

Current Approaches to Mortality Projections

Lauren Medina and Daniel Goodkind
Population Division, U.S. Census Bureau

Joint Eurostat/UNECE Work Session on Demographic Projections
Belgrade, Serbia
25-27 November 2019

This presentation is released to inform interested parties of ongoing research and to encourage discussion. Any views expressed are those of the authors and not necessarily those of the U.S. Census Bureau.

Outline

Domestic Population Projections

- Cohort-Component Method
- Mortality by Nativity
- Projected Mortality Trends

International Population Projections

- International Database (IDB)
- Demographic Analysis and Population Projection System (DAPPS)

Domestic Population Projections

Cohort-Component Method

$$P_t = P_{t-1} + B_{t-1,t} - D_{t-1,t} + M_{t-1,t}$$

Where:

P_t = Population at time t

P_{t-1} = Population at time $t - 1$

$B_{t-1,t}$ = Births in the interval $t - 1$ to t

$D_{t-1,t}$ = Deaths in the interval $t - 1$ to t

$M_{t-1,t}$ = Net International Migration in the interval $t - 1$ to t

Projecting Mortality: Data and Characteristics

Numerators

- **Mortality data** – Vital Statistics, National Center for Health Statistics (NCHS)

Denominators

- **Population estimates** – Population Estimates Program, U.S. Census Bureau
- **Incorporating Nativity** – Survey data, U.S. Census Bureau

Characteristic	Detail
Age	0-99; 100+
Sex	Male; Female
Race and Hispanic Origin	White Black or African American American Indian or Alaska Native Asian Native Hawaiian or Other Pacific Islander ----- Hispanic Non-Hispanic <i>1997 Office of Management and Budget standards on race and ethnicity</i>
Nativity	Native-born; Foreign-born

Projecting Mortality: Adjusting for Race and Hispanic Origin

Recoding

- The process designed to ensure consistency in race and ethnicity measures over time

Grouping

- Combining race/ Hispanic origin groups to account for concerns about the quality of race reporting in the death data
 - **Group 1:** Non-Hispanic White, Asian, and Native Hawaiian or Other Pacific Islander
 - **Group 2:** Non-Hispanic Black or African American and American Indian or Alaska Native
 - **Group 3:** Hispanic or Latino (of any race)

Projecting Mortality: Method

1) Indirectly project life expectancy at birth (e_0) by sex to the year 2100 to determine which model life tables will be used to project mortality rates

2) Project mortality rates to the year 2100

3) Create life tables for the years 2017 through 2060 using projected mortality rates

For more information on the methods used for the 2017 National Population Projections, please see: <https://www2.census.gov/programs-surveys/popproj/technical-documentation/methodology/methodstatement17.pdf>

