

**Purdue University
School of Health Sciences**

Principles of Public Health Science - 20743 - HSCI 20100 – 001

Principles of Community Health Prevention, CRN: 15437, Course Number: HK 36500

3 Credits – Spring 2015 (Jan 12th, 2014 - May 9th, 2015)

Course Director and Lecturer : James D. McGlothlin, M.P.H., Ph.D., C.P.E. Office: HAMP 1263e Civil Engineering Bld. Tel: 496-6359, Fax 496-1377 e-mail address: jdm3@purdue.edu Office Hrs: Arranged Health Sciences Office Phone 494-6290 (Yvonne Nash Secretary)	Class time: Tues, Thurs., 10:30 – 11:45 am Classroom: Mathematical Sciences Building, Room 175 All Office Hours and TAs will be in HAMP 1285 Teaching Assistant: Post-Doc: Dr. Sandra S. Cole (sscole@purdue.edu) Tues, 3:00-4:15; Thurs 3:00-4:30 Thurs. HAMP 1285 Office Phone 496-6982 Undergraduate Teaching Assistants: Derek Hughes (hughes64@purdue.edu): Wednesday 9:30-11:00 am; Thursday 1:30-3:00 pm Sally Romanek (sromanek@purdue.edu) Tuesday/Friday 12:00-1:30 pm
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Text:

Introduction to Community Health, 8th Edition

McKenzie, J.F., Pinger, R.R., and Kotecki, J.

Additional Readings will be assigned during the semester.

COURSE DESCRIPTION

HSCI 201, Semester 03, Credit: 3.0, Type: Lecture

This course begins with a definition of public health and a review of its history and its role in disease prevention. The basic tools of public health practice, vital statistics and epidemiology, are then presented. After gaining an understanding of how these tools are used in assessing the health status of a community, the etiology and control of infectious and non-infectious threats to our health will be examined. The course concludes with risk analysis as a basis for public health policy determination.

Goals of the Course:

- **To impart a knowledge of the basic principles of public health**
- **To learn of the many factors causal to disease and the maintenance of health**
- **To understand the complexity and multiplicity of disciplines in the practice of public health.**

Course Objectives:

Upon completion of this course, the students should:

- **Understand the basic terms and definitions of public health**
- **Understand the causal factors to disease causation and disease prevention**
- **Understand the complex “fabric” of public health (at the local, state and federal levels) with regard to how the different disciplines of public health work independently and together in the practice of public health surveillance and disease prevention.**

COURSE REQUIREMENTS and GRADING

Classroom Lecture:

Classroom lectures will be presented by the School of Health Sciences faculty and by outside invited public health professionals.

Attendance:

Attendance in class is mandatory. Unexcused absences will affect your grade.

Grading:

Grades will be determined based on the following performance criteria:

Grade Breakdown:

- a) Attendance, Participation & Group Discussion: 5%
- b) Homework (as assigned).
In many instances homework questions will be given as class daily quiz questions: 10%
Please follow your reading assignments – listed in the class schedule.
- c) Short in Class Quizzes (on average 2 to 5 questions per class session): 10 %
In class quizzes will be based on lectures, lecture notes, reading assignments, homework, and material from Principles of Epidemiology in Public Health Practice
[The strategy is to help you keep up with your readings and meet our goal of developing a knowledge base of important facts you should know about public health:
Includes activities a + b + c above)]
 - Midterm I: 15%
 - Midterm II: 15%
 - Midterm III: (cumulative) 25%
 - Project (see details below) 20%
- Work individually on unit mastery of a Centers For Disease Control and Prevention course Principles of Epidemiology in Public Health Practice, Third Edition. An Introduction to Applied Epidemiology and Biostatistics Self-Study Course SS1978
(link: <http://www.cdc.gov/ophss/csels/dsepd/ss1978/>)
(Textbook link: <http://www.cdc.gov/ophss/csels/dsepd/ss1978/ss1978.pdf>)
(CE Course Registration: <http://www2a.cdc.gov/TCEOnline/>)
- A poster (template will be provided) is to be developed on a Molecular Epidemiology Public Health topic. 5%
All work must be original!

Grade Cut Off.

A score of	99.9	% to 100% (or greater)	receives an	A+	
A score of at least	90	% but less than	99.9	% receives an	A
A score of at least	88.5	% but less than	90	% receives an	A-
A score of at least	85	% but less than	88.5	% receives a	B+
A score of at least	80	% but less than	85	% receives a	B
A score of at least	77	% but less than	80	% receives a	B-
A score of at least	73	% but less than	77	% receives a	C+
A score of at least	70	% but less than	73	% receives a	C
A score of at least	65	% but less than	70	% receives a	C-
A score of at least	61	% but less than	65	% receives a	D+
A score of at least	57	% but less than	61	% receives a	D
A score of at least	53	% but less than	57	% receives a	D-
A score of less than	53			% receives an	F

Examination Dates:

Midterm I: Thursday, February 5th, 2015 (in class-closed book)

Midterm II: Thursday, March 12th, 2015 (in class-closed book)

Midterm III: (cumulative): Thursday, April 23rd, 2015 (in class-closed book)

Ethics: Cheating of any kind will not be tolerated.

Homework:

Chapter readings and homework are posted in your class schedule and you are expected to keep up with the readings as scheduled.

Quizzes:

Short in class quizzes of 3-5 questions (**using a clicker**) will be given for every class (usually in the middle of a lecture period). Answers to the quiz will be posted on the HSCI 201 website within one week of the quiz questions. The quizzes will be based on chapter reading assignments (including the CDC SS1978 material), homework, lectures and lecture notes.

***Attendance, Participation & Group Discussions, Homework, and Short Quizzes:**

Attendance and quiz scores will be taken for each class by using your “Clicker”. You are responsible for making sure your batteries are fully charged and that your clicker is working for this class. Based on the lectures, students will engage in discussions about public health issues they read (from topics noted in the class syllabus, newspapers, and assigned articles). Group participation will help each student better understand the science of public health as well as the contemporary issues associated with local, state and federal policies and practices. Talking to others when the professor is lecturing is not acceptable.

Homework: Chapter readings are shown in your class schedule. Also, you will be given a reading schedule for the CDC SS1978 material. In many instances, your homework will be the chapter readings and to see if you have read the chapters, quizzes in class will be given. Usually, the homework assignments will be done in the form of quiz questions. On occasion, homework assignments will be collected.

Quizzes: Will be administered for every class (usually mid-way through the class period). Quizzes will be short (approximately 4-6 questions) true/false and multiple choice, and will be responded to using your Clicker, you will receive immediate feedback on how you did in class.

Midterms I, II and III: The 1st, 2nd, and 3rd midterms will be based on lectures, lecture material, homework, and assigned readings. The midterms will be multiple choices and answered on a ScanTron. The 3rd midterm is cumulative (meaning material from the beginning of the semester to the end).

Research Project (Poster on a Molecular Epidemiology Public Health topic):

This public health course will require students to apply what they have learned by working individually passing 6 CDC unit mastery sessions and achieving a passing grade. The CDC will send each student a Certificate of completion when they are done (this will count as 15% of your grade). From this material each student will decide on a Molecular Epidemiology Public Health Topic where they will research, organize, and develop a poster (5% of final grade). Guidelines for developing your poster will be posted on the 201 HSCI website. The best posters will be shown at the end of the semester, during dead week.

