Get every one in the picture

Deaths and Crude Death Rate

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

Adapted from Pacific Community's
Data analysis and report writing
Workshop for the North Pacific

Mortality as measure for health

- The level of mortality is an essential measure of health outcomes.

- We want to know who is dying, at what age they are dying, and what they are dying from
- How does this compare to accepted “norms” or other countries, and how is this changing over time?

The mortality of a population depends on various factors

- Demographic composition of the population, i.e. the age and sex distribution;
- Quality and utilisation of health and medical services such as immunisation programmes, maternal and child health care, primary health care, etc.;
- Environmental conditions and availability of infrastructure such as housing, water supply, sanitation, waste disposal;
- Life style factors, such as abuse of alcohol and tobacco;
- Work-related dangers;
- Exposure to events outside individual control such as natural disasters, war;
- Socio-economic status, such as income and education.

Measures of all-cause mortality

- **Absolute number of deaths**
- **Crude death rates**
- Age-specific death rates
- Age-standardized death rates
- Life expectancy

Number of deaths

- Death data tabulated by sex and age group are important in their own right,
  - easily understood by decision makers
  - resonates with the community

- Deaths are also the basis for all further calculations on age-specific and age-standardized mortality

Question:

- Which country has higher mortality?
  - Country A had 41,000 deaths in 2011
  - Country B had 1,000 deaths in 2011

Answer: We don't know

- The number of deaths alone does not tell us anything about the mortality in a country.
- A large number of deaths may simply reflect a large population, or a large population of people more likely to die (the very old).

Data in 2011	Country A	Country B
Country	Papua New Guinea	Tonga
Population 2011	6,188,000	106,000
Deaths	41,000	1,000

Data from the U.S. Census Bureau's International Data Base

Why age distributions of deaths are important

- All-age mortality is not very useful for health planning or monitoring
- We need to know how many deaths occur in different age groups.
- We want to know how old people are when they die, and how this compares to the mortality in other countries and regions of the world.
- We need to disaggregate mortality data by sex as men and women die of different things at different ages.

Percent distribution of deaths by sex

- It's helpful for health and policy planners to understand the percent distribution of deaths
- Infants die of different causes than the elderly

