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Terminology in public health

by

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objectives

By the end of this lecture students will be able to:

1. Explain common definitions and terminology used in public health
2. Apply these definitions in different situations



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What is Health?



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Health is

"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO 1948)





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What is Final scope of
Health?



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Final scope of health is the ability to lead a "socially and economically productive life".

Many sectors (health, education, agriculture, police) need to work together to help achieve well being which cannot be achieved with health services only.





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Public health is

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





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Disease, Illness, sickness



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- **Disease** - refers to **abnormal medically defined changes** in the structure or functioning of the **human body**.
- **Illness** – refers to the individual's experience or subjective perception of **lack of physical and/or mental well-being**
- **Sickness** – refers about **consequences to function normally in social roles**





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Any departure, subjective or objective, from a state of physiological or psychological well-being.

In contrast to the words 'disease', 'illness' and 'health problem', the word morbidity is used in a 'collective' way to describe the overall situation in a community/country about prevalent health issues affecting various population groups.





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morbidity rate

looks at the incidence of a disease
across a population and/or geographic
location during a single year





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Morbidity refers to the **unhealthy state** of an individual, while **mortality** refers to the **state of being mortal**. Both concepts can be applied at the individual level or across a population. For example, a **morbidity rate** looks at the incidence of a disease across a population and/or geographic location during a single year.

Mortality rate is the rate of death in a population. The two are often used together to calculate the prevalence of a disease — e.g., measles — and how likely that disease is to be deadly, particularly for certain demographics.



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	Morbidity	Mortality
Definition	Morbidity refers to the state of being diseased or unhealthy within a population.	Mortality is the term used for the number of people who died within a population.
Demographic reference	Morbidity refers to an incidence of ill health in a population.	Mortality refers to the incidence of death or the number of deaths in a population.





	Morbidity	Mortality
Types of data	Data is collected according to the disease type, gender, age, area.	The mortality rate can be distinguished into crude death rate; perinatal mortality rate; the maternal mortality rate; infant mortality rate; child mortality rate; standardized mortality rate; and age-specific mortality rate.



Morbidity indicators

- Incidence & Prevalence
- Notification Rates
- Attendance Rates at hospitals, etc
- Admission, readmission and discharge rates
- Duration of hospital stay
- Spells of sickness

Mortality indicators

- Crude Death Rate
- Expectation of Life
- Infant Mortality Rate
- Child Mortality Rate
- Under-5 proportionate mortality rate
- Maternal Mortality Rate
- Proportional Mortality Rate
- Disease-specific Mortality Rate



Epidemiology

Epidemiology is often described as the basic science of public health.

Epi: on or upon

Demos: people or population

Logos: study of

Epidemiology is the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems

(Last JM, editor. Dictionary of epidemiology. 4th ed. New York: Oxford University Press; 2001. p. 61.)



POPULATION/COMMUNITY

- **POPULATION/COMMUNITY:** A specific group of people, often living in a defined **geographical area**, who share a common **culture, values** and **norms**, are arranged in a social structure according to relationships which the community has developed **over a period of time**.



DISTRIBUTION

- Epidemiology is concerned with the **frequency** and **pattern** of **health events in a population**
- Frequency refers not only to the number of health events but also to the relationship of that number to the size of the population (**rates**)
- Pattern refers to the occurrence of health-related events by **time, place, and person.**