Civility:

Civility is very important. Please note that this means being courteous to your fellow students and to show respect and be polite by being attentive and not talking to someone else while the speaker is presenting their material. Also, this means arriving on time, being attentive (not reading the paper, playing on your laptop, doing homework for other classes, sleeping, getting noisy before the class ends, leaving early, etc.). Those who blatantly violate these rules will be asked to leave. Others who violate these rules will be identified and their attendance will not be counted for that class. Please take these requests for your civility very seriously. Approximately 75% of you will be advancing to professional programs (graduate school, medical school, PT/OT, IH, etc.) and you cannot let a few disruptive students hurt your opportunity to learn, enjoy the class and get a good grade. I will be counting on you to put some peer pressure on the few who may be disruptive.

Excused Absences

You will be expected to be in class because you will be losing valuable information if you are absent. In extenuating circumstances, you can ask for an excused absence, but please contact Dr. McGlothlin prior to class time to indicate the reason. If you are ill, you are expected to submit the PUSH or related medical document as soon as possible to me when you get better, but depending upon the circumstances, may not always be able to do so prior to the date of a missed class or assignment. I understand this and will work with you, but key to this is medical documentation.

(Thank you to Professor Linda Chezem for permission to use parts of her syllabus to explain clearly the following policies):

Academic Dishonesty

Do not cheat yourself out of the opportunity to think and learn. Any dishonesty in the classroom or in class work will result in a penalty that is consistent with the activity.

Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III-B-2-a, University Regulations] Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72-18, December 15, 1972]

You may want to refer to Purdue's student guide for academic integrity (<http://www.purdue.edu/odos/aboutodos/academicintegrity.php>)

Use of Copyrighted Materials

Your research, analysis, and conclusions are far more important than anything you might copy. Your grade will be partially determined by whether you have correctly cited to reputable authorities and given credit where due. Another component for the determination of your grade is your analysis and explanation of how you determined what sources to use and cite in considering the issues. Do not make course notes available to other students or a commercial service as the law and policy can change anytime a law is passed or a court decision is handed down. This means that course materials can become dated overnight.

Among the materials that may be protected by copyright law are the lectures, notes, and other material presented in class or as part of the course. Always assume the materials presented by an instructor are protected by copyright unless the instructor has stated otherwise. Students enrolled in, and authorized visitors to, Purdue University courses are permitted to take notes, which they may use for individual/group study or for other non-commercial purposes reasonably arising from enrollment in the course or the University generally.

Notes taken in class are, however, generally considered to be "derivative works" of the instructor's presentations and materials, and they are thus subject to the instructor's copyright in such presentations and materials. No individual is permitted to sell or otherwise barter notes, either to other students or to any commercial concern, for a course without the express written permission of the course instructor. To obtain permission to sell or barter notes, the individual wishing to sell or barter the notes must be registered in the course or must be an approved visitor to the class. Course instructors may choose to grant or not grant such permission at their own discretion, and may

require a review of the notes prior to their being sold or bartered. If they do grant such permission, they may revoke it at any time, if they so choose.

Grief Absence Policy for Students

Purdue University recognizes that a time of bereavement is very difficult for a student. The University therefore provides the following rights to students facing the loss of a family member through the Grief Absence Policy for Students (GAPS). GAPS Policy: Students will be excused for funeral leave and given the opportunity to earn equivalent credit and to demonstrate evidence of meeting the learning outcomes for missed assignments or assessments in the event of the death of a member of the student's family.

Below is Purdue's policy prohibiting violent behavior. See the following website for additional information: http://www.purdue.edu/policies/pages/facilities_lands/i_2_3.shtml Violent Behavior Policy

Purdue University is committed to providing a safe and secure campus environment for members of the university community. Purdue strives to create an educational environment for students and a work environment for employees that promote educational and career goals. Violent Behavior impedes such goals. Therefore, Violent Behavior is prohibited in or on any University Facility or while participating in any university activity.

Students with Disabilities

Purdue University is required to respond to the needs of the students with disabilities as outlined in both the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 through the provision of auxiliary aids and services that allow a student with a disability to fully access and participate in the programs, services, and activities at Purdue University.

I want this class to be focused on learning. I will appreciate early notice of any need to make accommodations for a disability so I can work with you before the class begins.

If you have a disability that requires special academic accommodation, please make an appointment to speak with me in order to discuss any adjustments. It is important that we talk about this at the beginning of the semester. It is the student's responsibility to notify the Disability Resource Center (<http://www.purdue.edu/drc>) of an impairment/condition that may require accommodations and/or classroom modifications.

Nondiscrimination

Purdue University is committed to maintaining a community, which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life.

Purdue University prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, genetic information, marital status, parental status, sexual orientation, gender identity and expression, disability, or status as a veteran. The University will conduct its programs, services and activities consistent with applicable federal, state and local laws, regulations and orders and in conformance with the procedures and limitations as set forth in [Executive Memorandum No. D-1](#), which provides specific contractual rights and remedies. Any student who believes they have been discriminated against may visit

www.purdue.edu/report-hate to submit a complaint to the Office of Institutional Equity. Information may be reported anonymously.

Emergency Preparedness

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Here are ways to get information about changes in this course.

Course web page: <https://courses.pnhs.purdue.edu/hsci580/materials/>

Dr. James D. McGlothlin email: jdm3@purdue.edu

Dr. James D. McGlothlin Office phone: 765-496-6359

SAFETY

EMERGENCY PREPAREDNESS – A MESSAGE FROM PURDUE

To report an emergency, call 911. To obtain updates regarding an ongoing emergency, sign up for Purdue Alert text messages, view www.purdue.edu/ea.

There are nearly 300 Emergency Telephones outdoors across campus and in parking garages that connect directly to the PUPD. If you feel threatened or need help, push the button and you will be connected immediately.

If we hear a fire alarm during class we will immediately suspend class, evacuate the building, and proceed outdoors. Do not use the elevator.

If we are notified during class of a Shelter in Place requirement for a tornado warning, we will suspend class and shelter in [the basement].

If we are notified during class of a Shelter in Place requirement for a hazardous materials release, or a civil disturbance, including a shooting or other use of weapons, we will suspend class and shelter in the classroom, shutting the door and turning off the lights.

Please review the Emergency Preparedness website for additional information. http://www.purdue.edu/ehps/emergency_preparedness/index.html

Principles of Public Health Science
Dr. McGlothlin Course Director and Lecturer
HSCI 201 / 20743, Spring 2015
Detail of Lecture Topics

Introduction to Community Health, 8th edition

McKenzie, J.F., Pinger, R.R., and Kotecki, J.

<http://www.jbpub.com/communityhealth/7e/>

Synopsis of Book Contents:

UNIT ONE: Foundations of Community and Public Health

CHAPTER 1: Community Health - Yesterday, Today, and Tomorrow

The concepts and principles of community health are presented. This chapter explains the differences between community health and personal health and between community health and public health. Next a history of community health and public health is presented. Finally, five serious health problems facing communities in the 1990s and early 2000s are examined, and offer an outlook for community health in the 21st Century in the world and U. S.

CHAPTER 2: Organizations that help Shape Community and Public Health

Discusses the various health organizations that help shape a community's ability to respond effectively to health-related issues by protecting and promoting the health of the community and its members. Each type of health agency is described and the differences in their purposes and responsibilities is explained along with their organizational structures and their funding.

CHAPTER 3: Epidemiology: The Study of Disease, Injury, and Death in the Community

Defines epidemiology and briefly review its history. The importance of using rates to describe the occurrence of disease in populations and provide examples of different kinds of rates is explained. The process of reporting births, deaths, and disease is discussed. Several standardized measurements of health status and several sources of standardized data are presented. Three basic types of epidemiological studies are presented.

