

# Public Health

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## Introduction to Public Health

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**Note:**

Thanks to the Centers for Disease Control and Prevention for the use of these slides.



### DATA SCIENCE FOR DRUG DISCOVERY, HEALTH AND TRANSLATIONAL MEDICINE

Center for Surveillance, Epidemiology, and Laboratory Services  
Division of Scientific Education and Professional Development



# Course Topics

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## Introduction to Public Health

1. Public Health Definition and Key Terms
2. History of Public Health
3. A Public Health Approach
4. Core Functions and Essential Services of Public Health
5. Stakeholder Roles in Public Health
6. Determining and Influencing the Public's Health

# Learning Objectives

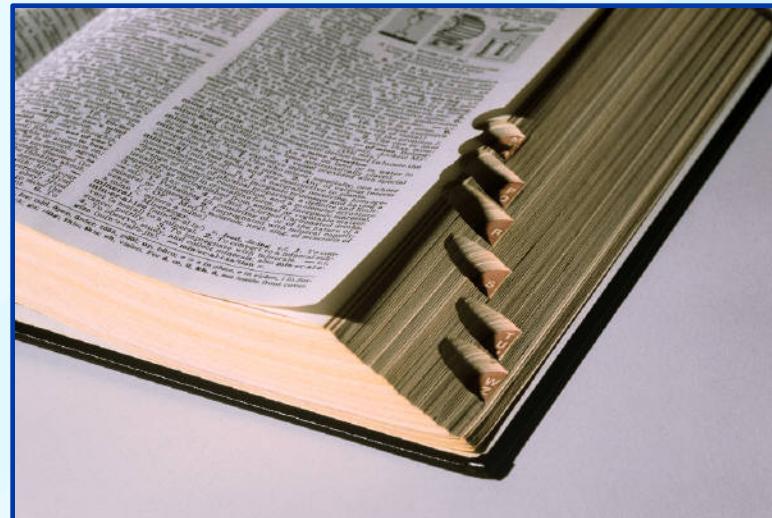
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After this course, you will be able to

- describe the purpose of public health
- define key terms used in public health
- identify prominent events in the history of public health
- recognize the core public health functions and services
- describe the role of different stakeholders in the field of public health
- list some determinants of health
- recognize how individual determinants of health affect population health

# Topic 1

## Public Health Definition and Key Terms



# Public Health Defined

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Photo: IF Fisher and EL Fisk

“The science and art of preventing disease, prolonging life, and promoting health through the organized efforts and informed choices of society, organizations, public and private communities, and individuals.”

—CEA Winslow

# The Mission of Public Health

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INSTITUTE OF MEDICINE  
OF THE NATIONAL ACADEMIES

“Fulfilling society’s interest in assuring conditions in which people can be healthy.”

—Institute of Medicine



World Health Organization

“Public health aims to provide maximum benefit for the largest number of people.”

—World Health Organization

# Public Health Key Terms

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**clinical care:** prevention, treatment, and management of illness and the preservation of mental and physical well-being through the services offered by medical and allied health professions; also known as *health care*.

**determinant:** factor that contributes to the generation of a trait.

**epidemic or outbreak:** occurrence in a community or region of cases of an illness, specific health-related behavior, or other health-related event clearly in excess of normal expectancy. Both terms are used interchangeably; however, epidemic usually refers to a larger geographic distribution of illness or health-related events.

**health outcome:** result of a medical condition that directly affects the length or quality of a person's life.



# Knowledge Check

Fill in the blank with the correct answer.

- A. groups of people      B. individuals

Public health aims to provide groups of people with the right to be healthy and live in conditions that support health.



## Knowledge Check

Fill in the blank with the correct answer.

- A. pandemic
- B. intervention
- C. epidemic or outbreak
- D. prevention

A(n) epidemic or outbreak is a disease occurrence among a population that is in excess of what is expected for a given time and place.