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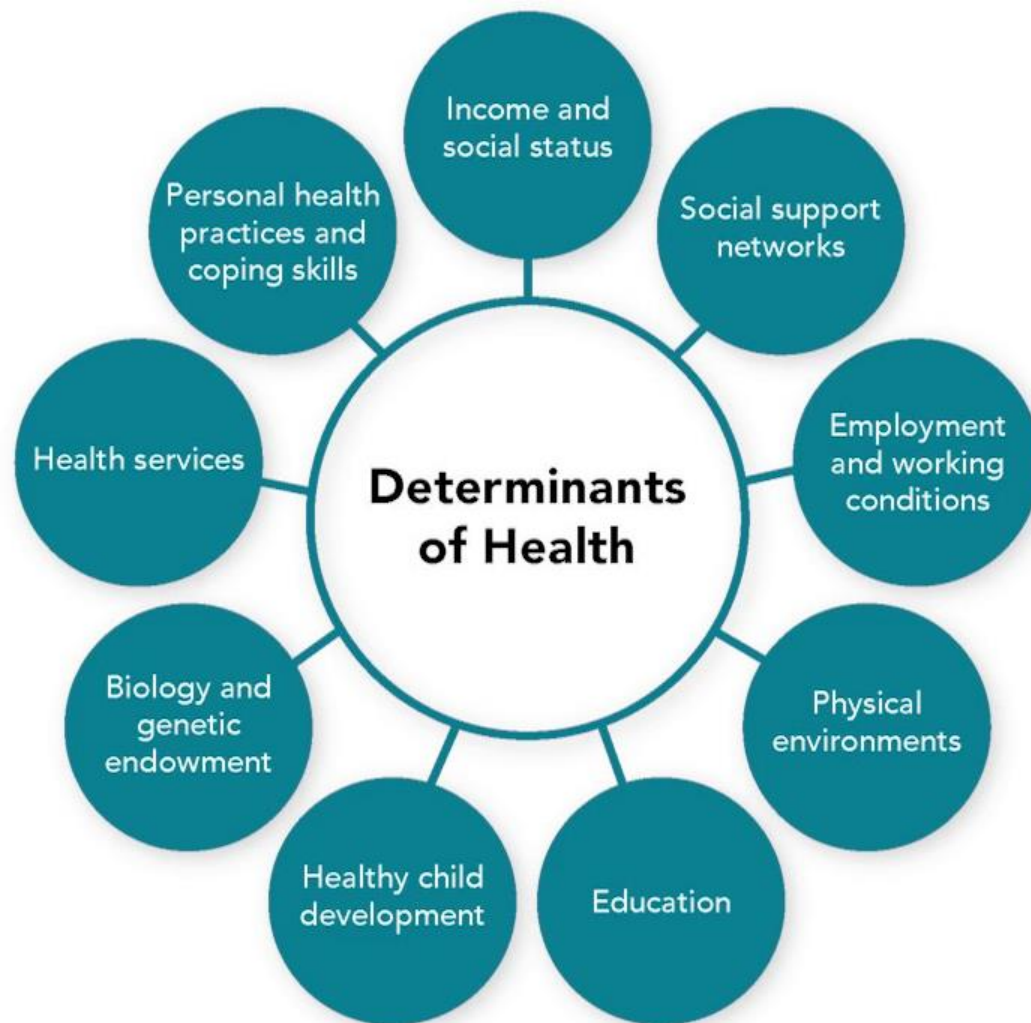
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DETERMINANTS OF HEALTH



- **DETERMINANTS OF HEALTH:** The range of **personal, social, economic and environmental factors** which **determine** the *health status* of *individuals or populations*
- Personal or proximal determinants of health are **age, sex and genetic factors**. Life style factors such as smoking habits, diet and physical activity play an important role in a wide range of health problems