CHAPTER 4: Epidemiology: Prevention and Control of Diseases and Health Conditions

Classification of diseases and other health problems and provide examples of diseases in each classification are presented. Models for communicable disease transmission are presented and explained as is a model for multi-causation diseases. Ways communities can prioritize health problems and then define terms used in disease prevention and control are discussed. Lastly, primary, secondary, and tertiary prevention as it applies to both communicable and non-communicable diseases are presented.

CHAPTER 5: Community Organizing/Building and Health Promotion Programming

Chapters 3 and 4 described epidemiological methods, which are essential tools for the community health professional. In this chapter, two additional skills useful to the community health values: community organizing and how to plan a community health program are presented.

CHAPTER 6: The School Health Program: A Component of Community and Public Health

The school health program is an important component of community health because every citizen must pass through this institution and the large number of students enrolled at any one time. In this chapter, the school

health and the roles of those involved in the delivery of school health programs is described. The development and implementation of school health policy and the major components of an ideal school health program are presented. Lastly, the major issues facing school health today are discussed.

UNIT TWO: The Nation's Health

CHAPTER 7: Maternal, Infant, and Child Health

This chapter is the first of several in which the health problems of specific sub populations: mothers, infants, and children are discussed. Maternal, infant, and child health issues are presented. Then a review the unique health insurance concerns of this group is presented. Programs that could bring about an improvement in maternal and child health are outlined.

CHAPTER 8: Adolescents, Young Adults, and Adults

The years of life between the ages of 15 and 64 are some of the most productive, if not the most productive, of people's lives. Chapter 8 provides an overview of the health status of (15 to 24 years of age), and adults (25 to 64 years of age). A health profile is provided for each age group as are community health strategies for improving their health.

CHAPTER 9: Elders

The median age of Americans is increasing and is expected to continue to rise for years to come. The aging of the American population presents a variety of socioeconomic and community health problems, including a declining dependency ratio and a growing need for health care services. In this chapter we define terms used to discuss aging and health care, debunk myths about aging, and explain the demographics of aging and present a health profile of seniors. Also, we will discuss the unique health care needs of seniors and community efforts to meet these needs.

CHAPTER 10: Community and Public Health and Racial/Ethnic Populations

The strength and greatness of America lies in the diversity of its people. One reflection of diversity is our skin color. According to the Census Bureau the population of the U. S. continues to be predominantly white. In 1997 the majority (72.4%) of people living in the U. S. were white. The remaining 27.6% of the population, by definition, comprised minority groups. In contrast, the 1990 census reported minority groups accounting for only 19.7%. The proportion of Americans who belong to a minority group continues to grow. From a community health perspective it is known that minority groups often bear a heavier burden of disease and other health problems than the general population. In this chapter, the disparities in health statistics between various minority groups and the general population are reviewed. Also, discussed in this chapter are causes of these disparities suggest three approaches which, if implemented, could lessen them.

CHAPTER 11: Community Mental Health

Mental illness is a major community health issue because of its prevalence and the demands it places on community resources. Over the years, society has tried many approaches to meeting the needs of the mentally ill. Today, communities continue to struggle to provide adequate health and social services to this special, but diverse population. This chapter reviews history of this struggle and elucidates current issues in mental health care including the mentally ill homeless, treatment and social services for the mentally ill, and the outlook for mental health care in America in the 21st Century.

CHAPTER 12: Alcohol, Tobacco, and Other Drugs: A Community Concern

The abuse of alcohol, tobacco, and other drugs is a significant community health problem, costing thousands of lives, billions of dollars and untold personal and community anguish each year. In this chapter, the scope

of the current drug problem in the United States, its causes, and federal, state and local efforts to resolve it are reviewed. These efforts involve both prevention and control strategies including education, treatment, public policy, and law enforcement.

CHAPTER 13: Health Care Delivery in the United States

In this chapter America's health care delivery system is discussed. First, a brief review the evolution of health care in the United States over the past 150+ years is presented. Then the spectrum of health care delivery, defining the various types of care provided is discussed. This is followed by a description of the kinds of health care providers and, finally, by an outline of the kinds of facilities in which health care delivery takes place.

UNIT THREE: Environmental Health and Safety

CHAPTER 14: Community and Public Health and the Environment

In chapter 14, the first of two on environmental issues in community health, the concept of the environment and review both natural hazards and human sources of wastes and pollution is reviewed. These include solid waste, hazardous waste, air pollution, water pollution, radiation, and noise pollution. For each type of waste or pollutant, the chapter outlines the sources, review major effects of regulation, and summarize present and future solutions for reduction and control. The next chapter addresses specific health risks that can result from mismanaging our environment.

CHAPTER 15: Injuries as a Community and Public Health Problem

In chapter 15 the scope of both unintentional and intentional injuries as community health problems is defined and examined. Injuries are among the leading causes of premature death and disability. Approaches to reducing the number and seriousness of unintentional and intentional injuries in the community are discussed.

CHAPTER 16: Safety and Health in the Workplace

After the home, Americans spent the next largest portion of their time at work. In this final chapter, work-related injuries and diseases are examined. After reviewing the history and scope of occupational safety and health, an outline of legislative efforts aimed at protecting workers is presented. The epidemiology of occupational injuries and illnesses and review prevention and control efforts is given. Finally, an outline of resources (people and programs) for reducing the number and seriousness of workplace injuries and diseases is offered for consideration.

Principles of Epidemiology in Public Health Practice, Third Edition

An Introduction to Applied Epidemiology and Biostatistics

http://www.cdc.gov/osels/scientific_edu/SS1978/

Lesson 1: Introduction to Epidemiology

Lesson 2: Summarizing Data

Lesson 3: Measures of Risk

Lesson 4: Displaying Public Health Data

Lesson 5: Public Health Surveillance

Lesson 6: Investigating an Outbreak

Glossary:

active immunity see [immunity, active](#).

active surveillance see [surveillance, active](#).

age-adjusted mortality rate see [mortality rate, age-adjusted](#).

agent a factor (e.g., a microorganism or chemical substance) or form of energy whose presence, excessive presence, or in the case of deficiency diseases, relative absence is essential for the occurrence of a disease or other adverse health outcome.

age-specific mortality rate see [mortality rate, age-specific](#).

alternative hypothesis see [hypothesis, alternative](#).

analytic epidemiology see [epidemiology, analytic](#).

analytic study see [study, analytic](#).

antibody any of a variety of proteins in the blood that are produced in response to an antigen as an immune response.

antigen any substance (e.g., a toxin or the surface of a microorganism or transplanted organ) recognized as foreign by the human body and that stimulates the production of antibodies.

applied epidemiology see [epidemiology, applied](#).

arbovirus any of a group of viruses that are transmitted between hosts by mosquitoes, ticks, and other arthropods.

arithmetic mean see [mean, arithmetic](#).

arithmetic-scale line graph see [line graph, arithmetic-scale](#).

arthropod an organism that has jointed appendages and segmented external skeleton (e.g., flies, mosquitoes, ticks, or mites).

association the statistical relation between two or more events, characteristics, or other variables.

asymmetrical a type of distribution where the shape to the right and left of the central location is not the same. Often referred to as a skewed distribution; the mean, median, and mode of an asymmetrical distribution are not the same.

asymmetrical without symptoms.

attack rate a form of incidence that measures the proportion of persons in a population who experience an acute health event during a limited period (e.g., during an outbreak), calculated as the number of new cases of a health problem during an outbreak divided by the size of the population at the beginning of the period, usually expressed as a percentage or per 1,000 or 100,000 population (see also [incidence proportion](#)).

attack rate, secondary a measure of the frequency of new cases of a disease among the contacts of known patients.

attributable proportion see [proportion, attributable](#).

attributable risk percent see [proportion, attributable](#).

attribute a risk factor that is an intrinsic characteristic of the individual person, animal, plant, or other type of organism under study (e.g., genetic susceptibility, age, sex, breed, weight).

axis one of the dimensions of a graph in a rectangular graph, the x-axis is the horizontal axis, and the y-axis is the vertical axis.