Life Expectancy by Nativity: Findings

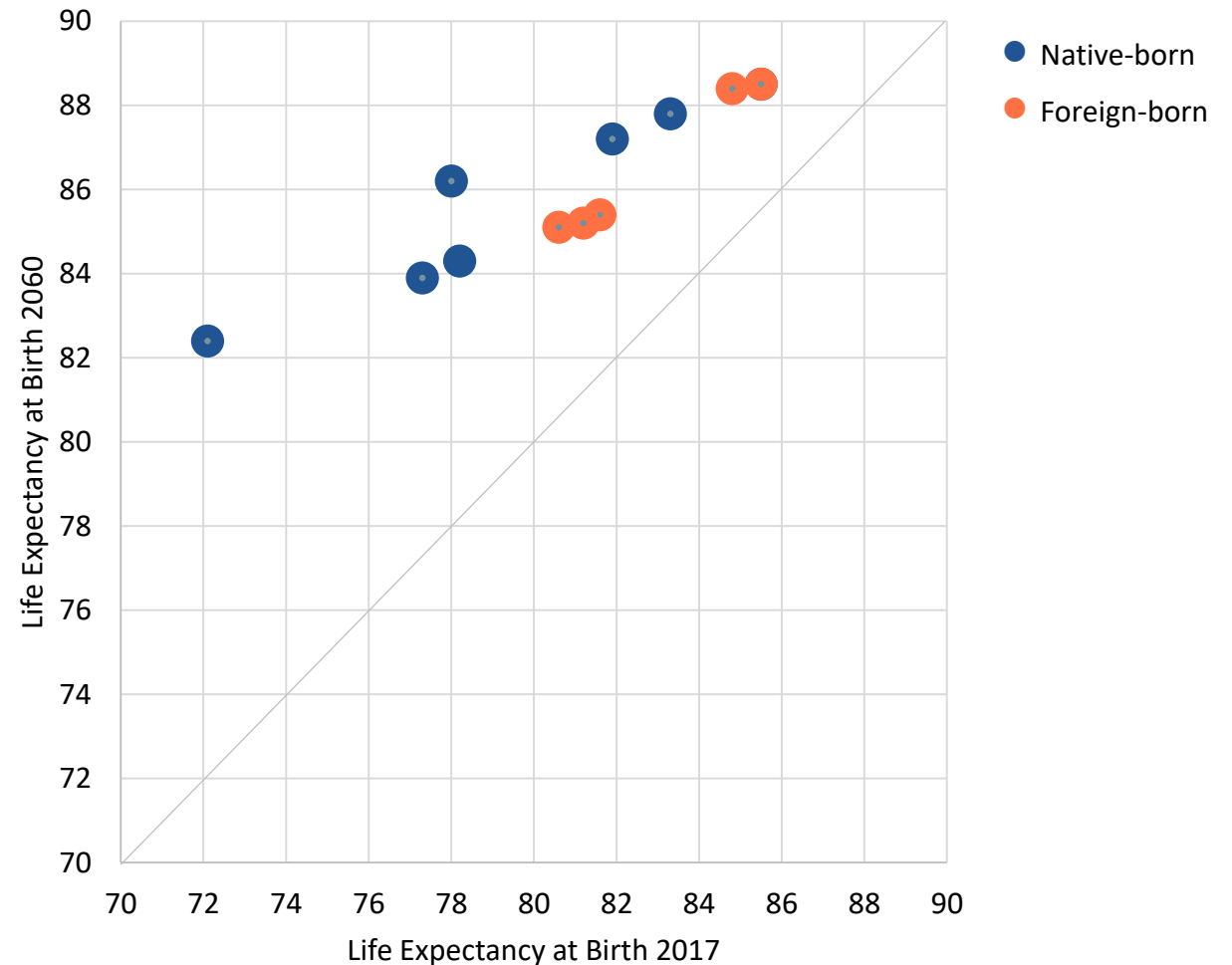
Foreign born tend to live longer

The differences by race and Hispanic origin are greater for native-born groups

Despite large increases between 2017 and 2060, some groups will continue to have lower life expectancy

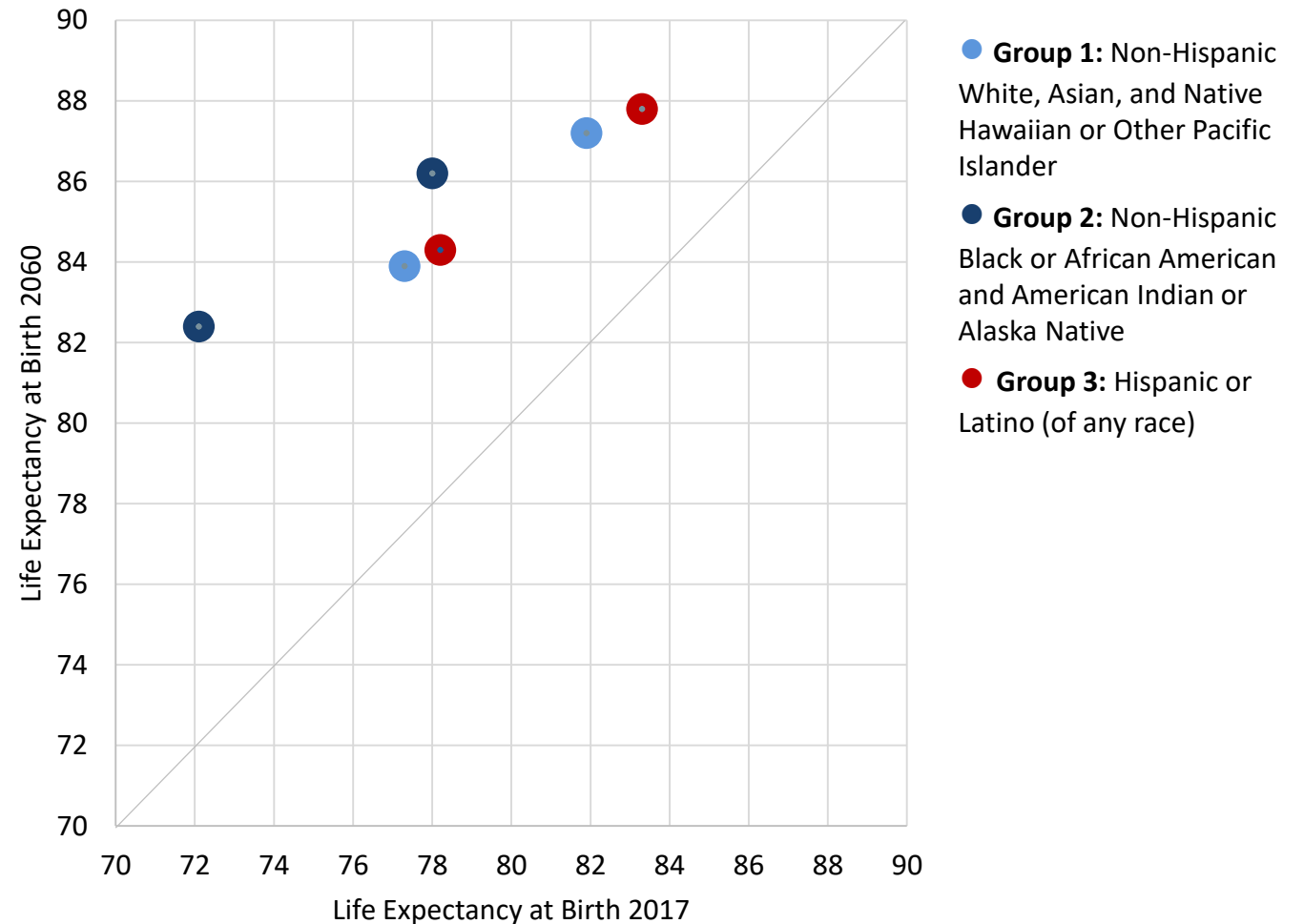
Life Expectancy at Birth by Nativity: 2017 and 2060