# Topic 2

## The History of Public Health



# Sanitation and Environmental Health

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500 BCE



Greeks and Romans practice community sanitation measures

1840s



The Public Health Act of 1848 was established in the United Kingdom

1970



The Environmental Protection Agency was founded

# Pandemics

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## Influenza



500 million infected worldwide in 1918

## Polio



Vaccine introduced in 1955; eradication initiative launched in 1988

## HIV



34 million living with HIV worldwide; 20% decline in new infections since 2001

# Preparedness for Disaster Response

## Biologic Warfare



Plague used as a weapon of war during the Siege of Kaffa

## September 2001



Public health surveillance conducted after the 9/11 attacks

## Hurricane Katrina



Emergency services, public health surveillance, and disease treatment provided

# Prevention Through Policy

## Book of Leviticus



The world's  
first written  
health code

## Tobacco Laws



Laws banning smoking  
in public places

## Obesity



Food labeling and  
promotion of physical  
activity



## Knowledge Check

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Which of the following events in public health history have been pandemics? (Select all that apply)

A. Siege of Kaffa



B. Influenza



C. Polio

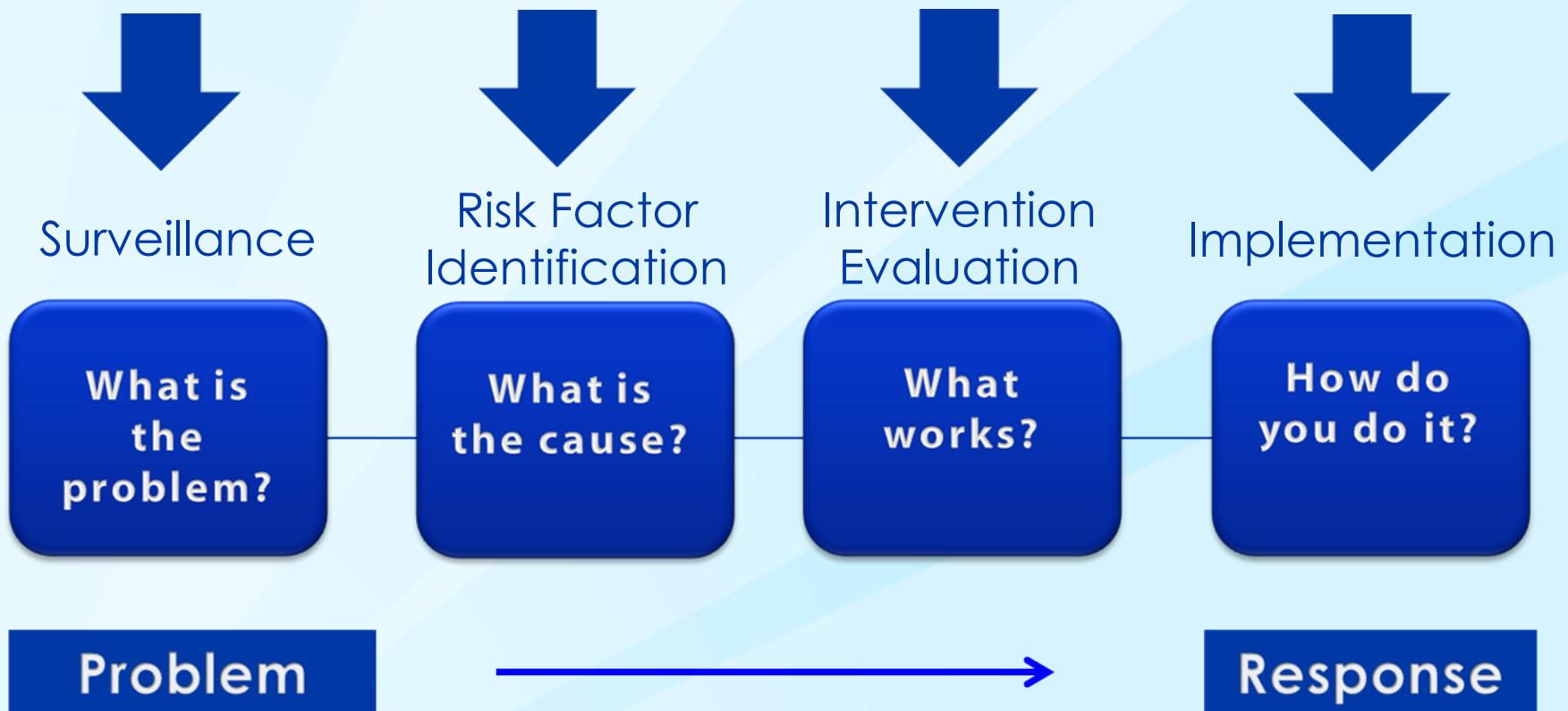
D. Hurricane Katrina

# Topic 3

## A Public Health Approach



# A Public Health Approach



# Public Health Core Sciences



# Cholera — A Public Health Approach

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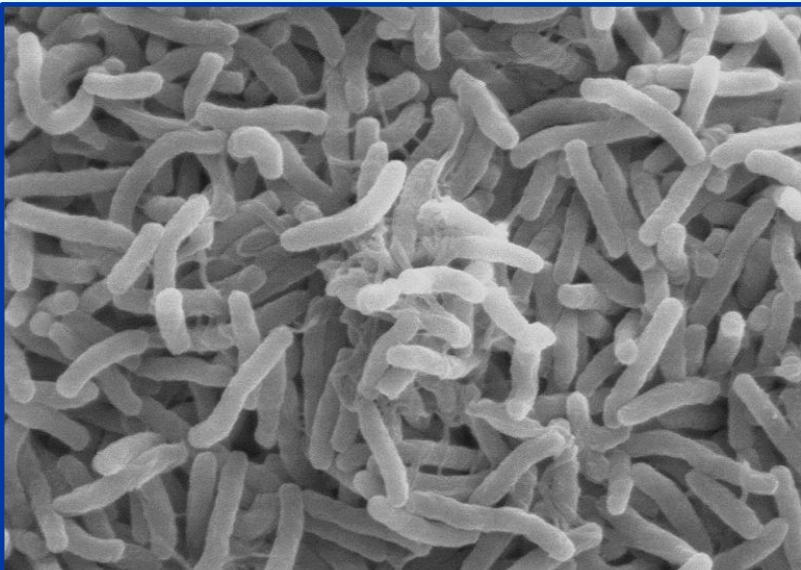


Photo: TJ Kirn, MJ Lafferty, CMP Sandoe, and R Taylor,  
Dartmouth Medical School

Cholera, a fatal intestinal disease, was rampant during the early 1800s in London, causing death to tens of thousands of people in the area. Cholera was commonly thought to be caused by bad air from rotting organic matter.

# John Snow, Physician

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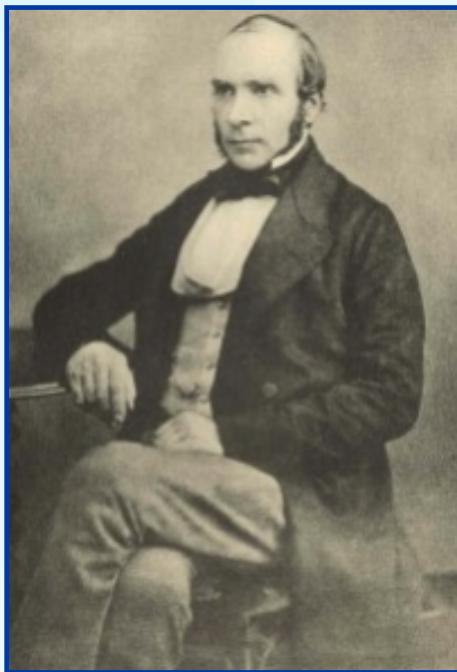


Photo: London School of Hygiene  
and Tropical Medicine

John Snow is best known for his work tracing the source of the cholera outbreak and is considered the father of modern epidemiology.