B

bar chart a visual display in which each category of a variable is represented by a bar or column bar charts are used to illustrate variations in size among categories.

bar chart, 100% component a stacked bar chart in which all bars or columns are the same length, and the measured axis represents 0%–100%.

bar chart, deviation a bar chart displaying either positive or negative differences from a baseline.

bar chart, grouped a bar chart displaying quantities of two variables, represented by adjoining bars or columns (i.e., a group) of categories of one variable, separated by space between groups.

bar chart, stacked a bar chart displaying quantities of two variables, represented by subdivided bars or columns (the subdivisions representing the categories of one variable) separated by space between bars or columns.

bias a systematic deviation of results or inferences from the truth or processes leading to such systematic deviation; any systematic tendency in the collection, analysis, interpretation, publication, or review of data that can lead to conclusions that are systematically different from the truth. In epidemiology, does not imply intentional deviation.

bias, information systematic difference in the collection of data regarding the participants in a study (e.g., about exposures in a case-control study, or about health outcomes in a cohort study) that leads to an incorrect result (e.g., risk ratio or odds ratio) or inference.

bias, selection systematic difference in the enrollment of participants in a study that leads to an incorrect result (e.g., risk ratio or odds ratio) or inference.

bimodal having two data peaks.

biologic transmission see [transmission, biologic](#).

birth cohort see [cohort, birth](#).

birth rate, crude the number of live births during a specified period divided by the mid-period population, usually expressed per 1,000 population.

box plot a visual display that summarizes data by using a "box and whiskers" format to indicate the minimum and maximum values (ends of the whiskers), interquartile range (length of the box), and median (line through the box).

C

carrier a person or animal that harbors the infectious agent for a disease and can transmit it to others, but does not demonstrate signs of the disease. A carrier can be asymptomatic (never indicate signs of the disease) or can display signs of the disease only during the incubation period, convalescence, or postconvalescence. The period of being a carrier can be short (a transient carrier) or long (a chronic carrier).

case an instance of a particular disease, injury, or other health conditions that meets selected criteria (see also [case definition](#)). Using the term to describe the person rather than the health condition is discouraged (see also [case-patient](#)).

case-control study see [study, case-control](#).

case definition a set of uniformly applied criteria for determining whether a person should be identified as having a particular disease, injury, or other health condition. In epidemiology, particularly for an outbreak investigation, a case definition specifies clinical criteria and details of time, place, and person.

case-fatality rate (also called **case-fatality ratio**) the proportion of persons with a particular condition (e.g., patients) who die from that condition. The denominator is the number of persons with the condition; the numerator is the number of cause-specific deaths among those persons.

case, index the first case or instance of a patient coming to the attention of health authorities.

case-patient in a case-control study, a person who has the disease, injury, or other health condition that meets the case definition (see also [case](#)).

case, source the case or instance of a patient responsible for transmitting infection to others; the instance of a patient who gives rise to an outbreak or epidemic.

cause, component a factor that contributes to a sufficient cause (see also [cause, sufficient](#)).

cause of disease a factor (e.g., characteristic, behavior, or event) that directly influences the occurrence of a disease. Reducing such a factor among a population should reduce occurrence of the disease.

cause, necessary a factor that must be present for a disease or other health problem to occur.

cause-specific mortality rate see [mortality rate, cause-specific](#).

cause, sufficient a factor or collection of factors whose presence is always followed by the occurrence of a particular health problem.

census the enumeration of an entire population, usually including details on residence, age, sex, occupation, racial/ethnic group, marital status, birth history, and relationship to the head of household.

central location (also called **central tendency**) a statistical measurement to quantify the middle or the center of a distribution. Of the multiple ways to define central tendency, the most common are the mean, median, and mode.

chain of infection the progression of an infectious agent that leaves its reservoir or host through a portal of exit, is conveyed by a mode of transmission, and then enters through an appropriate portal of entry to infect a susceptible host.

"chartjunk" unnecessary or confusing visual elements in charts, illustrations, or graphs. The term was first used by Edward Tufte in his book, *The Visual Display of Quantitative Information* (1983).

class interval the span of values of a continuous variable that are grouped into a single category (see also [class](#)), usually to create a frequency distribution for that variable.

class limits the values at the upper and lower ends of a class interval.

clinical criteria the medical features (e.g., symptoms, medical examination findings, and laboratory results) that are used in a case definition.

clinical disease a disease that has been manifested by its symptoms and features.

clinical trial see [trial, clinical](#).

cluster an aggregation of cases of a disease, injury, or other health condition (particularly cancer and birth defects) in a circumscribed area during a particular period without regard to whether the number of cases is more than expected (often the expected number is not known).

cohort a well-defined group of persons who have had a common experience or exposure and are then followed up, as in a cohort study or prospective study, to determine the incidence of new diseases or health events.

cohort, birth a group of persons born during a particular period or year.

cohort study see [study, cohort](#).

common-source outbreak see [outbreak, common-source](#).

community immunity see [immunity, herd](#).

community trial see [trial, community](#).

comparison group a group in an analytic study (e.g., a cohort or case-control study) with whom the primary group of interest (exposed group in a cohort study or case-patients in a case-control study) is compared. The comparison group provides an estimate of the background or expected incidence of disease (in a cohort study) or exposure (in a case-control study).

confidence interval a range of values for a measure (e.g., rate or odds ratio) constructed so that the range has a specified probability (often, but not necessarily, 95%) of including the true value of the measure.

confidence limits the end points (i.e., the minimum and maximum values) of a confidence.

confounding the distortion of the association between an exposure and a health outcome by a third variable that is related to both.

contact exposure to a source of an infection; a person who has been exposed.

contact, direct exposure or transmission of an agent from a source to a susceptible host through touching (e.g., from a human host by kissing, sexual intercourse, or skin-to-skin contact) or from touching an infected animal or contaminated soil or vegetation.

contagious capable of being transmitted from one person to another by contact or close proximity.

contingency table a two-variable table of cross-tabulated data.

continuous variable see [variable, continuous](#).

control in a case-control study, a member of the group of persons without the health problem under study (see also [comparison group](#) and [study, case-control](#)).

crude when referring to a rate, an overall or summary rate for a population, without adjustment.

crude birth rate see [birth rate, crude](#).

crude death rate see [mortality rate, crude](#).

crude mortality rate see [mortality rate, crude](#).

cumulative frequency in a frequency distribution, the number or proportion of observations with a particular value and any smaller value.

cumulative frequency curve a plot of the cumulative frequency rather than the actual frequency for each class interval of a variable. This type of graph is useful for identifying medians and quartiles and other percentiles.

