Module 3.
Evaluating Coverage of Deaths of Women in Reproductive Age

United States® Census Bureau

USAID FROM THE AMERICAN PEOPLE

Module 3. Episodes

- **Episode 1. Methods for Evaluating Coverage of Deaths of Women of Reproductive Age**
- Episode 2. Generalized Growth Balance Method (GGB)
- Episode 3. Synthetic Extinct Generation Method (SEG) and Combined GGB and SEG method
- Annex 0. Methods for Evaluating Population Age and Sex Distributions
- Annex 1. Details on GGB method
- Annex 2. Details on SEG method

United States® Census Bureau

USAID FROM THE AMERICAN PEOPLE

Episode 1.
Methods for Evaluating Coverage of Deaths of Women in Reproductive Age

United States Census Bureau

USAID FROM THE AMERICAN PEOPLE

Goal

- To introduce the logic behind methods for evaluating coverage of deaths recordings of women of reproductive age from censuses.

United States Census Bureau

USAID FROM THE AMERICAN PEOPLE

Road Map

- Data Completeness and Reasonableness.
- Components of Pregnancy-Related Mortality Ratio (PRMR).
- Evaluating Numbers of Deaths of Women.
- The Brass Growth Balance Method.
  - Assumptions.
  - Logic behind the evaluation method.
  - Caveats.
- Learning Assessment.

United States® Census Bureau

USAID FROM THE AMERICAN PEOPLE

Data Completeness and Reasonableness

- Data users should assess completeness and reasonableness of census data before estimating maternal mortality.
- Measures of maternal mortality should reflect:
  - The risk of maternal death per woman.
  - The risk of maternal death per birth.
  - The overall levels of fertility and mortality.
  - The distribution by cause at a specific period in time.

United States® Census Bureau

USAID FROM THE AMERICAN PEOPLE

Data Completeness and Reasonableness

- Recording fewer deaths, births or population in a census might lead to biased estimates of pregnancy-related or maternal mortality.
- Potential biases in census data on reported deaths in the household result from:
  - Sensitivity of household members to talk about recent deaths in the household resulting in refusals.
  - Household decomposition following the death of a household member.
  - Recall bias.

Data Evaluation and Adjustment

- Due to potential biases in census data, there is a need for evaluating census coverage of population, death, and birth records.
- Methods in modules 3 and 4 evaluate coverage of death and birth records and adjust estimates of maternal and pregnancy-related mortality.

Evaluating and Adjusting Pregnancy-Related Mortality Ratio (PRMR)

Pregnancy-related mortality ratio or PRMR is one of the central measures designed to express obstetric risk.

$$\text{PRMR} = \frac{\text{Number of Pregnancy-Related Deaths}}{\text{Number of Live Births}} \times 100{,}000$$

United States Census Bureau

USAID FROM THE AMERICAN PEOPLE

Evaluating and Adjusting Pregnancy-Related Mortality Ratio (PRMR)

Data evaluation focuses on:

- Deaths of women of reproductive age.
- Proportion of those deaths that are pregnancy-related.
- Births.

Evaluating Numbers of Deaths of Women

Evaluating Numbers of Deaths of Women of Reproductive Age

- It involves evaluating female deaths at all ages post-childhood.
  - It is important that deaths of older women are recorded.
- It is useful to include evaluation of male deaths to check plausibility.
- Numbers of deaths are evaluated by comparison with the population age distribution.

Evaluating Numbers of Deaths of Women of Reproductive Age

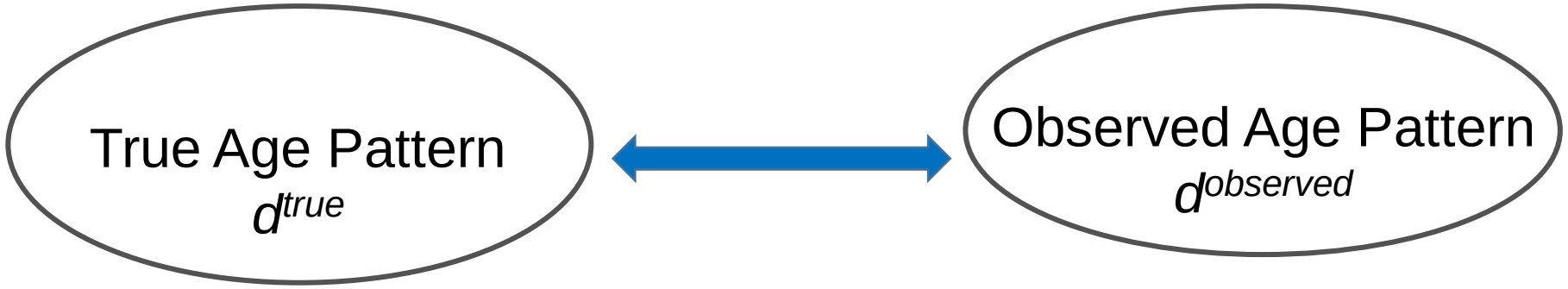
There are four methods:

- Brass Growth Balance.
- Generalized Growth Balance (GGB).
- Synthetic Extinct Generations (SEG).
- Combined GGB-SEG.

Logic Behind the Evaluation of Death Recording

- All methods compare the age distribution of deaths to the age distribution of the population alive.
- Death rates estimated from tabulations of deaths by age from one census or two censuses are compared to death rates implied by the population age distributions.

Logic Behind the Brass Growth Balance Method



The method assumes a difference between the true pattern that we are not observing, but that we can assume, and the observed age pattern of deaths, that might have fewer deaths due to biases in census reporting.

Brass Growth Balance Method: Assumptions

- The population is demographically stable, and its growth rate is constant across all age groups.
- Completeness of reporting of deaths and population does not vary by age.
- Errors of age reporting are not systematic and large.
- Population is closed to migration.

Logic Behind the Brass Growth Balance Method

Assume that you have data from one census only.

- The demographic balancing equation states that in any closed population, the population growth rate over a time period is equal to the difference between entry (or birth) and exit (or death) rates:

$$r = b - d$$

- Therefore, the birth rate is equal to the death rate plus the growth rate:

$$b = d + r$$

United States Census Bureau

USAID FROM THE AMERICAN PEOPLE

Logic Behind the Brass Growth Balance Method (Con.)

- In cases where all age specific growth rates are constant over a long period of time, the same principle applies for rates of open-ended segments of age x and above (x+).
- Therefore, the entry rate into each age open-ended segment is equal to a constant growth rate plus the true death rate:

$$b(x+) = r(x+) + d(x+)^{true}$$

Logic Behind the Brass Growth Balance Method (Con.)

- If deaths are incompletely reported in the census, then the true death rate is equal to the observed death rate multiplied by an adjustment factor:

$$d(x+)^{true} = d(x+)^{obs} * (1/c)$$

Logic Behind the Brass Growth Balance Method (Con.)

$$b(x+) = r(x+) + d(x+)^{true}$$

We can estimate this adjustment factor and the population growth rate by fitting a straight line between observed birth or entry and death rates in the open-ended age segments, following the equation:

$$b(x+) = r(x+) + d(x+)^{obs} * (1/c)$$

United States Census Bureau

USAID FROM THE AMERICAN PEOPLE

Caveats

- Remember that the first assumption of the Brass Growth Balance Method is:
  - The population is demographically stable, and its growth rate is constant across all age groups.
- However, what if in your country mortality and fertility rates have changed over time?

United States Census Bureau

USAID FROM THE AMERICAN PEOPLE

In the Following Episodes You Will…

- Learn how to use data from two censuses to overcome the limitation of the Brass Growth Balance Method.
- Apply a general case of the Brass Growth Balance Method, also called General Growth Balance (GGB) Method.
- Use of age-specific growth rates to approximate the distribution of deaths in a stationary population, also called the Synthetic Extinct Generations (SEG) Method.

Learning Assessment

- Select one correct answer.

If you have data from one census, you should use:

  - (A) Brass Growth Balance Method.
  - (B) Generalized Growth Balance Method.
  - (C) None of the above.

- True or False.

To estimate quality measures of maternal mortality you only need to evaluate death recordings from a census.

United States® Census Bureau

USAID FROM THE AMERICAN PEOPLE

Learning Assessment

If you have data from one census, you should use:

- Brass Growth Balance Method
- Generalized Growth Balance Method
- None of the above

- False

To estimate high quality measures of maternal mortality you only need to evaluate death recordings from a census.