# Epidemiology — What is the Problem?

Cluster of Cholera Cases, London — 1854

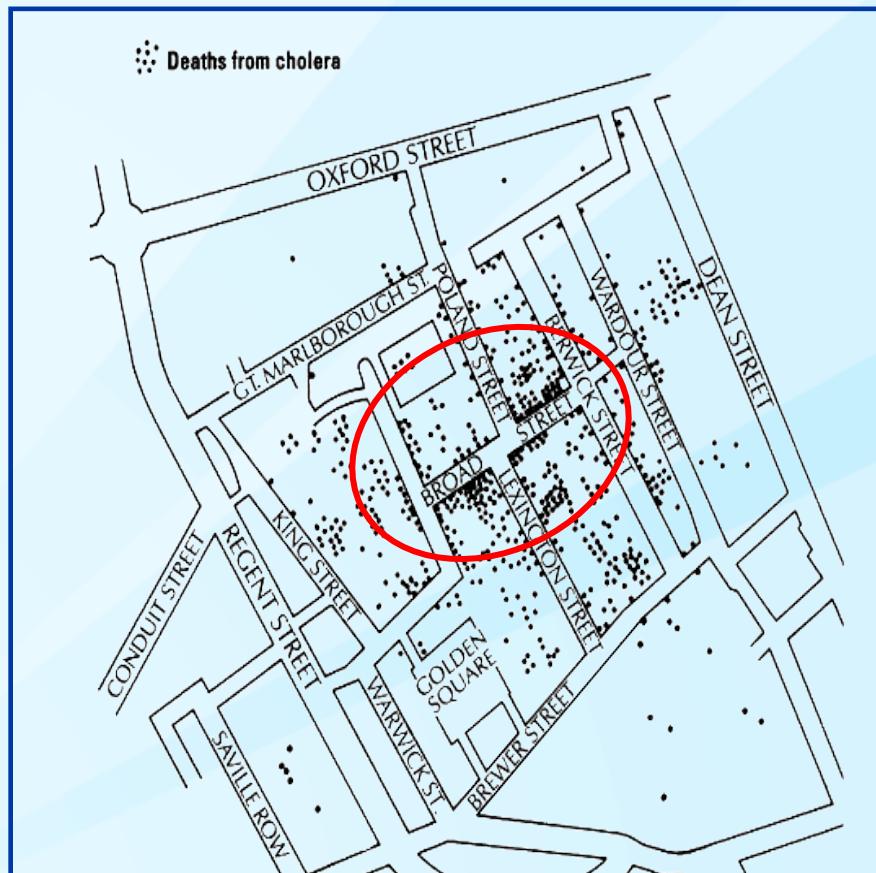


Image: The Geographical Journal

# Risk Factor Identification — What Is the Cause?

## Cluster of Cholera Cases and Pump Site Locations

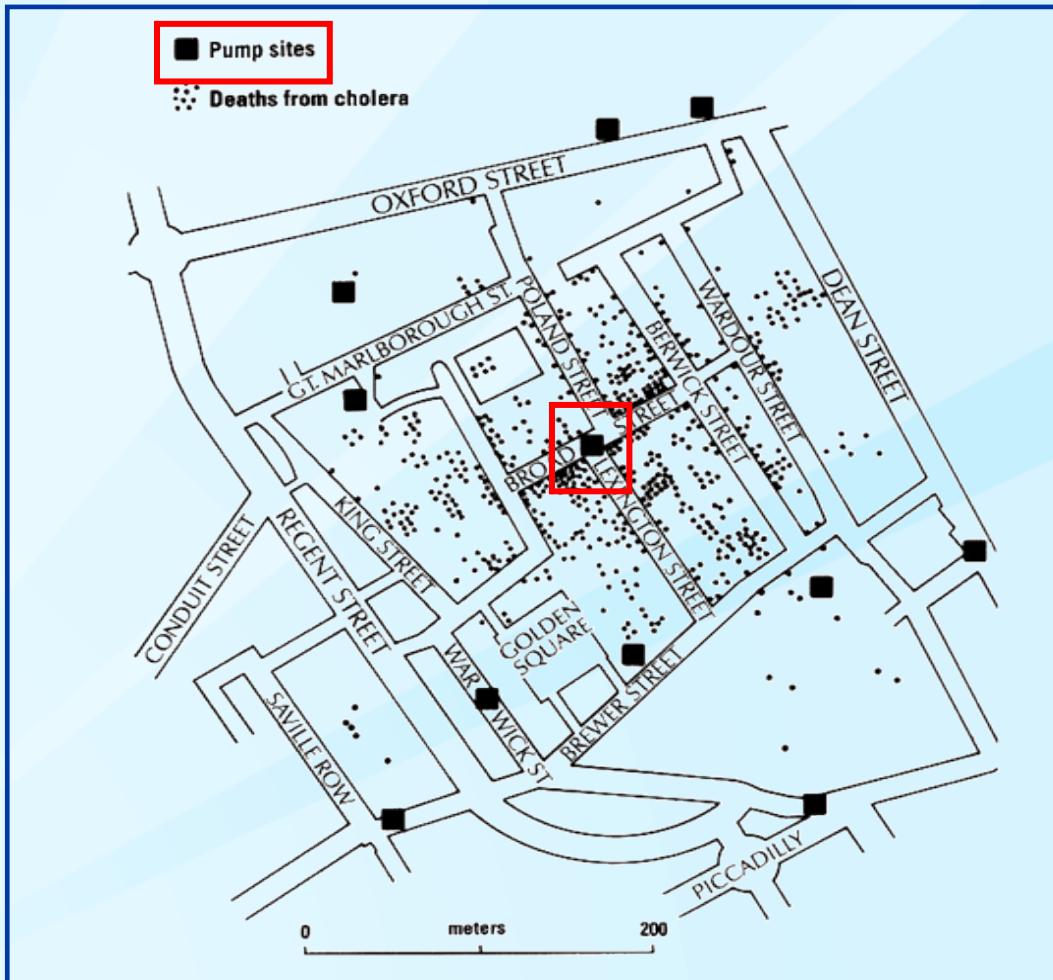


Image: The Geographical Journal

## Intervention Evaluation — What Works?

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Through continuous research, Snow understood what interventions were required to

- stop exposure to the contaminated water supply on a larger scale, and
- stop exposure to the entire supply of contaminated water in the area

# Implementation — How Do You Do It?

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Photo: Justin Cormack

John Snow's research convinced the British government that the source of cholera was water contaminated with sewage



## Knowledge Check

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Fill in the blanks with the correct answers.

Each public health core science helps us to  
protect and promote the public's health by  
providing public health practitioners with the  
answers they need.



# Knowledge Check

Match each component of the public health approach with the questions they answer.

A. Risk Factor Identification

C. Implementation

B. Surveillance

D. Intervention Evaluation

B. Surveillance

1. What is the problem?

A. Risk Factor Identification

2. What is the cause?

D. Intervention Evaluation