D

death-to-case ratio the number of deaths attributed to a particular disease, injury, or other health condition during a specified period, divided by the number of new cases of that disease, injury, or condition identified during the same period.

decision analysis application of quantitative methods to decision-making.

decision tree a branching chart that represents the logical sequence or pathway of a clinical or public health decision.

demographic information personal characteristics of a person or group (e.g., age, sex, race/ethnicity, residence, and occupation) demographic information is used in descriptive epidemiology to characterize patients or populations.

dendrogram see [phylogenetic tree](#).

denominator the lower portion of a fraction; used in calculating a ratio, proportion, or rate. For a rate, the denominator is usually the midinterval population.

dependent variable see [variable, dependent](#).

descriptive epidemiology see [epidemiology, descriptive](#).

determinant any factor that brings about change in a health condition or in other defined characteristics (see also [cause and risk factor](#)).

direct transmission see [transmission, direct](#).

discrete variable (or data) see [variable \(or data\), discrete](#).

distribution in epidemiology, the frequency and pattern of health-related characteristics and events in a population. In statistics, the frequency and pattern of the values or categories of a variable.

dose-response association between an exposure and health outcome that varies in a consistently increasing or decreasing fashion as the amount of exposure (dose) increases.

dot plot a visual display of the specific data points of a variable.

droplet nuclei the residue of dried droplets of infectious agents that is easily inhaled and exhaled and can remain suspended in air for relatively long periods or be blown over great distances.

droplet spread the direct transmission of an infectious agent by means of the aerosols produced in sneezing, coughing, or talking that travel only a short distance before falling to the ground.

E

effect the result of a cause.

effectiveness the ability of an intervention or program to produce the intended or expected results in the field.

efficacy the ability of an intervention or program to produce the intended or expected results under ideal conditions.

efficiency the ability of an intervention or program to produce the intended or expected results with a minimum expenditure of time and resources.

EIS Epidemic Intelligence Service; CDC's 2-year training program in applied epidemiology for public health professionals (<http://www.cdc.gov/eis>).

endemic the constant presence of an agent or health condition within a given geographic area or population; can also refer to the usual prevalence of an agent or condition.

environmental factor an extrinsic factor (e.g., geology, climate, insects, sanitation, or health services) that affects an agent and the opportunity for exposure.

epidemic the occurrence of more cases of disease, injury, or other health condition than expected in a given area or among a specific group of persons during a particular period. Usually, the cases are presumed to have a common cause or to be related to one another in some way (see also [outbreak](#)).

epidemic curve a histogram that displays the course of an outbreak or epidemic by plotting the number of cases according to time of onset.

epidemic period the time span of an outbreak or epidemic.

epidemiologic triad the traditional model of infectious disease causation having three components: an external agent, a susceptible host, and an environment that brings the host and agent together so that disease occurs.

epidemiology the study of the distribution and determinants of health conditions or events among populations and the application of that study to control health problems.

epidemiology, analytic the aspect of epidemiology concerned with why and how a health problem occurs. Analytic epidemiology uses comparison groups to provide baseline or expected values so that associations between exposures and outcomes can be quantified and hypotheses about the cause of the problem can be tested (see also [study, analytic](#)).

epidemiology, applied the application or practice of epidemiology to control and prevent health problems.

epidemiology, descriptive the aspect of epidemiology concerned with organizing and summarizing data regarding the persons affected (e.g., the characteristics of those who became ill), time (e.g., when they become ill), and place (e.g., where they might have been exposed to the cause of illness).

epidemiology, field applied epidemiology (i.e., the application or practice of epidemiology to control and prevent health problems), particularly when the epidemiologist(s) must travel to and work in the community in which the health problem is occurring or has occurred.

evaluation systematic and objective examination of activities to determine their relevance, effectiveness, and impact.

excess risk risk difference, calculated as the risk among the exposed group minus the risk among the unexposed group.

experimental study see [study, experimental](#).

exposed group a group whose members have had contact with a suspected cause of, or possess a characteristic that is a suspected determinant of, a particular health problem.

exposure having come into contact with a cause of, or possessing a characteristic that is a determinant of, a particular health problem.

F

false-negative a negative test result for a person who actually has the condition similarly, a person who has the disease (perhaps mild or variant) but who does not fit the case definition, or a patient or outbreak not detected by a surveillance system.

false-positive a positive test result for a person who actually does not have the condition. Similarly, a person who does not have the disease but who nonetheless fits the case definition, or a patient or outbreak erroneously identified by a surveillance system.

field epidemiology see [epidemiology, field](#).

follow-up study see [study, cohort](#).

fomite an inanimate object that can be the vehicle for transmission of an infectious agent (e.g., bedding, towels, or surgical instruments).

forest plot a graph that displays the point estimates and confidence intervals of individual studies included in a meta-analysis or systematic review as a series of parallel lines.

frequency the amount or number of occurrences of an attribute or health outcome among a population.

frequency distribution a complete summary of the frequencies of the values or categories of a variable, often displayed in a two-column table with the individual values or categories in the left column and the number of observations in each category in the right column.

frequency polygon a graph of a frequency distribution in which values of the variable are plotted on the horizontal axis, and the number of observations are plotted on the vertical axis. Data points are plotted at the midpoints of the intervals and are connected with straight lines.

G

geometric mean see [mean, geometric](#).

graph a visual display of quantitative data arranged on a system of coordinates.

H

health a state of complete physical, mental, and social well-being and not merely the absence of disease or other infirmity.

health indicator any of a variety of measures (e.g., mortality rate) that indicate the state of health of a given population.

health information system a combination of health statistics from different sources. Data from these systems are used to learn about health status, health care, provision and use of services, and the impact of services and programs on health.

healthy worker effect the observation that employed persons generally have lower mortality rates than the general population, because persons with severe, disabling disease (who have higher mortality rates) tend to be excluded from the workforce.

herd immunity see [immunity, herd](#).

high-risk group a group of persons whose risk for a particular disease, injury, or other health condition is greater than that of the rest of their community or population.

HIPAA the Health Insurance Portability and Accountability Act, enacted in 1996, which addresses the privacy of a person's medical information as well as postemployment insurance and other health-related concerns.

histogram a visual representation of the frequency distribution of a continuous variable. The class intervals of the variable are grouped on a linear scale on the horizontal axis, and the class frequencies are grouped on the vertical axis. Columns are drawn so that their bases equal the class intervals (i.e., so that columns of adjacent intervals touch), and their heights correspond to the class frequencies.

host a person or other living organism that is susceptible to or harbors an infectious agent under natural conditions.

host factor an intrinsic factor (e.g., age, race/ethnicity, sex, or behaviors) that influences a person's exposure, susceptibility, or response to an agent.

hyperendemic the constant presence at high incidence and prevalence of an agent or health condition within a given geographic area or population.

hypothesis a supposition, arrived at from observation or reflection, that leads to refutable predictions; any conjecture cast in a form that will allow it to be tested and refuted.

hypothesis, alternative the supposition that an exposure is associated with the health condition under study. The alternative is adopted if the null hypothesis (see also [hypothesis, null](#)) proves implausible.

hypothesis, null the supposition that two (or more) groups do not differ in the measure of interest (e.g., incidence or proportion exposed); the supposition that an exposure is not associated with the health condition under study, so that the risk ratio or odds ratio equals 1. The null hypothesis is used in conjunction with statistical testing.