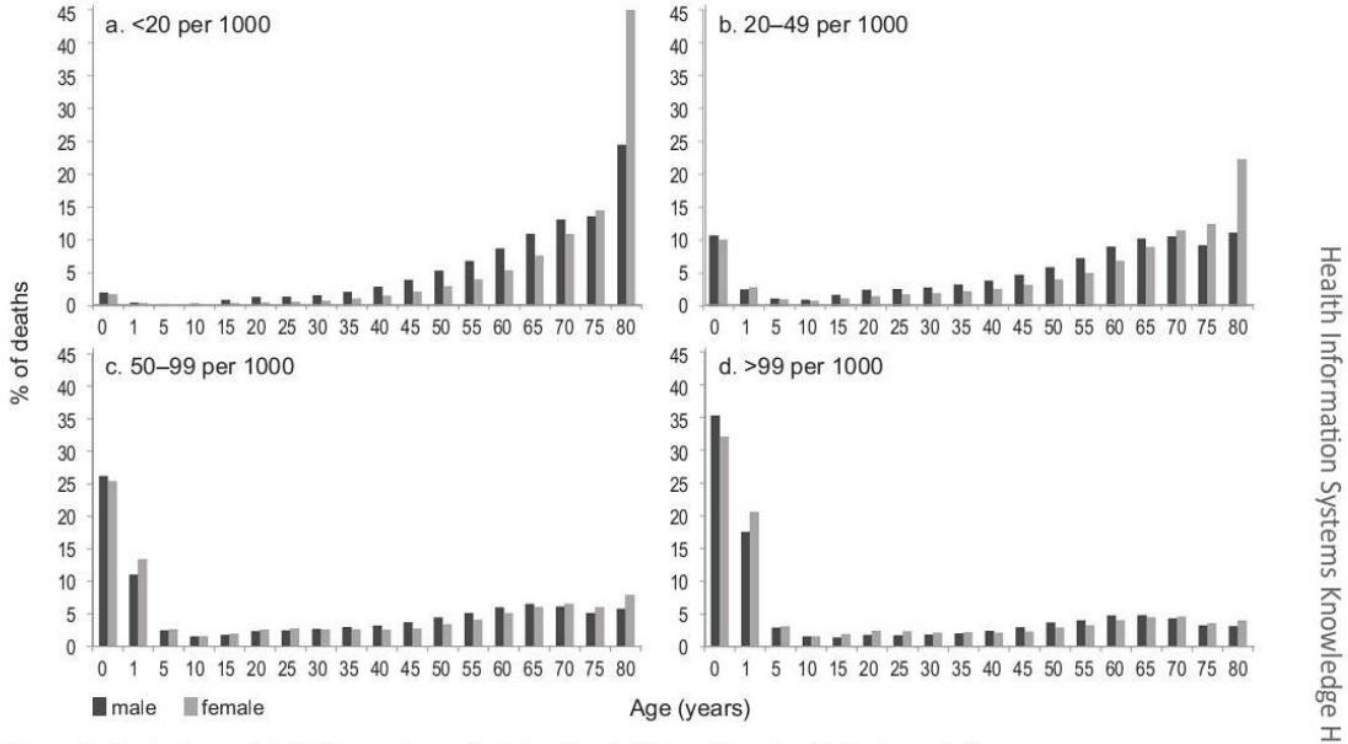


Figure 8 Typical age distributions of reported deaths at different levels of infant mortality

Graph from: University of Queensland Health Information Systems Knowledge Hub's *Mortality statistics: a tool to improve understanding and quality*

Note on disaggregating by location

- People do not necessarily die where they live
  - Particularly true of deaths in health facilities
  - Where are health facilities usually located?
- Usually we want to know the mortality rates of those who actually *live* in the area
  - When might we want to know deaths by place of occurrence? (think about traffic and other accidents)
- At the sub-national level, deaths counted should only include *usual residents*
- Ensure consistent definitions between the numerator (deaths) and denominator (population)

Effect of Location

City X

- Population: 1 million
- Deaths of usual residents:10,000
- Crude death rate: **10 per 1,000**

Village catchment Y

- Population: 100,000
- Deaths of usual residents : 1,000
- Crude death rate: **10 per 1,000**

If deaths are counted by usual residence

Effect of Location

City X

- Population: 1 million
- Hospitals: 10
- Deaths occurring in City X: 10,500
- Crude death rate: **10.5 per 1,000**

Village catchment Y

- Population: 100,000
- Health centres: 1
- Deaths occurring in catchment Y: 500
- Crude death rate : **5 per 1,000**

If deaths are counted in the location they occur

The Crude Death Rate (CDR)

- The most frequently used measure of general mortality
- CDR = the number of deaths in a defined period (usually a calendar year) per 1,000 people.
- It is defined as “crude” because does not account for the age (and sex) composition of a population.

Crude Death Rate

- Why we use the CDR:
  - easy to understand
  - requires the least amount of information
  - helps us understand mortality's "contribution" to population growth

CDR Example

- Average number of deaths in 2017 is 2,500
- Our midpoint is July 1, 2017. (Why?)
- Population was 150,645 on July 1, 2017. We then perform the calculation:
- 1000 * (2,500/150,645) to get a CDR of 16.6
- We can say there were 16.6 deaths per 1,000 population in 2017.

CDR by sex

- It’s useful to calculate the CDR for males, females, and both sexes combined.
- Expect the CDR for males to be higher than for females.
  - Deviations from this pattern could indicate that women and girls face severe disadvantages in terms of health and nutrition.
  - Alternatively, there may be problems with data completeness and quality with systematic underreporting of female deaths.

Question:

- Which country has higher mortality?
  - Country X had a CDR of 9 in 2011
  - Country Y had a CDR of 6 in 2011

Answer: We don’t know

- The CDR is also influenced by the population age structure.
- Populations with a large proportion of young children or a high proportion of elderly people will have relatively higher crude death rates because mortality risks are highest at very young and the oldest ages.