Foreign born tend to live longer



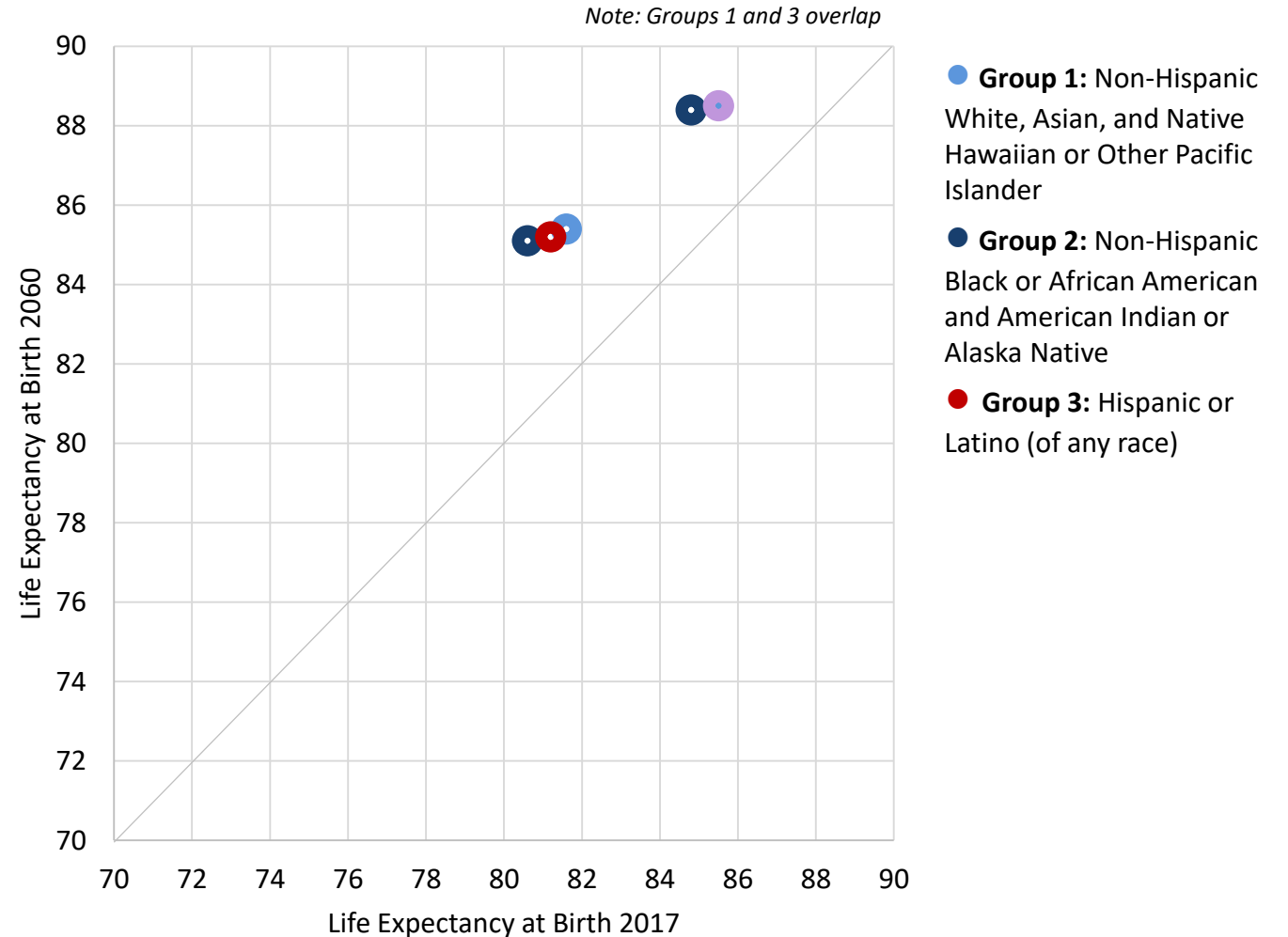
Life Expectancy at Birth by Race and Hispanic Origin: 2017 and 2060, Native-born