3. What works?

C. Implementation

4. How do you do it?

# Topic 4

## Core Functions and Essential Services of Public Health



# Three Core Functions of Public Health

Assessment

→ Systematically collect, analyze, and make available information on healthy communities

Policy  
Development

→ Promote the use of a scientific knowledge base in policy and decision making

Assurance

→ Ensure provision of services to those in need

# Ten Essential Public Health Services



1. Monitor Health
2. Diagnose and Investigate
3. Inform, Educate, Empower
4. Mobilize Community Partnership
5. Develop Policies
6. Enforce Laws
7. Link to/Provide Care
8. Assure a Competent Workforce
9. Evaluate
10. Research

# Core Functions at Government Levels

	Assessment	Policy Development	Assurance
Federal	National tobacco public health surveillance	Smoking ban on commercial flights	Federal grants for antismoking research
State	Monitor state tobacco use	Increase tobacco tax	Funding for campaign through Proposition 99
Local	Report on local tobacco use	County laws prohibiting smoking in bars	Resources to help smokers quit in multiple languages



## Knowledge Check

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Which of the following is NOT a core function of public health?

A. Assurance

B. Assessment



C. Authority

D. Policy development



## Knowledge Check

The essential health services of monitoring health and diagnosing and investigating disease relate to which core public health function?