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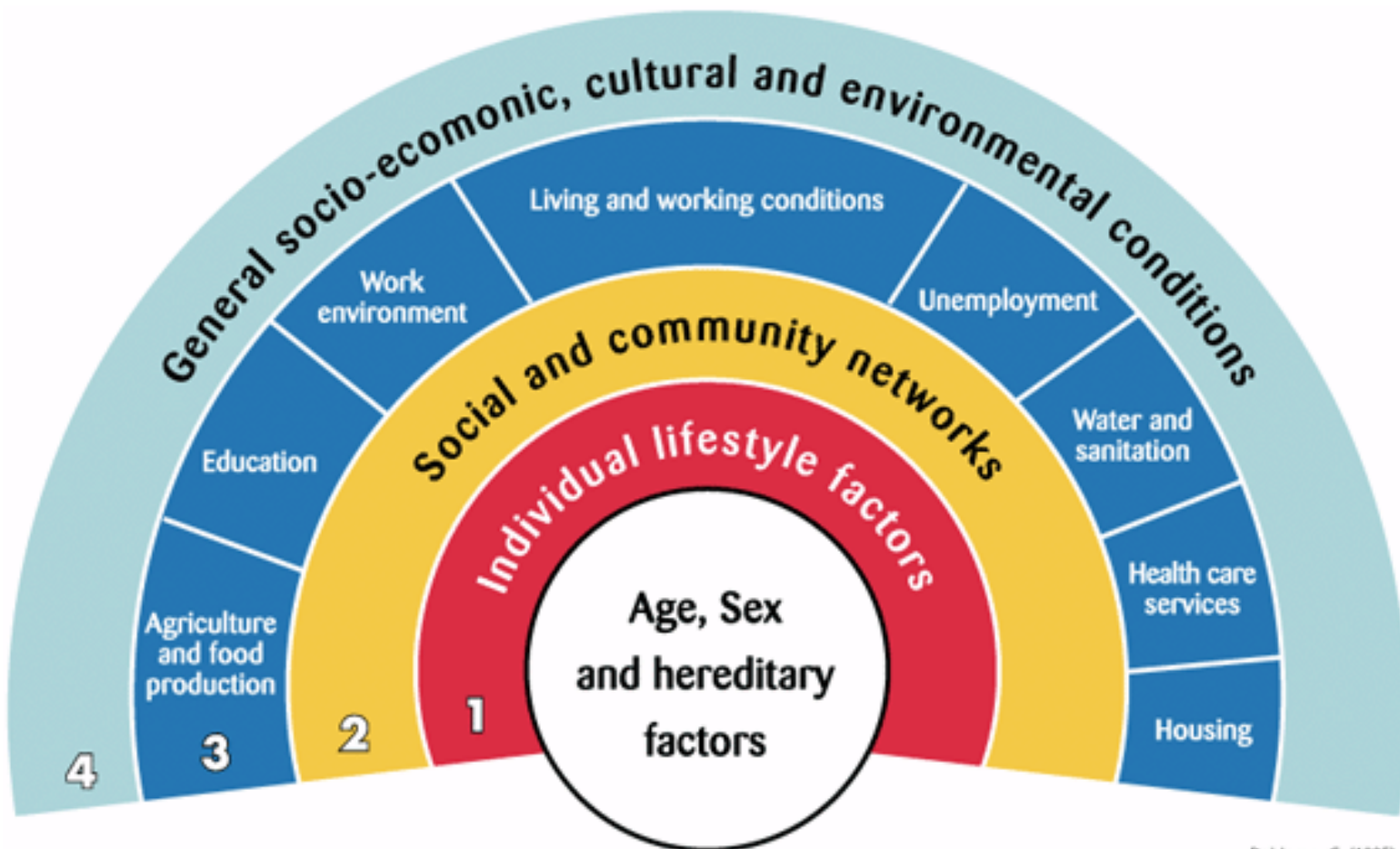
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Dahlgren, G. (1995)
European Health Policy Conference:
Opportunities for the Future. Vol 11 - Intersectoral Action for Health.
Copenhagen: WHO Regional Office for Europe

Communicable disease

An illness due to a **specific infectious agent** or its **toxic products** that arises through transmission of that agent from reservoir to susceptible host. Easily transmissible diseases are called **contagious diseases**

- **Communicable Disease (typhoid, influenza,..**
- **Non- Communicable Disease (DM, cancer,..**

Contamination

- The presence of living infectious agents on the exterior surface of the body or on the clothes or articles of the person or on any inanimate object in the environment including water and food.