I

immunity, active resistance developed in response to an antigen (i.e., an infecting agent or vaccine), usually characterized by the presence of antibody produced by the host.

immunity, herd the resistance to an infectious agent of an entire group or community (and, in particular, protection of susceptible persons) as a result of a substantial proportion of the population being immune to the agent. Herd immunity is based on having a substantial number of immune persons, thereby reducing the likelihood that an infected person will come in contact with a susceptible one among human populations, also called **community immunity**.

immunity, passive immunity conferred by an antibody produced in another host. This type of immunity can be acquired naturally by an infant from its mother or artificially by administration of an antibody-containing preparation (e.g., antiserum or immune globulin).

incidence a measure of the frequency with which new cases of illness, injury, or other health condition occurs among a population during a specified period.

incidence proportion the fraction of persons with new cases of illness, injury, or other health condition during a specified period, calculated as the number of new cases divided by the size of the population at the start of the study period (see also [attack rate](#)).

incidence rate a measure of the frequency with which new cases of illness, injury, or other health condition occur, expressed explicitly per a time frame. Incidence rate is calculated as the number of new cases over a specified period divided either by the average population (usually mid-period) or by the cumulative person-time the population was at risk.

incubation period the time interval from exposure to an infectious agent to the onset of symptoms of an infectious disease.

independent variable see [variable, independent](#).

index case see [case, index](#).

indirect transmission see [transmission, indirect](#).

individual data values or observations from each record (also called raw data).

infant mortality rate see [mortality rate, infant](#).

infection invasion of the body tissues of a host by an infectious agent, whether or not it causes disease.

infectivity the ability of an infectious agent to cause infection, measured as the proportion of persons exposed to an infectious agent who become infected.

information bias see [bias, information](#).

interquartile range a measure of spread representing the middle 50% of the observations, calculated as the difference between the third quartile (75th percentile) and the first quartile (25th percentile).

isolation the separation of infected persons to prevent transmission to susceptible ones. Isolation refers to separation of ill persons; **quarantine** refers to separation of potentially exposed but well persons.

L

latency period the time from exposure to a causal agent to onset of symptoms of a (usually noninfectious) disease (see also [incubation period](#)).

life expectancy a statistical projection of the average number of years a person of a given age is expected to live, if current mortality rates continue to apply.

line graph, arithmetic-scale a graph that displays patterns or trends by plotting the frequency (e.g., number, proportion, or rate) of a characteristic or event during some variable, usually time. The y-axis, measuring frequency, uses an arithmetic scale.

line graph, semilogarithmic-scale a graph that displays patterns or trends by plotting the frequency (e.g., number, proportion, or rate) of a characteristic or event during some variable, usually time. The y-axis, measuring frequency, uses a logarithmic scale.

line listing a type of epidemiologic database, organized similar to a spreadsheet with rows and columns in which information from cases or patients are listed each column represents a variable, and each row represents an individual case or patient.

logarithmic transformation conversion of nominal or ordinal data to logarithmic data. The purpose is to examine rate of change instead of amount of change only.

M

map, area (shaded, choropleth) a visual display of the geographic pattern of a health problem, in which a marker is placed on a map to indicate where each affected person lives, works, or might have been exposed.

mean (or average) commonly called the average; it is the most common measure of central tendency.

mean, arithmetic the measure of central location, commonly called the average, calculated by adding all the values in a group of measurements and dividing by the number of values in the group.

mean, geometric the mean, or average, of a set of data measured on a logarithmic scale.

measure of association a quantified relationship between exposure and a particular health problem (e.g., risk ratio, rate ratio, and odds ratio).

measure of central location a central value that best represents a distribution of data. Common measures of central location are the mean, median, and mode also called the measure of central tendency.

measure of dispersion see [measure of spread](#).

measure of spread a measure of the distribution of observations out from its central value. Measures of spread used in epidemiology include the interquartile range, variance, and the standard deviation.

measurement scale the complete range of possible values for a measurement.

mechanical transmission see [transmission, mechanical](#).

median the measure of central location that divides a set of data into two equal parts, above and below which lie an equal number of values (see also [measure of central location](#)).

medical surveillance see [surveillance, medical](#).

midrange the halfway point, or midpoint, in a set of observations. For the majority of data, the midrange is calculated by adding the smallest observation and the largest observation and dividing by two. The midrange is usually calculated as an intermediate step in determining other measures.

mode the most frequently occurring value in a set of observations (see also [measure of central location](#)).

mode of transmission the manner in which an agent is transmitted from its reservoir to a susceptible host (see also [transmission](#)).

morbidity disease; any departure, subjective or objective, from a state of physiological or psychological health and well-being.

mortality death.

mortality rate a measure of the frequency of occurrence of death among a defined population during a specified time interval.

mortality rate, age-adjusted a mortality rate that has been statistically modified to eliminate the effect of different age distributions among different populations.

mortality rate, age-specific a mortality rate limited to a particular age group, calculated as the number of deaths among the age group divided by the number of persons in that age group, usually expressed per 100,000.

mortality rate, cause-specific the mortality rate from a specified cause, calculated as the number of deaths attributed to a specific cause during a specified time interval among a population divided by the size of the midinterval population.

mortality rate, crude a mortality rate from all causes of death for an entire population, without adjustment.

mortality rate, infant the mortality rate for children aged <1 year, calculated as the number of deaths reported among this age group during a given period divided by the number of live births reported during the same period, and expressed per 1,000 live births. Infant mortality rate is a universally accepted indicator of the health of a nation's population and the adequacy of its health-care system.

mortality rate, neonatal the mortality rate for children from age birth up to, but not including, 28 days. In calculating neonatal mortality rates, the numerator is the number of deaths among this age group during a given period, and the denominator is the number of live births reported during the same period. The neonatal mortality rate is usually expressed per 1,000 live births.

mortality rate, postneonatal the mortality rate for children from age 28 days up to, but not including, 1 year. In calculating postneonatal mortality rates, the numerator is the number of deaths among this age group during a given period, and the denominator is the number of live births during the same period. The postneonatal mortality rate is usually expressed per 1,000 live births.

mortality rate, race/ethnic-specific a mortality rate limited to a specified racial or ethnic group both numerator and denominator are limited to that group.

mortality rate, sex-specific a mortality rate among either males or females.

N

natural history of disease the progression of a disease process in a person from the time it begins to the time it resolves, in the absence of treatment.

NCHS The National Center for Health Statistics, the US governmental organization responsible for national vital statistics and multiple national health surveys. Organizationally, NCHS is a component of the Centers for Disease Control and Prevention, one of the agencies of the US Department of Health and Human Services.

NHANES The National Health and Nutrition Examination Survey, a representative survey of the civilian, noninstitutionalized US population conducted by the National Center for Health Statistics, designed to (1) estimate the proportion of the US population and designated groups with selected disease and risk factors; (2) monitor trends in selected behaviors, exposures, and diseases; and (3) study the associations among diet, nutrition, and health.

necessary cause see [cause, necessary](#).

neonatal mortality rate see [mortality rate, neonatal](#).

nominal scale see [scale, nominal](#).

normal curve the bell-shaped curve that results when a normal distribution is graphed.

normal distribution a distribution represented as a bell shape, symmetrical on both sides of the peak, which is simultaneously the mean, median, and mode, and with both tails extending to infinity.

notifiable disease a disease that, by law, must be reported to public health authorities upon diagnosis.

null hypothesis see [hypothesis, null](#).

numerator the upper portion of a fraction (see also [denominator](#)).

O

observational study see [study, observational](#).

odds ratio a measure of association used in comparative studies, particularly case-control studies, that quantifies the association between an exposure and a health outcome; also called the cross-product ratio.

ordinal scale see [scale, ordinal](#).

outbreak the occurrence of more cases of disease, injury, or other health condition than expected in a given area or among a specific group of persons during a specific period. Usually, the cases are presumed to have a common cause or to be related to one another in some way.

Sometimes distinguished from an epidemic as more localized, or the term less likely to evoke public panic (see also [epidemic](#)).

outbreak, common-source an outbreak that results from persons being exposed to the same harmful influence (e.g., an infectious agent or toxin). The exposure period can be brief or can extend over days, weeks, or longer, with the exposure being either intermittent or continuous.

outbreak, point-source a common source outbreak in which the exposure period is relatively brief so that all cases occur within one incubation period.

outbreak, propagated an outbreak that spreads from person to person rather than from a common source.

outcome(s) any or all of the possible results that can stem from exposure to a causal factor or from preventive or therapeutic interventions; all identified changes in health status that result from the handling of a health problem.

outlier a value substantively or statistically different from all (or approximately all) of the other values in a distribution.