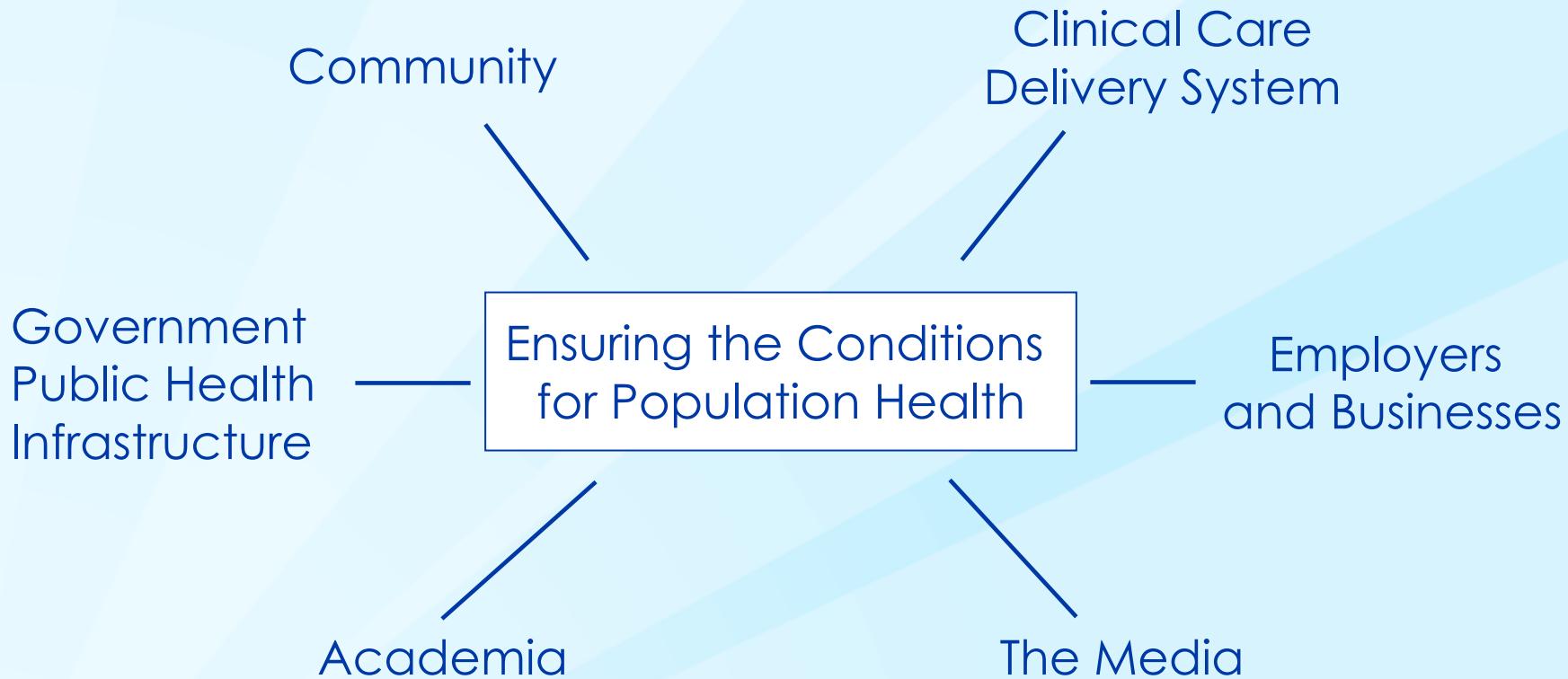
- A. Assurance
- B. Assessment
- C. Policy Development

# Topic 5

## Stakeholder Roles in Public Health



# Partners in the Public Health System



# Nongovernmental Organization Examples

Organization Type	Example
Professional membership organizations	American Public Health Association
Associations related to a specific health concern	American Cancer Society
Organizations of citizens focused on health concerns	Americans for Nonsmokers Rights
Foundations that support health projects and influence public policy development	Bill and Melinda Gates Foundation

# Health Care as a Partner in Public Health

Public Health	Health Care
Population focus	Individual patient focus
Public health ethic	Personal service ethic
Prevention or public health emphasis	Diagnosis and treatment emphasis
Joint laboratory and field involvement	Joint laboratory and patient involvement
Clinical sciences peripheral to professional training	Clinical sciences essential to professional training
Public sector basis	Private sector basis

# Other Partners in Public Health

Media



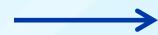
- Vehicle for public discourse
- Health education and promotion
- Health communication
- Social media as catalyst
- Employer-sponsored health insurance programs
- Wellness initiatives and benefits
- Healthy workplaces and communities

Employers  
and Businesses



- City planning
- Education
- Health in all policies

Government  
Agencies



- Education
- Training
- Research
- Public Service

Academia





# Knowledge Check

Match each stakeholder to its role in public health.

