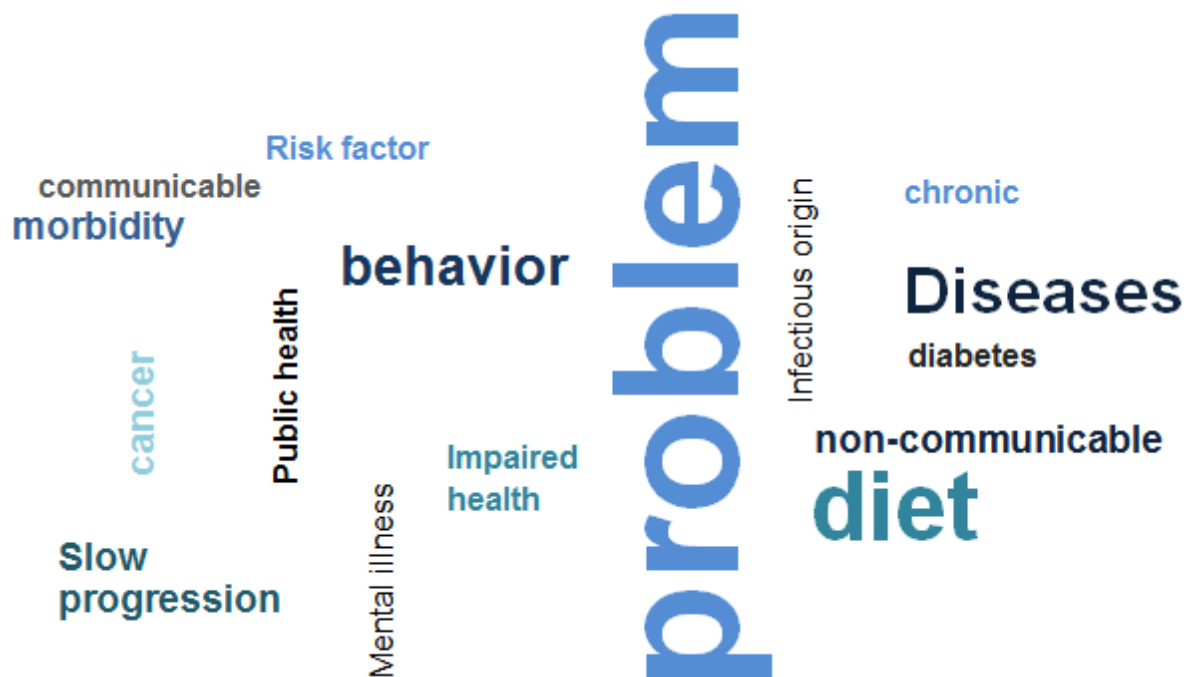


PARTICIPANT GUIDE



Introduction to NCD Epidemiology

Created: 2013



Introduction to NCD Epidemiology. Atlanta, GA: Centers for Disease Control and Prevention (CDC), 2013.

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Introduction to NCD Epidemiology

LEARNING OBJECTIVES

- At the end of the training, you will be able to describe how you will use epidemiology to address a public health problem.

ESTIMATED COMPLETION TIME

- 2 hours, 25 minutes (*110 minutes interactive presentation; 35 minutes Skill Assessment*)

REFERENCES AND RESOURCES

- Gregg, M.B. (Ed.). 2008. Field Epidemiology (3rd ed.). New York: Oxford University Press.
- Porta, M and Last, J.M. (Ed.). 2008. A Dictionary of Epidemiology (5th ed.). New York: Oxford University Press.
- Office of Workforce and Career Development. 2006. Principles of Epidemiology in Public Health Practice (3rd ed.). Atlanta: CDC.
- McKenna et al. 1998. Current Issues and Challenges in Chronic Disease Control. In: Chronic Disease Epidemiology and Control. Washington:

MODULE CONTENT

| Slide | Notes |
|---|-------|
|  <h3>Learning Objective</h3> <p>At the end of the training, participants will be able to describe how to use epidemiology to address a public health problem.</p> <p><small>Introduction to NCD Epidemiology 2</small></p> | |
|  <h3>Lesson Overview</h3> <ul style="list-style-type: none"> • Basic terminology • Comparison of non-communicable diseases and communicable diseases • Definition and approaches of epidemiology • Public health management cycle • Core functions of epidemiology <p><small>Introduction to NCD Epidemiology 3</small></p> | |
| <h3>Non-Communicable Disease (NCD): Definition</h3> <p>Noncommunicable diseases (NCDs), also known as chronic diseases, are not passed from person to person. They are of long duration and generally slow progression.</p> <p><small>(WHO, 2011)</small></p> <p><small>Introduction to NCD Epidemiology 4</small></p> | |

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Notes

Non-Communicable Disease (NCD): Definition (cont.)

