

- **Epidemic**- occurrence of expected number of cases among a group of people over time
- **Incidence**- # of new cases in a population
- **Prevalence**- # of cases in a population (per 10,000 or 100,000)
- **Outbreak**- more cases of particular disease than expected in given area over given time
- **Endemic**- large numbers of people over geographic area distribution affected with the same disease
- **Pandemic**- an epidemic spanning a very wide area
- **Vector**- an animal intermediate that transmits a pathogen to humans
- **Virulence**- Degree or intensity of pathogenicity of an organism
- **Compromised host**- host with lowered resistance to infection
- **Nosocomial infection**- an infection that is traced back to a hospital
- **Infectivity**- capacity to cause infection in a susceptible host
- **Pathogenicity**- capacity to cause disease in a host
- **Virulence**- severity of disease that the agent causes to host
- **Case definition**- The onset of \_\_\_(symptoms) in a \_\_\_(person) at \_\_\_(time and place)
- **Confirmed**- diagnosis by lab verification
- **Probable**- many factors point to diagnosis, but no lab verification
- **Suspected**- some factors point to diagnosis
- **Reservoir**- site that harbors pathogenic organisms (human, animal, soil)
- **Mortality rate**- # sick divided by # exposed
- **Mortality rate**- # dead per 100,000 population
- **Case Fatality rate**- # dead divided by # sick
- **Modes of transmission**- droplet (through air, flu, TB, SARS, hantavirus), blood (sexual or injected, HIV, hepatitis), direct contact (touching, leprosy, chicken pox), oral-fecal (contaminated water, cholera, giardia), vector (spread by animal, malaria, Lyme disease)
- **AIDS**- acquired immunodeficiency syndrome, spread by blood/ sexually, attacks immune system
- **Tuberculosis**- caused by bacteria, cough, fever, fatigue, weight loss, treated by antibiotics, attacks respiratory system or other parts of body
- **Malaria**- caused by protozoan, spread by mosquitoes (anophelies), cyclic fever & chills
- **2 Titles**: Person, Place, Time, Agent, Host, Environment
- **Index Case**: The first case in an outbreak
- **Virus**: 1. Are small, much smaller than bacteria 2. not composed of cells 3. have 2 basic components: DNA or RNA covered in protein. Viruses can only reproduce inside the cells of other living organisms (rabies, AIDS, SARS, ebola, measles)
- **Bacteria**: Bacteria have 1 cell and no nucleus. DNA and ribosomes float in the cell. They have flagella to help them swim. They have no cell organelles. Gram + bacteria have a strong cell wall with peptidoglycan and a capsule. Bacteria also have pill that help stick. (E. coli, streptococcus, diphtheria, MRSA, Lyme disease)

Shapes: spherical (cocci) Arrangements: staph (clumps) Srep (chain)  
Rod (bacilli) Srep (chain)  
Spiral (spirilla or spirochete)

**Cohort Study**- used for outbreaks in small, well-defined populations, moves forward or backward from exposure

Disease?	Disease +	Disease -
Exposed	(A)	(B)
Unexposed	(C)	(D)

**Attack Rate**- exposed  $A/(A+B)$  unexposed  $C/(C+D)$

**Relative Risk**-  $[A/(A+B)]/[C/(C+D)]$

Relative Risk > 1: more likely

Relative Risk < 1: possible protective effect

0 → 1 →

**Case control Study**- used when groups are not well-defined compares people with the disease to people without, works backward

Exposed	Case Patients	Controls
Yes	(A)	(B)
No	(C)	(D)

**Odds ratio**:  $(A/C) / (B/D) = (A \times D) / (B \times C)$

A= # of case patients exposed

B= # of control people exposed

C= # of case patients unexposed

D= # of control people unexposed

- **Cholera**- Vibrio Cholerae (oral-fecal)
- **Campylobacter Enteritis**- campylobacter jejuni (oral-fecal)
- **Chicken Pox**- varicella zoster (droplet and direct contact)
- **Chlamydia**- Chlamydia trachomatis (sexually)
- **E. coli**- E. coli (oral-fecal)
- **Malaria**- plasmodium (vector, anophelies mosquito)
- **MRSA**- staphylococcus aureus (direct contact)
- **SARS**- coronavirus (droplet)
- **Leprosy**- mycobacterium leprae (direct contact)
- **Schistosomiasis**- schistosoma (oral/contact with water)
- **Shingles**- herpes zoster (contact, droplet)
- **Strep throat**- streptococcus (droplet)
- **Tuberculosis**- mycobacterium tuberculosis (droplet)
- **Tetanus**- clostridium tetani (contact)
- **Ebola**- filoviridae (contact/blood)
- **Athlete's foot**- trichophyton (contact)
- **Jakob**- Prion (ingestion)
- **Tapeworm**- nematode (ingestion)
- **Hepatitis**- hepatitis A, B, C virus (A: oral fecal, B: sexually)
- **Giardia**- giardia lamblia (direct contact)