- A. Academia
- C. Government

- B. Employers and businesses
- D. Media

D. Media

1. Vehicle for public discourse

C. Government

2. Health in all policies

A. Academia

3. Education and training

B. Employers and businesses

4. Wellness initiatives and benefits

# Topic 6

## Determining and Influencing the Public's Health



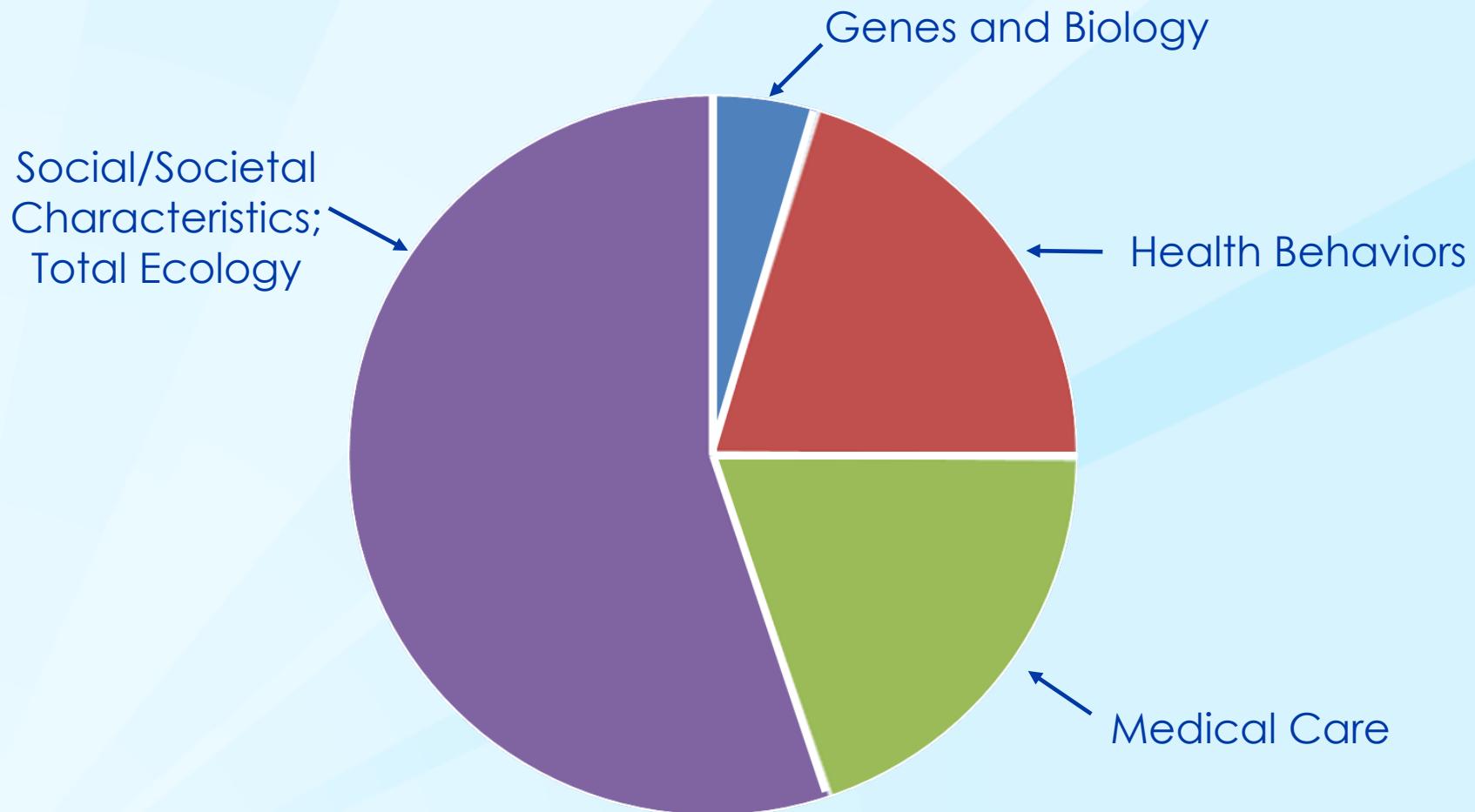
# Health Determinants

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- Genes and biology
- Health behaviors
- Social or societal characteristics
- Health services or medical care

