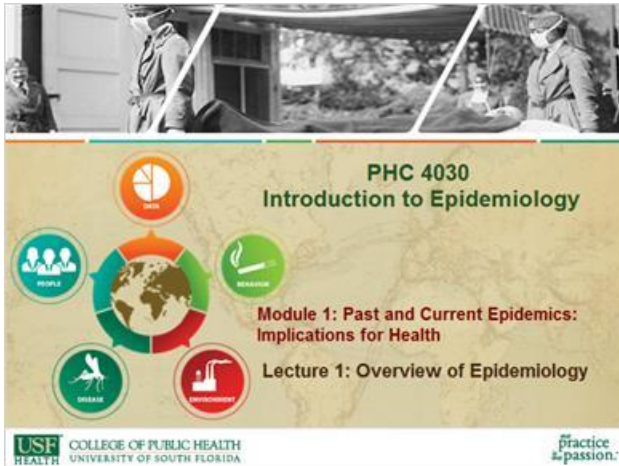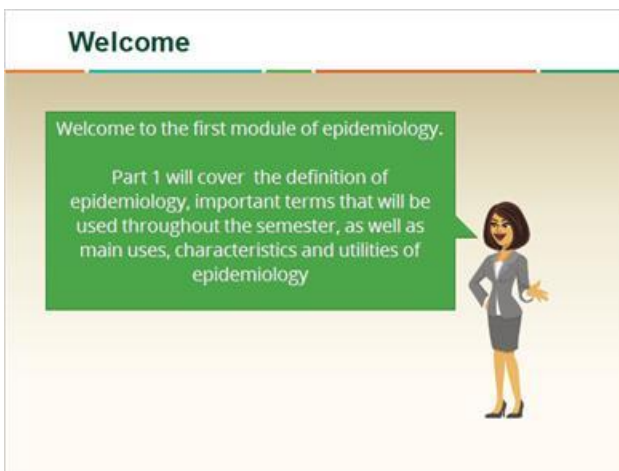# 1. Overview of Epidemiology

1.1 Lecture 1: Overview of Epidemiology

1.2 Welcome

1.3 What is epidemiology?

What is Epidemiology?
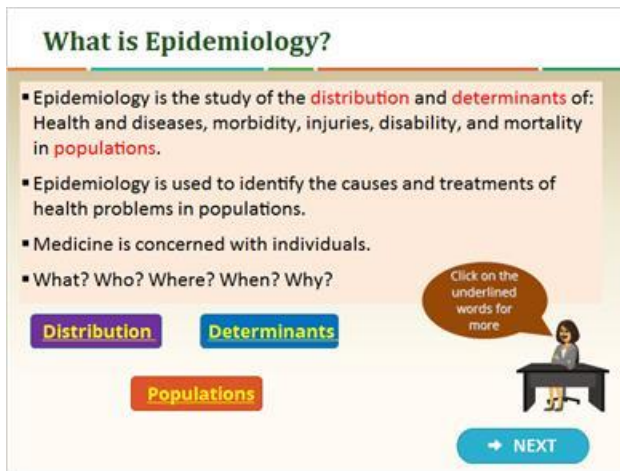
- Epidemiology is the study of the distribution and determinants of: Health and diseases, morbidity, injuries, disability, and mortality in populations.
- Epidemiology is used to identify the causes and treatments of health problems in populations.
- Medicine is concerned with individuals.
- What? Who? Where? When? Why?

Distribution   Determinants

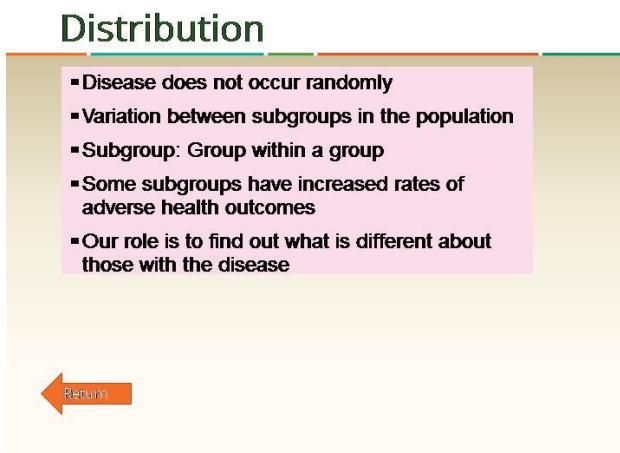Populations

Click on the underlined words for more

→ NEXT

Distribution (Slide Layer)