## Types of epidemic

- **Point source**- An epidemic in which all cases are infected at the same time, usually from a single source or exposure.
- **Continuous source**- An epidemic in which the causal agent (e.g. polluted drinking water, spoiled food) is infecting people who come into contact with it, over an extended period of time.
- **Person-to-Person** (a.k.a. Propagated)- An epidemic in which the causal agent is transmitted from person to person, allowing the epidemic to propagate

## Chain of Transmission

Reservoir

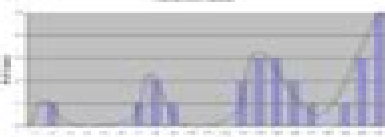
Portal of Exit

Mode of Transmission

Portal of Entry

## Host Types:

(Can be infected)  
Susceptible  
Infected  
Immune



Study design	Strength	Weakness
Case-control	Good for rare disease or long latency, examine multiple exposures from a single outcome; less expensive and quicker to conduct than cohort study	Possible error in recalling past exposure (Recall Bias) Possible time-order confusion
Cohort	Examining multiple outcomes for a single exposure; examine rare exposures (such as asbestos but not for rare disease); can calculate the incidence of disease (while case control cannot); best technique for an outbreak in a small, well defined population; most accurate observational study	Not good for rare diseases, costly in time and resources; possible loss to follow up over time; factor, which may be many years in the past or may be seen as socially (un)desirable
Cross-sectional	Relatively short duration; can study several outcomes; least expensive	Since exposure and disease status are measured at the same point in time, it may not always be possible to distinguish whether the exposure preceded or followed the disease.
Experimental or Trial	Most scientifically sound, best measure of exposure	Time consuming and Expensive; Unethical for Harmful Exposures

Bacterial	Fungal	Viral	Parasitic
Food poisoning	Candidiasis	Influenza	Chagas Disease
Gonorrhea	Fungal Meningitis	Chickenpox	Ascari
TSS	Genital warts	HIV/AIDS	Strongyloides
Cholera	Aspergillus	Herpes	Malaria
Gastro & ulcers	Athlete's foot	Mumps, measles, rubella	Quarries Giardiasis
Pneumonia	Ringworm	HPV	trichomoniasis
Ear infections & strep throat		Shingles	toxoplasmosis

## 10 Steps to Outbreak Investigation

- 1) Prepare for field work- Research disease, prepare to travel, make arrangements with personal contacts
- 2) Establish the existence of an outbreak- compare current number of cases to previous cases, use health records, documents, etc.
- 3) Verify diagnosis- Review clinical and laboratory results for the cases, interview patients
- 4) Define and identify cases- establish case definition, have clinical info, characteristics of the people, place, time, etc.
- 5) Describe and orient the data in terms of person, place, and time- use epi curve to describe how many cases at what time
- 6) Develop hypotheses- consider disease, interview people who are ill, try and notice what certain characteristics make people have the disease
- 7) Evaluate hypotheses- compare with established fact, use statistics, use case-control or cohort studies
- 8) Refine hypotheses- study environment, use data for more insight
- 9) Control and Prevention measures- immunization, medicine, isolation, carry out as soon as possible
- 10) Communicate findings- Oral briefing for local health authorities, written report for archives

# Outbreak Study Guide

**Donald P. Hanley**



## **Outbreak Study Guide:**

*A Pocket Guide to Epidemiology* David G. Kleinbaum, Kevin M. Sullivan, Nancy D. Barker, 2007-03-11 In the nearly three years since the publication of the ActivEpi companion text the authors received several suggestions to produce an abbreviated version that narrows the discussion to the most essential principals and methods A Pocket Guide to Epidemiology contains less than half as many pages as the ActivEpi Companion Text and is a stand alone introductory text on the basic principals and concepts of epidemiology