The differences by race and Hispanic origin are greater for native-born groups



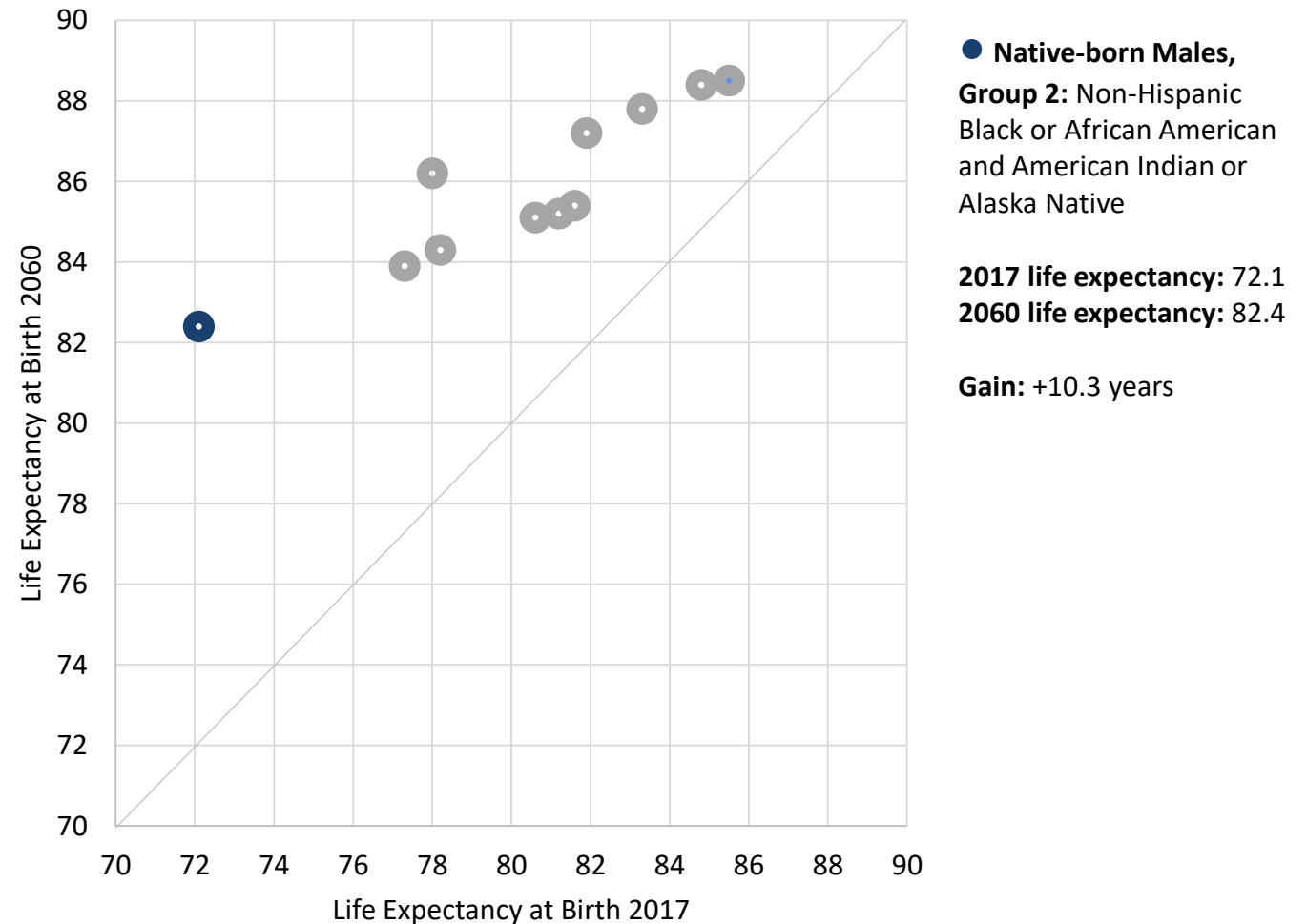
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