- Chronic conditions are characterized by the following:
 - Do not result from an (acute) infectious process
 - Are "not communicable"
 - Cause premature morbidity, dysfunction, and reduced quality of life
 - Usually develop and progress over long periods,
 - Often initially insidious
 - Once manifested there is usually a protracted period of impaired health

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Non-Communicable Disease (NCD): Extended Definition

In some definitions, NCDs also include:

- Chronic mental illness
- Injuries, which have an acute onset, but may be followed by prolonged convalescence and impaired function

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Key Point: There are a variety of opinions about this definition in the field and there is not 100% agreement; for example, some would argue that HIV is a chronic condition.

Types of NCDs

- Cardiovascular disease (Coronary heart disease, Stroke)
- Cancer
- Chronic lung disease
- Diabetes
- Chronic neurologic disorders (Alzheimer's, dementias)
- Arthritis/Musculoskeletal diseases

World Health Organization: NCD Mortality and Morbidity Website

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Notes

| Leading Causes of Attributable Global Mortality and Burden of Disease, 2004 | | | |
|---|------|--|-----|
| Attributable Mortality | | Attributable DALYs | |
| | % | | % |
| 1. High blood pressure | 12.8 | 1. Childhood underweight | 7.8 |
| 2. Tobacco use | 8.7 | 2. High blood pressure | 7.5 |
| 3. High blood glucose | 5.8 | 3. Unsafe sex | 6.6 |
| 4. Physical inactivity | 5.5 | 4. Unsafe water, sanitation, hygiene | 6.1 |
| 5. Overweight and obesity | 4.8 | 5. High blood glucose | 4.9 |
| 6. High cholesterol | 4.5 | 6. Indoor smoke from solid fuels | 4.8 |
| 7. Unsafe sex | 4.0 | 7. Tobacco use | 3.9 |
| 8. Alcohol use | 3.8 | 8. Physical inactivity | 3.8 |
| 9. Childhood underweight | 3.8 | 9. Suboptimal breastfeeding | 3.7 |
| 10. Indoor smoke from solid fuels | 3.3 | 10. High cholesterol | 3.3 |
| 59 million total global deaths in 2004 | | 1.5 billion total global DALYs in 2004 | |
| World Health Organization: Global Burden of Disease 2004 Update PowerPoint | | | |
| Introduction to NCD Epidemiology | | | |

| Characteristics of NCDs |
|--|
| <ul style="list-style-type: none"> • Complex etiology (causes) • Multiple risk factors • Long latency period • Non-contagious origin (non-communicable) • Prolonged course of illness • Functional impairment or disability • Incurability • Insidious onset |
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| Risk Factor |
|---|
| <p>“An aspect of personal behavior or lifestyle, an environmental exposure, or a hereditary characteristic that is associated with an increase in the occurrence of a particular disease, injury, or other health condition.”</p> |
| (Principles of Epidemiology, CDC, 2006) |
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Modifiable Risk Factor

- A risk factor that **can** be reduced or controlled by intervention, thereby reducing the probability of disease.
- The WHO has prioritized the following four:
 - Physical inactivity
 - Tobacco use
 - Alcohol use
 - Unhealthy diets

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Non-Modifiable Risk Factor

- A risk factor that **cannot** be reduced or controlled by intervention, for example:
 - Age
 - Gender
 - Race
 - Family history (genetics)

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Common Risk Factors

Noncommunicable Diseases
4 Diseases, 4 Modifiable Shared Risk Factors

| | Tobacco Use | Unhealthy diets | Physical Inactivity | Harmful Use of Alcohol |
|---------------------|-------------|-----------------|---------------------|------------------------|
| Cardio-vascular | | | | |
| Diabetes | | | | |
| Cancer | | | | |
| Chronic Respiratory | | | | |

Noncommunicable Diseases
World Health Organization
ECDC-EC High-level Expert

ECDC-EC High-level Expert

World Health Organization

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Key Point: If you have an intervention for physical inactivity and tobacco use you can make progress on four key NCDs. You don't need to plan separate interventions for each NCD or each risk factor.

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Communicable Disease: Definition

- An infectious disease transmissible (as from person to person) by direct contact with an affected individual or the individual's discharges or by indirect means (as by a vector)
- Examples:
 - Measles
 - Dengue
 - Typhoid

Meriam Webster: Communicable Disease Definition Website

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Non-Communicable Diseases vs Communicable Diseases

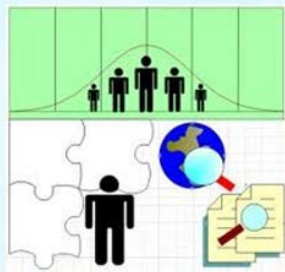


- How do they differ regarding:
 - Infectiousness?
 - Risk of Disease?

