

Fertility and its Measurement: Introduction and Simple Measures

Demography Camp

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1 Basic Definitions

- **Fertility:** refers to **live births** and to performance in producing live births
 - Any sign of life is considered a “live birth”
 - No sign of life is considered a still birth
- **Fecundity:** refers to the **biological capacity** to reproduce
- **Sterility:** incapacity to produce children
- **Fecundability:** monthly probability of conception

Note: the meanings of fertility and fecundity are reversed in romance languages (ex. fécondité et fertilité en Français)

2 How does fertility differ from mortality?

1. Only women bear children; both sexes die
2. Event of death removes person experiencing it from population; fertility does not
3. Fertility adds to population stock; mortality subtracts
4. Childbearing interval is much shorter than age range for deaths; usually assumed to be 15-44 or even 10-49
5. Women may have multiple births, or none at all; whereas everybody eventually dies and it is a nonrepeatable event

3 Simple Measures of Fertility

3.1 Annual Number of Births

Table 1: US Births

1940	2,559,000
1985	3,761,000
2003	4,090,000

3.2 Crude Birth Rate (CBR)

$$CBR = \frac{\text{births in a year}}{\text{person years lived during year}} \times 1000$$

Usually approximated by

$$CBR = \frac{\text{births in a year}}{\text{mid-year population}} \times 1000$$

Table 2: US CBR

1940	19.4
1985	15.8
2003	14.1

Advantages of CBRs:

- Simple to calculate; easy to interpret
- Together with CDR, gives population growth rate in closed population

Disadvantages of CBRs:

- Not just a measure of fertility
- Influenced by sex and age composition
 - Only women in childbearing ages produce children

3.3 General Fertility Rate (GFR)

Better to restrict fertility measure to women in childbearing age range

$$GFR = \frac{\text{births in a year}}{\text{mid-year population of women aged 15-44}} \times 1000$$

Table 3: US GFR

1940	79.9
1985	66.2
2003	66.1

- GFR requires more data than CBR
- Still influenced by the age distribution of women in the childbearing ages because fertility varies by age