Distribution

- Disease does not occur randomly
- Variation between subgroups in the population
- Subgroup: Group within a group
- Some subgroups have increased rates of adverse health outcomes
- Our role is to find out what is different about those with the disease

Return

Determinants (Slide Layer)

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
  - Examples: Smoking, Alcohol, Obesity
  - Multiple exposures may play a role in one disease

Return

Population (Slide Layer)

Population

- **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
- Some population subgroups have poorer health outcomes

Return

Subgroups (Slide Layer)

1.4 Outcomes

1.5 Quantification

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.**

1.6 Natural History of Disease

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   Click here
- 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.
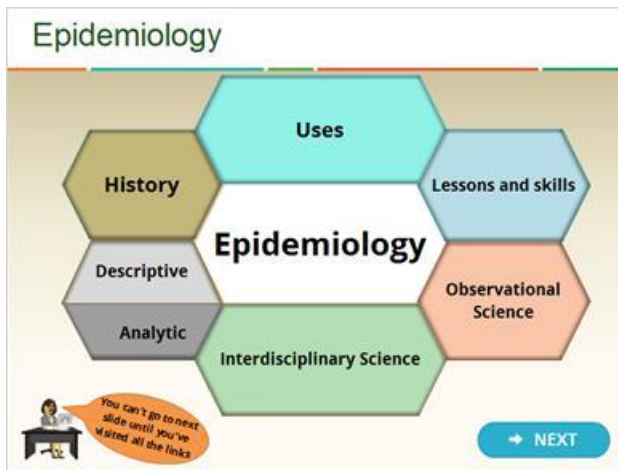
Prevention (Slide Layer)

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

Return

1.7 Epidemiology

Epidemiology

History
Uses
Lessons and skills
Descriptive
Epidemiology
Analytic
Observational Science
Interdisciplinary Science

You can't go to next slide until you've visited all the links

→ NEXT

Interdisciplinary (Slide Layer)

The Interdisciplinary Approach

Epidemiology is an **interdisciplinary science**, meaning it uses information from many fields including:

- Mathematics and biostatistics
- History
- Sociology
- Demography and geography
- Behavioral sciences
- Law

Return

Uses (Slide Layer)

Uses of Epidemiology

- Epidemiology is used to identify and evaluate intervention strategies.
- Overall goal of public health prevention is to prevent diseases or decrease the negative impact of disease
- Epidemiology helps with health promotion, alleviation of adverse health outcomes, and prevention of disease
  Examples: Infectious diseases, chronic diseases

Return

Lessons (Slide Layer)

Lessons learned and skills acquired through
Epidemiology

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

Return

Observational (Slide Layer)

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

Return

Descriptive (Slide Layer)

Descriptive Epidemiology

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

Return

Analytic (Slide Layer)

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.

Example: smoking increases the risk of lung cancer by 5 times.

Return

History (Slide Layer)

History of Epidemiology

Read about it in your book
We will revisit some areas throughout the
semester
- Black Death
- Jenner
- Snow on Cholera
- Influenza

Return

1.8 Theory of causality

Theory of causality

Robert Koch (1843-1910)
- Identified the cause of tuberculosis
- Koch's postulates

Chart

- 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

Koch (Slide Layer)
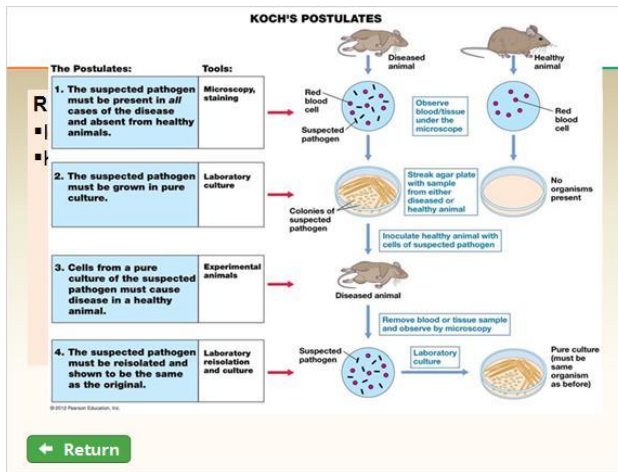
1.9 Demographic/Epidemiologic Transition

1.10 Untitled Slide