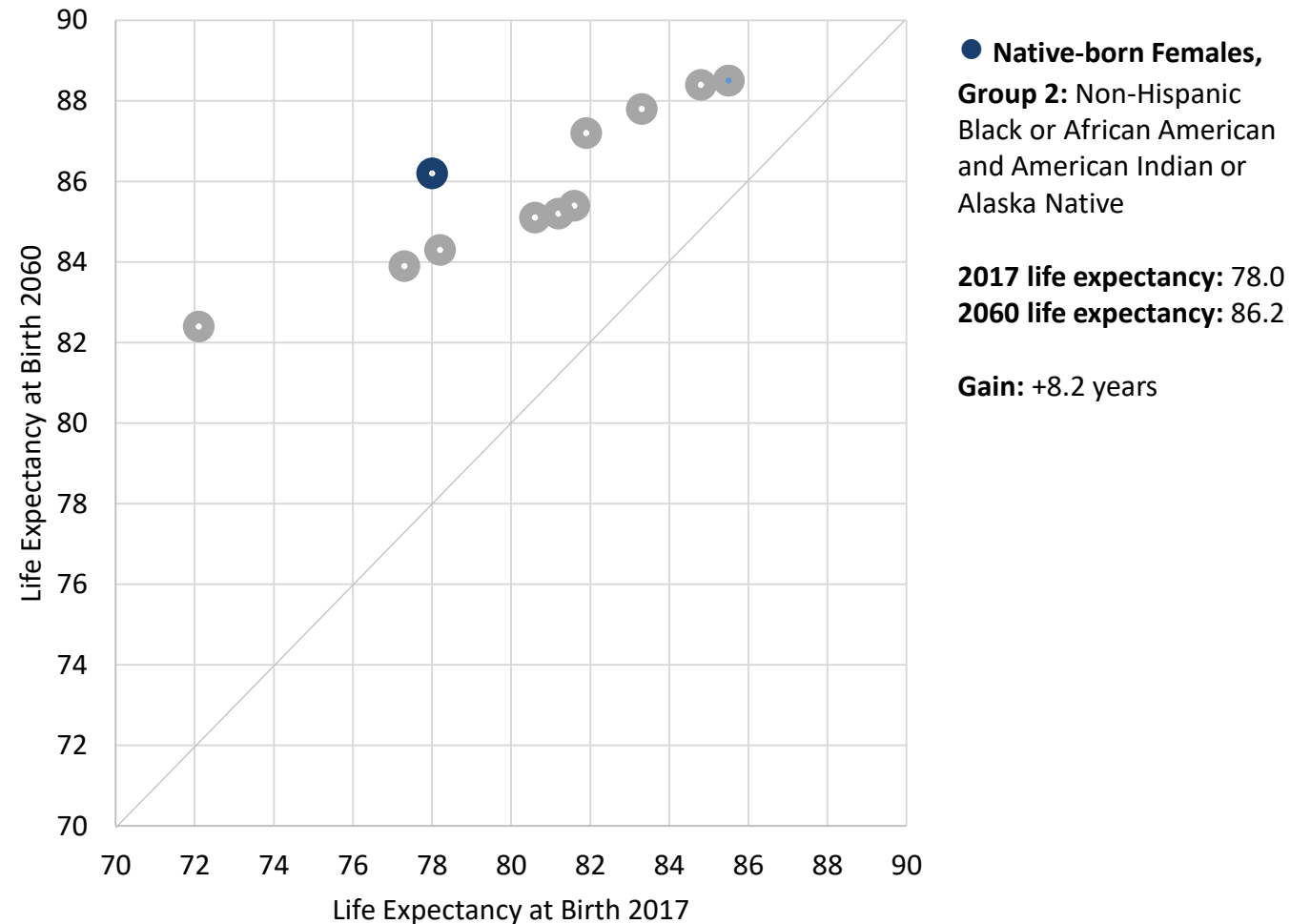
Life Expectancy at Birth: 2017 and 2060

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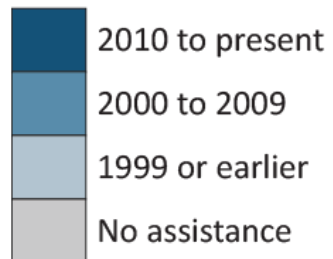