P

P value the probability of observing an association between two variables or a difference between two or more groups as large or larger than that observed, if the null hypothesis were true. Used in statistical testing to evaluate the plausibility of the null hypothesis (i.e., whether the observed association or difference plausibly might have occurred by chance).

pandemic an epidemic occurring over a widespread area (multiple countries or continents) and usually affecting a substantial proportion of the population.

passive immunity see [immunity, passive](#).

passive surveillance see [surveillance, passive](#).

pathogenicity the ability of an agent to cause disease after infection, measured as the proportion of persons infected by an agent who then experience clinical disease.

percentile a set of cut points used to divide a distribution or a set of ranked data into 100 parts of equal area with each interval between the points containing 1/100 or 1% of the observations. For example, the 5th percentile is a cut point with 5% of the observations below it and the remaining 95% above it.

period prevalence see [prevalence, period](#).

person-time rate the incidence rate calculated as the number of new cases among a population divided by the cumulative person-time of that population, usually expressed as the number of events per persons per unit of time.

person-time the amount of time each participant in a cohort study is observed and disease-free, often summed to provide the denominator for a person-time rate.

phylogenetic tree a branching chart that indicates the evolutionary lineage or genetic relatedness of organisms.

pie chart a circular graph of a frequency distribution in which each segment of the pie is proportional in size to the frequency of corresponding category.

point prevalence see [prevalence, point](#).

point-source outbreak see [outbreak, point-source](#).

population the total number of inhabitants of a geographic area or the total number of persons in a particular group (e.g., the number of persons engaged in a certain occupation).

population pyramid a graphical display of the age-sex distribution of a population, constructed with a horizontal histogram of the age distribution of males pointing to the left, and the corresponding horizontal histogram of age distribution of females pointing to the right.

portal of entry a pathway into the host that gives an agent access to tissue that will allow it to multiply or act.

portal of exit a pathway by which an agent can leave its host.

postneonatal mortality rate see [mortality rate, postneonatal](#).

predictive value positive the proportion of cases identified by a test, reported by a surveillance system, or classified by a case definition that are true cases, calculated as the number of true-positives divided by the number of true-positives plus false-positives.

prevalence the number or proportion of cases or events or attributes among a given population.

prevalence rate the proportion of a population that has a particular disease, injury, other health condition, or attribute at a specified point in time (point prevalence) or during a specified period (period prevalence).

prevalence, period the amount of a particular disease, chronic condition, or type of injury present among a population at any time during a particular period.

prevalence, point the amount of a particular disease, chronic condition, or type of injury present among a population at a single point in time.

privacy rule a set of regulations based on the Health Insurance Portability and Accountability Act to protect the privacy of individually identifiable health information.

propagated outbreak see [outbreak, propagated](#).

proportion a ratio in which the numerator is included in the denominator; the ratio of a part to the whole, expressed as a "decimal fraction" (e.g., 0.2), a fraction (1/5), or a percentage (20%).

proportion, attributable a measure of the impact of a causative factor on the public health; the proportion of a health state or event among exposed persons that can be attributed to the exposure also called attributable risk percent.

proportionate mortality the proportion of deaths among a population attributable to a particular cause during a selected period. Each cause of death is expressed as a percentage of all deaths, and the sum of the proportionate mortality for all causes must equal 100%. These proportions are not mortality rates because, in proportionate mortality, the denominator is all deaths instead of the population among whom the deaths occurred.

prospective study see [study, prospective](#).

Q

quarantine the separation of well persons who have been exposed or are suspected to have been exposed to a communicable disease, to monitor for illness and to prevent potential transmission of infection to susceptible persons during the incubation period. Quarantine refers to separation of potentially exposed but well persons; **isolation** refers to separation of ill persons.

R

race/ethnic-specific mortality rate see [mortality rate, race/ethnic-specific](#).

random sample see [sample, random](#).

range in statistics, the difference between the largest and smallest values in a distribution; in common use, the span of values from smallest to largest.

rate an expression of the relative frequency with which an event occurs among a defined population per unit of time, calculated as the number of new cases or deaths during a specified period divided by either person-time or the average (midinterval) population. In epidemiology, it is often used more casually to refer to proportions that are not truly rates (e.g., attack rate or case-fatality rate).

rate ratio a measure of association that quantifies the relation between an exposure and a health outcome from an epidemiologic study, calculated as the ratio of incidence rates or mortality rates of two groups.

ratio the relative size of two quantities, calculated by dividing one quantity by the other.

record in a line listing, each row is a record or observation. A record represents data related to a single case.

relative risk a general term for measures of association calculated from the data in a two-by-two table, including risk ratio, rate ratio, and odds ratio (see also [risk ratio](#)).

representative sample see [sample, representative](#).

reservoir the habitat in which an infectious agent normally lives, grows, and multiplies, which can include humans, animals, or the environment.

retrospective study see [study, retrospective](#).

risk the probability that an event will occur (e.g., that a person will be affected by, or die from, an illness, injury, or other health condition within a specified time or age span).

risk factor 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.

risk ratio a measure of association that quantifies the association between an exposure and a health outcome from an epidemiologic study, calculated as the ratio of incidence proportions of two groups.

S

sample a selected subset of a population a sample can be random or nonrandom and representative or nonrepresentative.

sample, random a sample of persons chosen in such a way that each one has the same (and known) probability of being selected.

sample, representative a sample whose characteristics correspond to those of the original or reference population.

scale, interval a measurement scale consisting of quantitative categories whose values are measured on a scale of equally spaced units, but without a true zero point (e.g., date of birth).

scale, nominal a measurement scale consisting of qualitative categories whose values have no inherent statistical order or rank (e.g., categories of race/ethnicity, religion, or country of birth).

scale, ordinal a measurement scale consisting of qualitative categories whose values have a distinct order but no numerical distance between their possible values (e.g., stage of cancer, I, II, III, or IV).

scale, ratio a measurement scale consisting of quantitative categories whose values are intervals with a true zero point (e.g., height in centimeters or duration of illness).

scatter diagram (or scattergram) a graphical display of the association between two variables in which a dot is plotted on the graph for each set of paired values for two continuous variables, with one variable plotted on the horizontal axis, and the other plotted on the vertical axis.

seasonality change in physiologic status or in the occurrence of a disease, chronic condition, or type of injury that conforms to a regular seasonal pattern.

secondary attack rate see [attack rate, secondary](#).

secular trend see [trend, secular](#).

selection bias see [bias, selection](#).

semilogarithmic-scale line graph see [line graph, semilogarithmic-scale](#)

sensitivity the ability of a test, case definition, or surveillance system to identify true cases; the proportion of people with a health condition (or the proportion of outbreaks) that are identified by a screening test or case definition (or surveillance system).

sentinel surveillance see [surveillance, sentinel](#).

sex-specific mortality rate see [mortality rate, sex-specific](#).

skewed a distribution that is not symmetrical.

source (of infection) the person, animal, object, or substance from which an infectious agent is transmitted to a host.

source case see [case, source](#).

specificity the ability of a test, case definition, or surveillance system to exclude persons without the health condition of interest; the proportion of persons without a health condition that are correctly identified as such by a screening test, case definition, or surveillance system.