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What is Epidemiology?



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Epidemiology: CDC Definition

“The study of the distribution and determinants of health-related states in specified populations, and the application of this study to control health problems.”

- Distribution
- Determinants
- Health-related states
- Specified population
- Application

(Last, 2001)

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**Epidemiology: CDC Definition
Distribution**

Distribution: Occurrence of cases by **time, place, and person**

Example: According to a study of deaths in Country X in 2008, 1,034 cervical cancer deaths occurred among women between the ages of 45-54.

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Key Point: Think of determinants as the “how” and the “why.”

**Epidemiology: CDC Definition
Determinants**

Determinants: All the causes and risk factors for the occurrence of a disease, including physical, biological, social, cultural, and behavioral factors

Example: Smoking was a risk factor or determinant for the greater number of cancer deaths among women ages 45-54 in Country X.

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Epidemiology: CDC Definition Health-Related States

Health-related states

- Diagnosis of a specific disease or cause of death
- Health-related behavior (e.g., smoking, taking prenatal vitamins)
- Example: According to the 2008 study in Country X, 1,034 cervical cancer deaths occurred among women between the ages of 45-54.

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Epidemiology: CDC Definition Specified Population

Specified Population: A measurable group, defined by location, time, demographics, and other characteristics

Example: Women aged 45-54 living in a rural village in Country X from 2001 through 2009.

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Epidemiology: CDC Definition Application

Application

- Analysis, conclusion, distribution, and timely use of epidemiologic information to protect the health of the population
- Example: As a result of the Country X Study, free cervical cancer screening programs were implemented. They targeted women living in remote areas in hopes of finding women with cervical cancer at an earlier stage of cancer in order to prevent death.

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Purpose of Epidemiology

- To measure frequency of disease
 - Quantify disease
- To assess distribution of disease
 - Who is getting disease?
 - Where is disease occurring?
 - When is disease occurring?
- To form hypotheses about causes and preventive factors
- To identify determinants of disease
 - Hypotheses are tested using epidemiologic studies

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Epidemiologic Assumptions

- Diseases and other health-related events do not occur at random.
- Diseases and other health-related events usually have causal and preventive factors that can be found.

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Approaches in Medicine vs. Epidemiology

| Approach/ Consideration | Clinical Medicine | Epidemiology |
|----------------------------|--|--|
| Focus | Individuals | Populations |
| Main Goal | Diagnosis and treatment | Prevention and control |
| Questions | What is wrong with this patient? | What are the leading causes of death or disability in this population? Risk factors? |
| Treatment | What treatment is appropriate? | What can be done to reduce or prevent disease or risk factors? |
| Who is involved? | Physician, laboratorian, nurse, and others | Epidemiologists, statisticians, and others from diverse disciplines |

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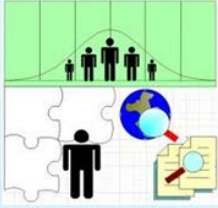
Key Point: Coordination between clinical practitioners and epidemiologists is critical; individual data or clinical data from the individuals needs to first be obtained from the clinical practitioners.

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Approaches to Epidemiology

1. Descriptive Epidemiology
2. Analytic Epidemiology



The illustration is divided into two horizontal sections. The top section, corresponding to 'Descriptive Epidemiology', shows a green bell curve with five black human figures of varying heights standing underneath it. The bottom section, corresponding to 'Analytic Epidemiology', shows a grid of puzzle pieces. One piece in the center features a black human figure. To the right of this piece is a blue and white globe, and below the globe is a magnifying glass over a document with a red arrow pointing to a specific spot.

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Descriptive Epidemiology

- Studies the *pattern* of health events and their *frequency* in populations in terms of:
 - Person
 - Place
 - Time
- Purpose:
 - To identify problems for further study
 - To plan, provide, and evaluate health services

