Hispanic / Non-Hispanic | Official | Age, sex, Hispanic origin | 0-29 |
| Full race and Hispanic origin detail | Experimental | Age, sex, race, Hispanic origin | 0-17 |
| Extended Hispanic / Non-Hispanic | Experimental | Age, sex, Hispanic origin | 0-39 |
| Subnational DA[1] | Experimental | Age | 0-4 |

[1]The Subnational DA series will not be produced until the final birth data are available in 2021.

# 2020 DA Challenges

- Assigning race and Hispanic origin to birth records
  - Kid-Link method
- Producing estimates with race and Hispanic origin detail that is consistent with the census
- Developing estimates of the oldest-aged population
- Estimating the foreign-born population
- Implementing differential privacy

# 2020 Research

## Births

- Incorporate provisional birth data for most recent years where final microdata are not available
- Account for differences between race assignment approaches used in historical birth records (before 1980) and in more recent birth records (1980 and after)

## Race and Hispanic Origin

- Standardize DA race assignment methods across all cohorts for all decades
- Improve race assignment methods to reflect increasing multiracial births
- Account for individuals who change their self-identification of race over time

# 2020 Research (cont.)

## Mortality and Aging

- Addressing misclassification of age, race, and Hispanic origin on death certificates
  - We are working on a proposal to use the Mortality Disparities in American Communities (MDAC) database, which links responses from the 2008 ACS to death records
- Looking at the validity of death data for the oldest ages
  - Supplement the vital statistics data with data from Medicare and other sources
- Working with people at the Center for Medicare and Medicaid Services (CMS) to filter out records that shouldn't be included in our estimates
  - Medicare database currently has a lot of people aged 115 or more

# 2020 Research (cont.)

**Net International Migration**

- Developing methods to estimate the total stock foreign-born population rather than estimating migration flows, which was done in the past
- Improving the estimates of the native population living abroad, especially for young children
  - Using Mexico's 2010 Census data and the National Survey of Occupation and Employment (ENOE), we found that approximately 200,000 children aged 0 to 4 that were born in the United States were living in Mexico at the time of the 2010 Census
  - For the 2020 DA, we are monitoring trends for this population in the ENOE survey and the 2018 Mexican Survey of Demographic Dynamics (ENADID)
- Estimating Puerto Rico migration after Hurricane Maria

# 2020 Research (cont.)

**Coverage of Children**

- Develop a series for the 2020 DA with full race and Hispanic origin detail for the population aged 0-17
- Develop DA state and county estimates of the population aged 0 to 4 in 2020

# Thank you

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