International Population Projections

U.S. Census Bureau International Work (60+ years)

- Builds statistical capacity around the world through technical assistance, training, and development of software products
- Conducts demographic, economic, and geographic studies of other countries
- Maintains an International Data Base (IDB)
 - Produces estimates and projections of over 200 country/area populations around the world
 - <https://www.census.gov/data-tools/demo/idb/informationGateway.php>

Most recent
assistance provided

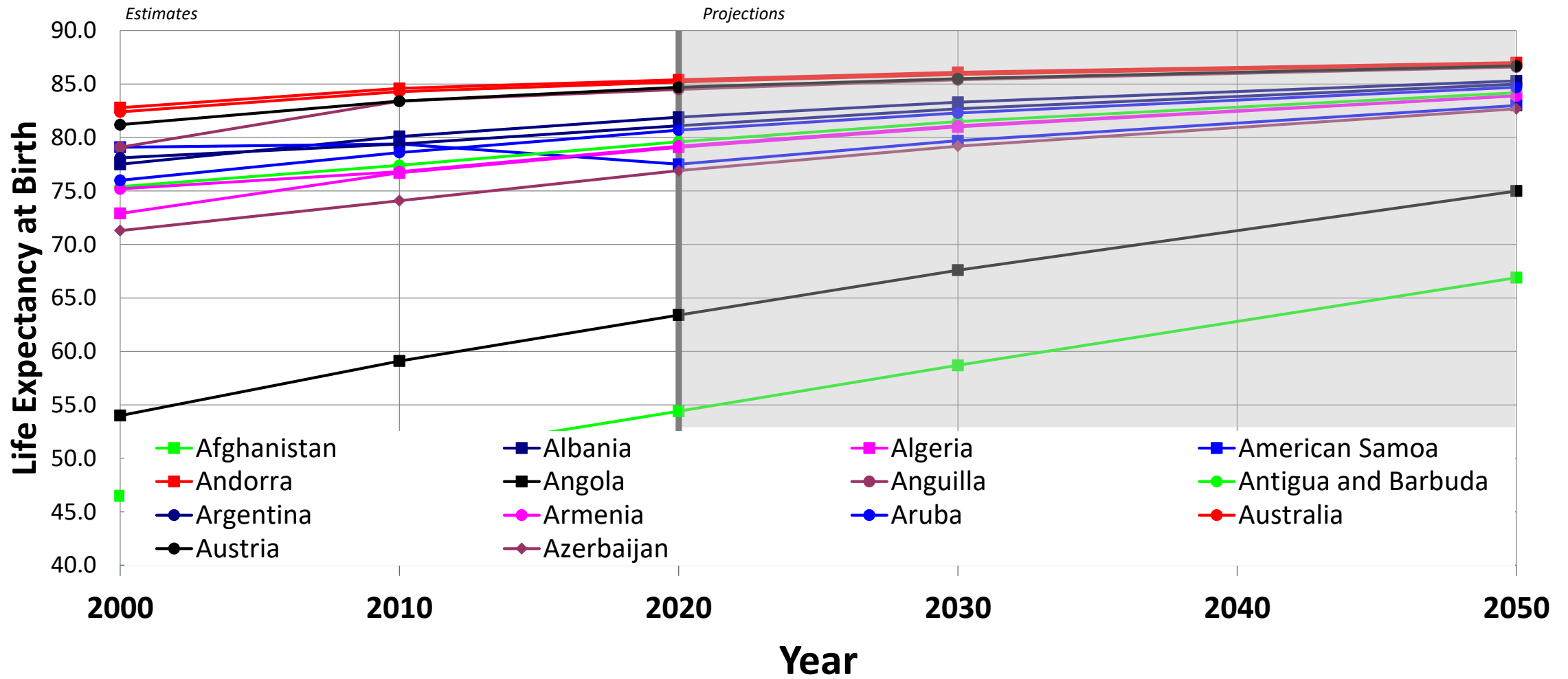


As of April 2018

International Mortality Projections

- Estimates for each country rely on available data (vital registration, censuses, surveys, etc.) along with assessments of data quality
- For projections, we assume a fixed logistic pattern of improvements based on worldwide historical trends, with a fixed ceiling of maximum life expectancy at birth (currently 82.6 for males and 88.4 for females)

Estimated and Projected Life Expectancy at Birth for Females



International Mortality Projections (cont.)

