

EPIDEMIOLOGY

History, Philosophy, and Uses of
Epidemiology

What is epidemiology?

- Epidemiology is the study of the distribution and determinants of health and diseases, morbidity, injuries, disability, and mortality in populations.
- Epidemiology is used to identify the causes and treatments of health problems in populations.
- Medicine is concerned with individuals.

What is Epidemiology video clip



Important definitions

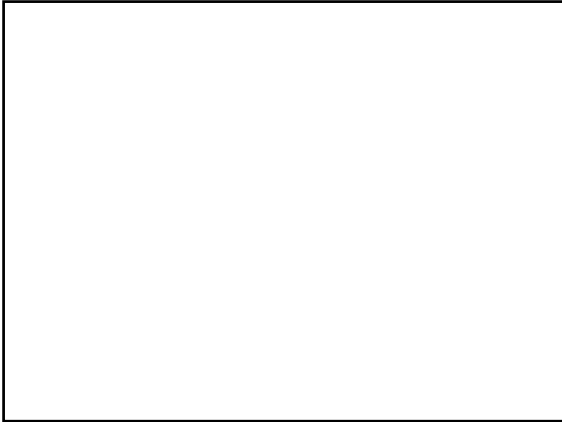
- Population – all the inhabitants of a given area together.
- Name some populations.
 - US citizens
 - University of South Florida students
 - Members of this class
 - Adolescent mothers
 - People who had a motor vehicle injury
 - Smokers

Distribution

- Disease does not occur randomly
- Variation between subgroups in the population
- Some subgroups have increased rates of adverse health outcomes

Subgroups

- What are some subgroups with poorer health outcomes?
- Smokers and lung cancer
- Obese people and diabetes
- African American women and low birth weight infants



Determinants

- Any factor that brings about a change in a health condition or other defined characteristic.
 - Biologic agents
 - Chemical agents
 - Less specific factors
 - Stress, lifestyle factors
- Exposure – contact with a disease-causing factor

Outcomes

- All possible results that stem from exposure to a causal factor
 - Variety
 - Morbidity (illness)
 - Mortality (death)

Quantification

- Counting of cases of illness or other health outcomes
 - Uses statistical measures
 - Describe the occurrence of health outcomes
 - Measure the association of outcomes with exposures
 - Quantifies variation of diseases and health outcomes according to subgroups of the population.

Natural History of Disease

- The course of a disease from the beginning to end without any clinical intervention.
 - Pre-pathogenesis: before the disease agent interacts with the host
 - Pathogenesis: after an agent has interacted with a host
- Three modes of prevention
 - Primary
 - Secondary
 - Tertiary

Types of prevention

- Primary
 - Prevention of a disease before it occurs
 - Targets pre-pathogenesis
- Secondary
 - Activities to limit the progression of disease
 - Occurs during early stages of pathogenesis
- Tertiary
 - Programs to restore patient's functioning
 - Occurs in the later stages of pathogenesis

Uses of Epidemiology

- Epidemiology is used to identify and evaluate intervention strategies.
- Overall goal of public health prevention is to prevent disease or decrease the negative impact of disease.

Epidemiology: an Interdisciplinary Science

- What do you learn from epidemiology
 - To use a scientific method
 - To increase your ability to think critically
 - To increase your understanding of statistics
 - To improve your communication skills

Epidemiology as an Observational Science

- Capitalizes on naturally occurring situations
- Observe exposure and outcomes among people in the real world
 - People choose to smoke and they are observed to see the outcomes
- Differs from laboratory science where the researcher is in control of exposure
 - Rats are selected to be exposed or not exposed to cigarette smoke

Descriptive epidemiology

- Studies with characterizing the amount and distribution of health and disease within a population
- Outcomes are classified by person, place, and time
- These studies may be used to determine hypotheses to be studied later in analytic studies

Analytic epidemiology

- Tries to determine the cause of a disease by looking at associations between people with and without an exposure and people with and without an outcome.
- Natural experiments in which subsets of populations have different levels of exposure and we look at rates of disease.

History of Epidemiology

- Good overview
- We will revisit some areas throughout the semester
 - Black Death
 - Influenza

Theory of causality

- Robert Koch 1182
 - Identified the cause of tuberculosis
 - Koch's postulates
 - The organism must be observed in every case of the disease
 - It must be isolated and grown in pure culture
 - When inoculated into a susceptible individual, it must cause disease
 - The organism must be observed in and recovered from the experimental animal

Demographic/epidemiologic transition

- Shift in the patterns of morbidity and mortality from causes primarily related to infectious diseases to those associated with chronic diseases.
- There was also a demographic transition with a shift from high birth rates and high mortality rates in more agrarian societies to lower birth and mortality rates in more developed societies.

Next activities

- Watch the film on the Black Death and complete the quiz
- Return to Lecture 1b in which we will discuss some highlights of this epidemic
- Then you should watch the film on a more recent epidemic, Influenza and complete that quiz
- Following that there is a lecture on Influenza in modern times.
- Then you will need to work on your group activities: scavenger hunt and memo assignment.