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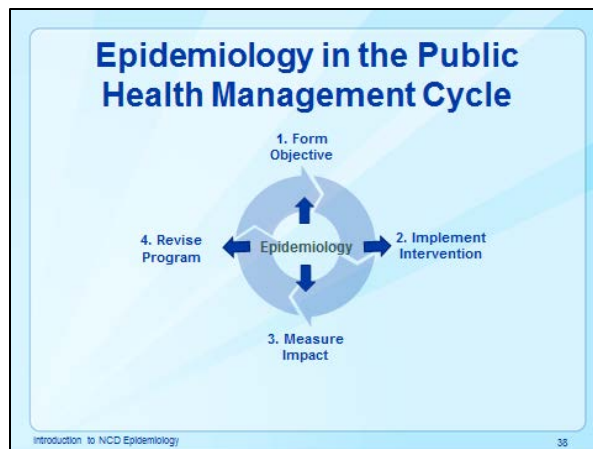
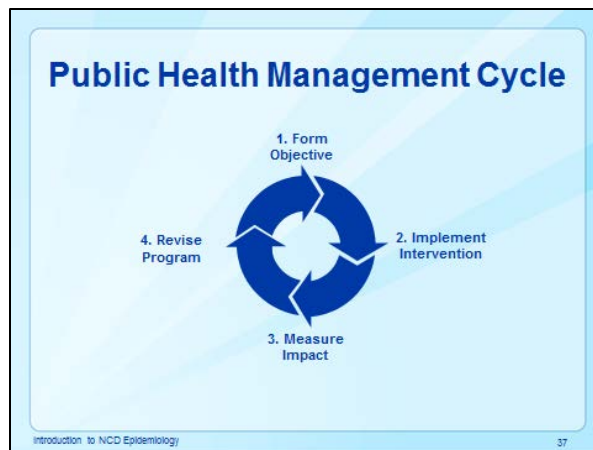
Analytic Epidemiology

- Studies the association between *risk factors* and disease
- Purpose:
 - To determine *why* disease rates are high (or low) in a particular group

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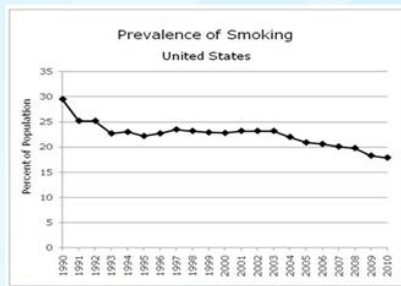
Key Point: Although there are only 4 steps in the cycle, there are many steps leading up to each. For example, you might test an intervention before you implement one.



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Public Health Surveillance



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Public Health Surveillance:
CDC Definition

Ongoing, systematic collection, analysis, and interpretation of health-related data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those responsible for prevention and control.

CDC's National Notifiable Diseases Surveillance System (NNDSS) Website

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Investigation



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Data Analysis

- Describe the distribution of a health condition or event in a community
- Create a hypothesis about what causes or protects against disease or injury
- Learn about factors thought to be associated with disease
- Assess associations between risk factors and disease, using statistical methods
- Interpret results and disseminate information

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Key Point: Epidemiology is used in the design and implementation of interventions by describing patterns of disease. This provides information on who, where, and when to focus interventions.

Intervention



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Evaluation

Process

Outcome

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Key Point: A process evaluation assesses the operation of the project while an outcome evaluation assesses changes in health.

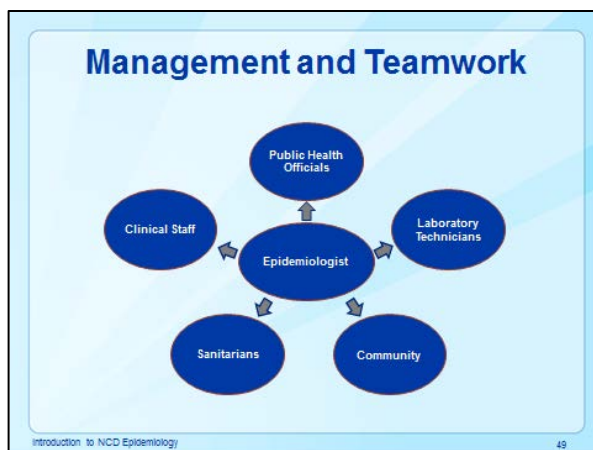
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Communication




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Review: Functions of Epidemiology

- Public Health Surveillance
- Investigation
- Data Analysis
- Intervention
- Evaluation
- Communication
- Management and Teamwork

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Half-Truths and Misunderstandings

Everyone
has to die of
something

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Half-Truths and Misunderstandings: Reality



| | |
|-----------|-----------------------------|
| Name | Jonas Justo Kassa |
| Age | 65 |
| Country | United Republic of Tanzania |
| Diagnosis | Diabetes |

Reality: death is inevitable but
it does not need to be slow,
painful, or premature

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Skill Assessment

1. Work in small groups to complete the assessment.
2. Discuss a local health problem and describe which **functions of epidemiology** to use to address the problem.
3. Assign a member of your group to record your responses.
4. Spend 20 minutes completing the assessment.
5. Be prepared to share your work with the class.

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