- Expected revisions to IDB projections in 2020:
 - Horizon will be extended from 2050 to 2100
 - Upper assumed ceiling of life expectancy will be raised based on the latest evidence and trends, which will bring them closer to those assumed for U.S. domestic population projections

International Projections Software (DAPPS)

- DAPPS (Demographic Analysis and Population Projections Software) is a user-friendly way to:
 - Input data and perform population projections
 - Undertake demographic analysis (based on inputs) to better determine the inputs for such projections

Demographic Analysis & Population Projection System (DAPPS) Software

APRIL 04, 2019

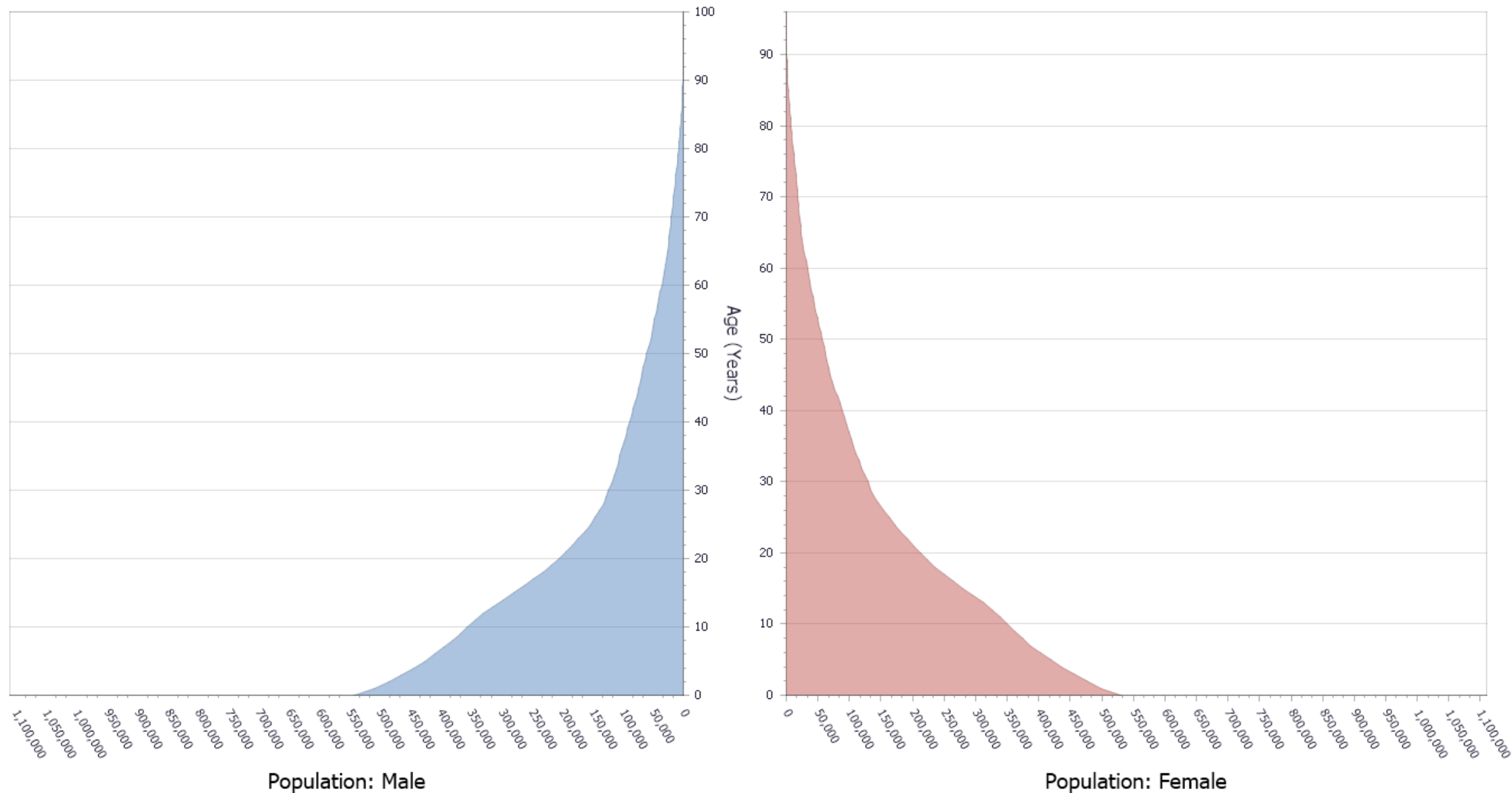
DAPPS 3.2

DAPPS is a program designed to help users analyze and produce population projections with ease. It accomplishes this through a user-friendly spreadsheet interface for data entry and the projection power of RUP.

International Projections Software (DAPPS) (cont.)