**Outbreak** Rodney P. Anderson, 2020-05-12 Outbreak Cases in Real World Microbiology 2nd Edition is the newest edition of this fascinating textbook designed for introductory microbiology students and instructors Thoroughly revised this collection of case studies of real world disease outbreaks generously illustrated in full color offers material that directly impacts college level students while the book s unique presentation offers instructors the flexibility to use it effectively in a number of ways More than 90 outbreak case studies organized into six sections according to the human body system affected illustrate the wide range of diseases caused by microbial pathogens The studies are presented at differing levels of difficulty and can be taught at all undergraduate levels Each case study includes questions for students to think about discuss and answer and the book includes an appendix that directs students to the specific reference material on which each case was based providing the opportunity to investigate further and to apply the reference content to the case being studied Each of the six sections of the book concludes with a College Perspective and a Global Perspective case study The College Perspective provides a direct and practical link between the microbiology course and the daily lives of students The Global Perspective connects students with outbreaks that have occurred in countries around the world to facilitate understanding of the social religious economic and political values at play in the treatment and prevention of infectious disease At the end of every section detailed descriptions offer concise yet complete information on each disease involved in that section

*Introduction to Epidemiology* Merrill, 2017 Introduction to Epidemiology Seventh Edition is the ideal introductory text for the epidemiology student with minimal training in the biomedical sciences and statistics

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**Alcamo's Fundamentals of Microbiology** Jeffrey C. Pommerville, 2004 Biological Sciences

**Study Guide for Goldfrank's Toxicologic Emergencies, 11th Edition** Rana Biary, Mary Ann Howland, Silas W. Smith, Richard S. Weisman, Neal A. Lewin, Lewis R. Goldfrank, Robert S. Hoffman, 2022-08-22 The hands on study companion for the most respected rigorous medical toxicology text available Goldfrank's Toxicologic Emergencies has long been the go to guide for accurately diagnosing and effectively treating poisoned and overdosed patients Now this practical companion provides everything you need to get even more out of Goldfrank's Study Guide for Goldfrank's Toxicologic Emergencies provides 1 400 questions with answers for testing your knowledge a process that increases information retention and serves as invaluable practice for board exams Each chapter has its own question set using both general factual and case based questions The guide is ideal for students nurses pharmacists and physicians Study Guide for Goldfrank's Toxicologic Emergencies covers General approaches to the poisoned patient Principles of medical toxicology Clinical basis of medical toxicology Poison prevention and education Research principles Legal and forensic considerations Foodborne Disease Outbreaks World Health Organization, 2008 These guidelines have been written for public health practitioners food and health inspectors district and national medical officers laboratory personnel and others who may undertake or participate in the investigation and control of foodborne disease outbreaks P 4 of cover **Essentials of Nursing Informatics Study Guide** Juliana J. Brixey, Jack E. Brixey, Virginia K. Saba, Kathleen A. McCormick, 2015-09-05 Introducing the most complete compact guide to teaching and learning nursing informatics If you're looking for a clear streamlined review of nursing informatics fundamentals Essentials of Nursing Informatics Study Guide is the go to reference Drawn from the newly revised 6th Edition of Saba and McCormick's bestselling textbook Essentials of Nursing Informatics this indispensable study guide helps instructors sharpen their classroom teaching skills while offering students an effective self study and review tool both in and out of the classroom Each chapter features a concise easy to follow format that solidifies students understanding of the latest nursing informatics concepts technologies policies and skills For the nurse educator the study guide includes teaching tips class preparation ideas learning objectives review questions and answer explanations all designed to supplement the authoritative content of the core text Also included is an online faculty resource to supplement classroom teaching offering instructors PowerPoints with concise chapter outlines learning objectives key words and explanatory illustrations and tables To request To request Instructor PowerPoint slides Visit [www.EssentialsofNursingInformatics.com](http://www.EssentialsofNursingInformatics.com) and under the Downloads and Resources tab click Request PowerPoint to access the PowerPoint request form Focusing on topics as diverse as data processing and nursing informatics in retail clinics the nine sections of Essentials of Nursing Informatics Study Guide encompass all areas of nursing informatics theory and practice Nursing Informatics Technologies System Life Cycle Informatics Theory Standards Foundations of Nursing Informatics Nursing Informatics Leadership Advanced Nursing Informatics in Practice Nursing Informatics Complex Applications Educational Applications Research Applications Big Data Initiatives The comprehensive yet concise coverage of Essentials of Nursing Informatics Study Guide

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