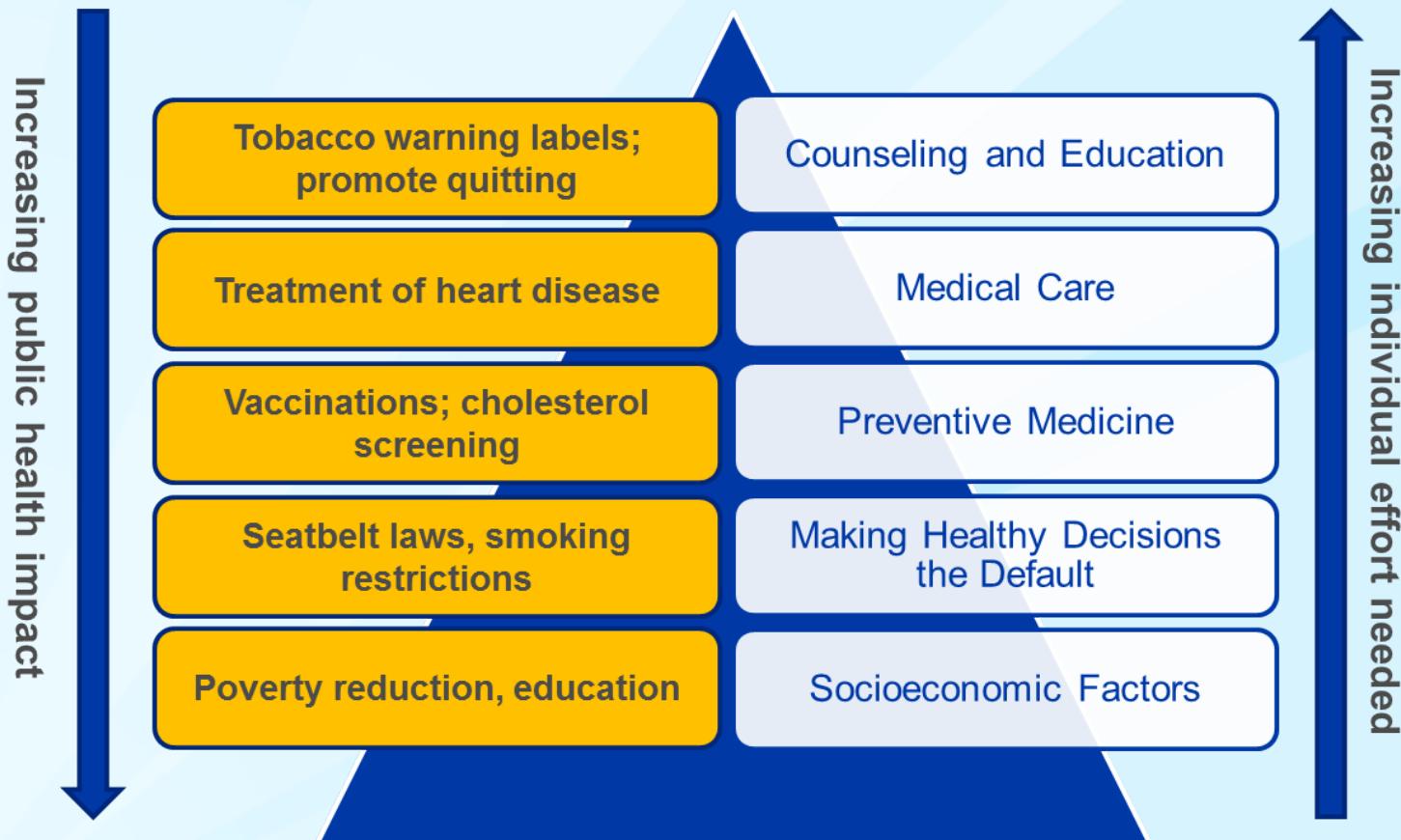
# What Determines the Health of a Population?



# Health Impact Pyramid



# Health Impact Pyramid





## Knowledge Check

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List the four determinants of health.

1. Genes and biology
2. Health behaviors
3. Social/societal characteristics
4. Health services or medical care



# Knowledge Check

Fill in the blanks using the following choices.

A. down

B. up

1. As we move down the health impact pyramid, the public health impact grows greater.
2. As we move up the health impact pyramid, the amount of individual effort increases.

# Public Health Core Sciences



# Course Summary

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During this course, you learned to

- describe the purpose of public health
- define key terms used in public health
- identify prominent events in the history of public health
- recognize the core public health functions and services
- describe the role of different stakeholders in the field of public health
- list some determinants of health
- recognize how individual determinants of health affect population health

# QUESTIONS?

# Resources and Additional Reading

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# Resources and Additional Reading

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