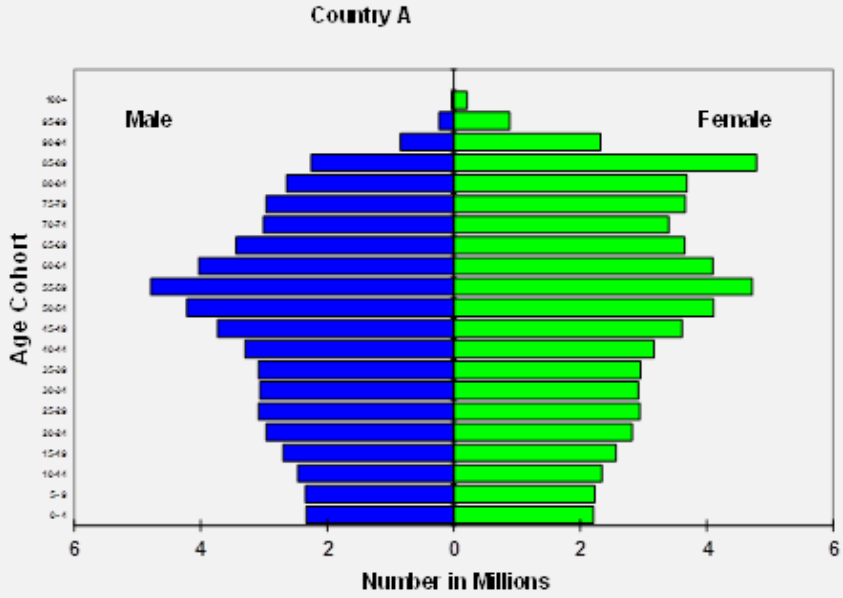
Why use the CDR?

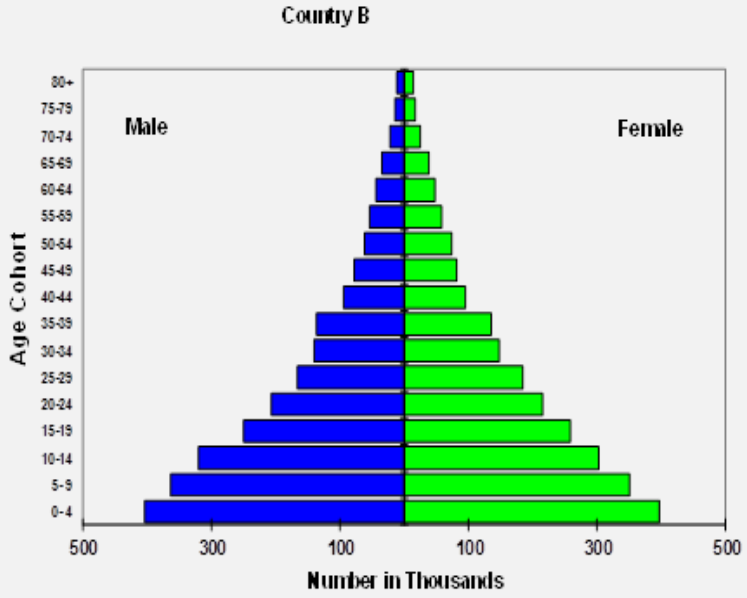
- Easy to understand
- Helps us understand how mortality might be affecting population growth

Country	Country X (Japan)	Country Y (Fiji)
CDR	9	6
Life expectancy at birth	84	71

Must standardize to make comparisons

- Two populations may have different crude death rates even if mortality at each age is the same.
- Country A may have lower mortality at each age than B, yet A may have a higher CDR! … how??





Lower limits of the CDR

- Demographers have demonstrated that there is generally a lower limit for the CDR of around 5 per 1000.

- Any CDR below 5 per 1000 should be treated with extreme caution as such a figure is strongly suggestive of INCOMPLETE death registration.

Your turn

- Using test data, develop tables for:
  - Deaths by age group for each sex
    - Should you use adjusted or unadjusted numbers?
- Graph the percent distribution of deaths by sex and age group
- Calculate the crude death rate for all deaths and by sex.
  - Should you use adjusted or unadjusted numbers?
- Repeat these exercises with your country data and if possible look at trends over time.
  - If possible, investigate deaths by place of usual residence vs. place of occurrence for your country data