- Some key advantages of using DAPPS:
 - Incorporates a tool to ensure that subnational cohort-component projections – performed separately in DAPPS – will sum in each year to a given national projection
 - Software is freely available
<https://www.census.gov/data/software/dapps.html>
 - Animated graphics of annual population change (screenshots for the age-sex structure of Niger in 2020 and 2050 on the following slides)

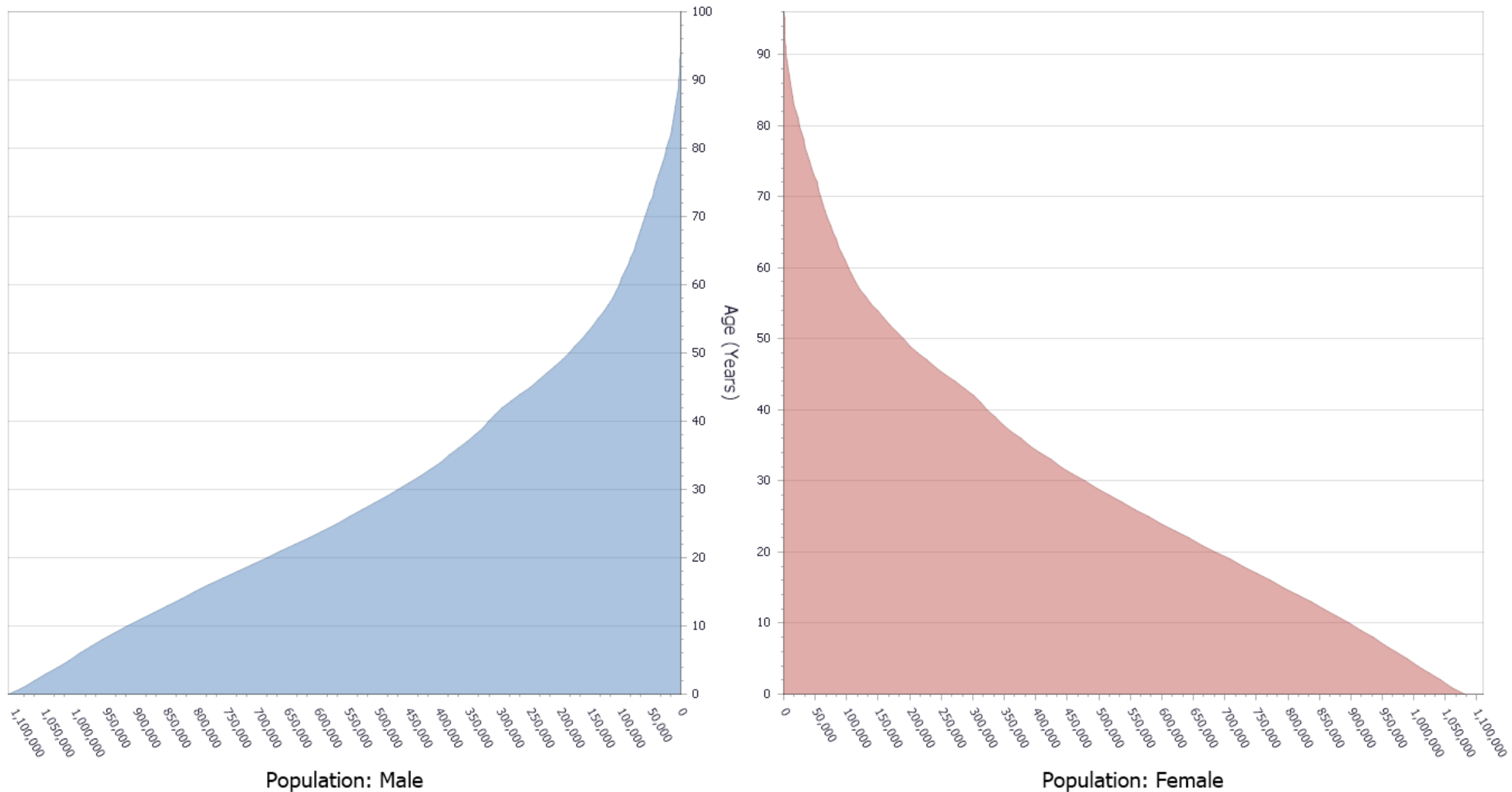
Population Pyramid: 2020



Population: Male

Population: Female

Population Pyramid: 2050



Population: Male

Population: Female



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our international work, visit:

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Thank you!

Lauren Medina

Population Division, U.S. Census Bureau

lauren.medina@census.gov

Daniel Goodkind

Population Division, U.S. Census Bureau

daniel.m.goodkind@census.gov