spectrum of illness the range of manifestations a disease process can take (e.g., from asymptomatic to mild clinical illness to severe illness and death).

sporadic an event that occurs infrequently and irregularly.

spot map a visual display of the geographic pattern of a health problem, in which a marker is placed on a map to indicate where each affected person lives, works, or might have been exposed.

standard deviation a statistical summary of how dispersed the values of a variable are around its mean, calculated as the square root of the variance.

standard error (of the mean) the standard deviation of a theoretical distribution of sample means of a variable around the true population mean of that variable. Standard error is computed as the standard deviation of the variable divided by the square root of the sample size.

statistical inference generalizations developed from sample data, usually with calculated degrees of uncertainty.

statistical significance the measure of how likely it is that a set of study results could have occurred by chance alone. Statistical significance is based on an estimate of the probability of the observed or a greater degree of association between independent and dependent variables occurring under the null hypothesis (see also [P value](#)).

study, analytic a study, usually observational, in which groups are compared to identify and quantify associations, test hypotheses, and identify causes. Two common types are cohort studies and case-control studies.

study, case-control an observational analytic study that enrolls one group of persons with a certain disease, chronic condition, or type of injury (case-patients) and a group of persons without the health problem (control subjects) and compares differences in exposures, behaviors, and other characteristics to identify and quantify associations, test hypotheses, and identify causes.

study, cohort an observational analytic study in which enrollment is based on status of exposure to a certain factor or membership in a certain group. Populations are followed, and disease, death, or other health-related outcomes are documented and compared. Cohort studies can be either prospective or retrospective.

study, cross-sectional a study in which a sample of persons from a population are enrolled and their exposures and health outcomes are measured simultaneously; a survey.

study, experimental a study in which the investigator specifies the type of exposure for each person (clinical trial) or community (community trial) then follows the persons' or communities' health status to determine the effects of the exposure.

study, observational a study in which the investigator observes rather than influences exposure and disease among participants. Case-control and cohort studies are observational studies (see also [study, experimental](#)).

study, prospective an analytic study in which participants are enrolled before the health outcome of interest has occurred.

study, retrospective an analytic study in which participants are enrolled after the health outcome of interest has occurred. Case-control studies are inherently retrospective.

subclinical without apparent symptoms.

surveillance, active public health surveillance in which the health agency solicits reports.

surveillance, medical monitoring of a person who might have been exposed to an infectious, chemical, radiologic, or other potentially causal agent, for the purpose of detecting early symptoms.

surveillance, passive public health surveillance in which data are sent to the health agency without prompting.

surveillance, sentinel a surveillance system that uses a prearranged sample of sources (e.g., physicians, hospitals, or clinics) who have agreed to report all cases of one or more notifiable diseases.

surveillance, syndromic (1) the monitoring of the frequency of illnesses with a specified set of clinical features among a given population without regard to the specific diagnoses, if any, that are assigned to them by clinicians. (2) A system for early detection of outbreaks whereby health department staff, assisted by automated acquisition of data routinely collected for other purposes and computer generation of statistical signals, monitor disease indicators, particularly those associated with possible terrorism-related biologic and chemical agents, continually or at least daily to detect outbreaks earlier than would otherwise be possible with traditional public health methods.

survey a systematic canvassing of persons to collect information, often from a representative sample of the population.

survival curve a line graph that begins with 100% of the study population and displays the percentage of the population still surviving at successive points in time. A survival curve can also be used to depict freedom from a health problem, complication, or another endpoint.

symmetrical a type of distribution where the shapes to the right and left of the central location are the same. Normal, bell-shaped distributions are symmetrical; the mean, median, and mode are the same.

symptom any indication of disease noticed or felt by a patient.

syndrome a combination of symptoms characteristic of a disease or health condition; sometimes refers to a health condition without a clear cause (e.g., chronic fatigue syndrome).

syndromic surveillance see [surveillance, syndromic](#).

T

table an arrangement of data in rows and columns. In epidemiology, the data are usually summaries of the frequency of occurrence of an event or characteristic occurring among different groups.

table shell a table that is completely drawn and labeled but contains no data.

table, two-by-two a two-variable table with cross-tabulated data, in which each variable has only two categories. Usually, one variable represents a health outcome, and one represents an exposure or personal characteristic.

transmission (of infection) any mode or mechanism by which an infectious agent is spread to a susceptible host.

transmission, airborne transfer of an agent suspended in the air, considered a type of indirect transmission.

transmission, biologic indirect transmission by a vector in which the infectious agent undergoes biologic changes inside the vector as part of its life cycle before it is transmitted to the host (see also [transmission, mechanical](#)).

transmission, direct immediate transfer of an agent from a reservoir to a host by direct contact or droplet spread.

transmission, indirect transfer of an agent from a reservoir to a host either by being suspended in air particles (airborne), carried by an inanimate objects (vehicleborne), or carried by an animate intermediary (vectorborne).

transmission, mechanical indirect transmission by a vector in which the infectious agent does not undergo physiologic changes inside the vector (see also [transmission, biologic](#)).

transmission, vectorborne transmission of an agent by a living intermediary (e.g., tick, mosquito, or flea); considered a type of indirect transmission.

transmission, vehicleborne transmission of an agent by an inanimate object; considered a type of indirect transmission; includes foodborne and waterborne transmission.

movement or change in frequency over time, usually upwards or downwards.

trend, secular changes occurring over a substantial period, generally years or decades.

trial, clinical an experimental study that uses data from individual persons. The investigator specifies the type of exposure for each study participant and then follows each person's health status to determine the effects of the exposure.

trial, community an experimental study that uses data from communities. The investigator specifies the type of exposure for each community and then follows the communities' health status to determine the effects of the exposure.

trial, randomized clinical a clinical trial in which persons are randomly assigned to exposure or treatment groups.

two-by-two table see [table, two-by-two](#).

V

variable the degree to which a measurement, questionnaire, test, or study or any other data-collection tool measures what it is intended to measure.

variable any characteristic or attribute that can be measured and can have different values.

variable (or data), discrete a variable that is limited to a finite number of values; data for such a variable.

variable, continuous a variable that has the potential for having an infinite number of values along a continuum (e.g., height and weight).

variable, dependent in a statistical analysis, a variable whose values are a function of one or more other variables.

variable, independent an exposure, risk factor, or other characteristic being observed or measured that is hypothesized to influence an event or manifestation (the dependent variable).

variance a measure of the spread in a set of observations, calculated as the sum of the squares of deviations from the mean, divided by the number of observations minus 1 (see also [standard deviation](#)).

vector a living intermediary that carries an agent from a reservoir to a susceptible host (see also [transmission, biologic](#) and [transmission, mechanical](#)) (e.g., mosquitoes, fleas, or ticks).

vehicle an inanimate object that can carry an agent from a reservoir to a susceptible host (e.g., food, water, blood products, and bedding) (see also [transmission, indirect](#)).

virulence the ability of an infectious agent to cause severe disease, measured as the proportion of persons with the disease who become severely ill or die.

vital statistics systematically tabulated data about recorded births, marriages, divorces, and deaths.

X

x-axis the horizontal axis of a rectangular graph, usually displaying the independent variable (e.g., time).

Y

y-axis the vertical axis of a rectangular graph, usually displaying the dependent variable (e.g., frequency — number, proportion, or rate).

years of potential life lost (YPLL) a measure of the impact of premature death on a population, calculated as the sum of the differences between a predetermined minimally acceptable age (e.g., 65 years or current life expectancy) and the age at death for everyone who died earlier than that age.

Z

zoonosis an infectious disease that is transmissible from animals to humans.