



Measuring Health Status and Basic Epidemiology Methods

Presented by:
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Learning Objectives

After this tutorial you will be able to:

- Define health
- Describe health indicators
- Identify common health indicators and data sources
- Explain how health indicators are used
- List the three characteristics of descriptive epidemiology
- Describe the difference between proportions, rates, and ratios

MEASURING HEALTH STATUS

What is Health?

Most accepted definition is that of the World Health Organization:

"[Health is] the state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"
- WHO, 1948

"extent to which an individual or group is able to realize aspirations and satisfy needs, and to change or cope with the environment. Health is a resource for everyday life, not the objective of living; it is a positive concept, emphasizing social and personal resources as well as physical capabilities"
-WHO, 1984

What is a Health Indicator?

- A direct or indirect characteristic used to describe the quality or quantity of health for an individual or population
- Examples
 - Prevalence, morbidity, mortality
 - Maternal and infant mortality rates

Why Measure Health Status?

- Knowledge necessary to develop effective programs and initiatives
- Helps to focus efforts and limited resources
- Enables tracking impact of interventions over time.
- Can encourage dialogue and actions to improve the population's health

How to Use Health Indicators

- Support planning
 - Identify, monitor, communicate information
- Track progress toward objectives
- Build awareness of community's health
 - Trends, problems, changes
- Engage partners & generate interventions
- Inform policy makers
 - Promote accountability of agencies

Who Uses Health Indicators?

- Use of health indicators to prioritize resource allocation
- Diverse users
 - International
 - National
 - State & Local
 - others
 - foundations, law enforcement, education, private sector, faith-based organizations, researchers, media

Characteristics of Good Health Indicators

- Specific and focused
- Statistically valid
- Relevant to target area of health
- Influenced by data
 - Quality
 - Accessibility
- Ease of communication

Common Health Indicators

- Vital statistics related to birth and death
- Health status
- Health behaviors
- Access to services/care
- Social indicators
 - Physical environment
 - Social environment

How are Health Indicators Collected?

- Vital statistics records
- Disease surveillance systems
- Health services administrative data
 - Example: hospital discharge and billing
- Surveys
 - Online
 - In-person
 - Telephone

Healthy People 2020

- > 1200 health objectives
- 26 Major Health Indicators
 - High-priority health issues
 - Examples

Source: www.healthypeople.gov

Ongoing Progress

- State of the USA (SUSA) developing health indicators satisfying the following criteria:
 - Importance to health
 - Data quality & availability for long-term tracking
 - Evaluation using readily available data collected by the federal government.
 - Available at population subgroup level

BASIC EPIDEMIOLOGY METHODS

Person, Place, and Time

- Descriptive epidemiology
 - Amount and distribution of disease within a population
- Person
 - “Who is getting the disease?”
- Place
 - “Where are people with the disease?”
- Time
 - “When does the disease occur?”

Proportions

- A **proportion** is composed of:
 - a numerator
 - a denominator containing the numerator

$$\frac{A}{A + B}$$

Example: measles

$$\frac{12 \text{ new cases}}{2,000 \text{ children}} = 0.006 \text{ (i.e. 0.6\%)}$$

Alternatively:

$$\begin{aligned} \frac{12 \text{ new cases}}{2,000 \text{ children}} \times 1,000 &= 12,000/2,000 \\ &= 6 \text{ cases per} \\ &\quad 1,000 \text{ children} \end{aligned}$$

Rate

- Include specific time dimension
- Example: # measles cases
 - Per year
 - Per 6 months
 - Over some other time period

Incidence and Prevalence

Incidence = $\frac{\text{New cases of disease in defined population}}{\text{Population at risk of acquiring the disease}}$

Prevalence = $\frac{\text{Existing cases of disease in defined population}}{\text{Population at risk of acquiring the disease}}$

Ratios

Rate = $\frac{\text{Group 1}}{\text{Group 2}}$

- Mutually exclusive groups
- Numerator cannot be included in denominator
- Example:

$$\frac{45,000 \text{ Males}}{35,000 \text{ Females}} = 1.29 = \frac{1.29 \text{ Males}}{1 \text{ Female}}$$

Using Ratios

	Diseased	Not Diseased	
Exposed	A	B	A + B
Unexposed	C	D	C + D

Risk (proportion) in those exposed: $A/(A+B)$

Risk (proportion) in those not exposed: $C/(C+D)$

Comparing these two risks:

$$\frac{\text{Risk in the exposed}}{\text{Risk in the unexposed}} = \frac{A / (A + B)}{C / (C + D)} = \text{Relative Risk}$$

Example

	Disease	No Disease	
Exposed	340	600	= 940
Unexposed	4	1000	= 1004

$$\frac{\text{Risk in the exposed}}{\text{Risk in the unexposed}} = \frac{340/940}{4/1004} = \frac{0.361}{0.00398} = 90.7$$

Conclusion

- Health measures and indicators important for developing, implementing, and evaluating public health interventions
- Basic understanding of epidemiology tools helpful for using data effectively