Infection

- **Infection** is the **entry** and development or multiplication of an **infectious agent** in the body of man or animals.
- **An infection does not always cause illness.**

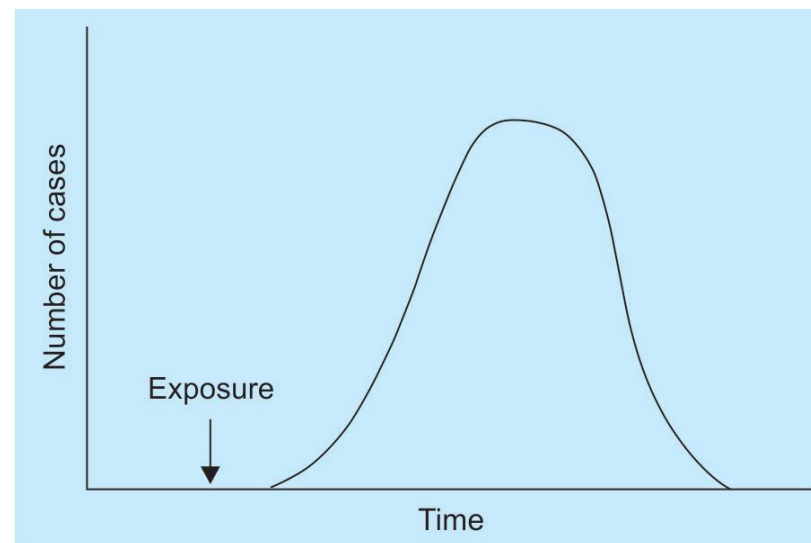
There are several levels of infection (Gradients of infection):

- **Colonization** (*S. aureus* in skin and normal nasopharynx)
- **In-apparent** cases
- **Clinical** cases (mild/moderate/severe-typical/atypical)

Point Source Epidemic

Single exposure common vehicle outbreak: Also known as '**Point Source Epidemic**', where exposure to disease agent is brief and essentially simultaneous

- Epidemic Curve rises and falls rapidly, with no secondary waves
- **Explosive: Clustering of cases within a narrow interval of time**
- All cases develop within one incubation period of disease





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PATHOGENESIS PHASE OF DISEASE

The pathogenesis of a disease is **the biological mechanism (or mechanisms)** that leads to the diseased state.

The term can also describe the origin and development of the disease, and whether it is acute, chronic, or recurrent.





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PATHOGENESIS PHASE OF DISEASE

- Begins with 'Entry of organism' in susceptible host
- Multiplication of organism, disease initiation and progression
- Final outcome may be recovery, disability or death
- Host may become **a clinical case, subclinical case or carrier**
- • Secondary and tertiary levels of prevention are possible
- • Screening of disease may improve prognosis and increase survival

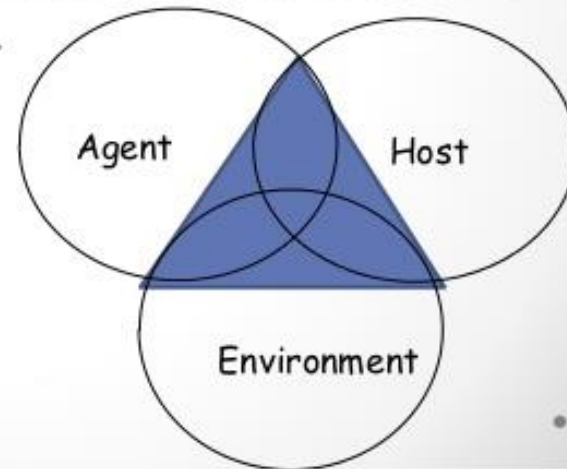


PRE PATHOGENESIS PHASE

- Disease agent has not entered man, but factors favouring disease exist in the environment.



- What required is an interaction of these factors to initiate the disease process.



Endemic

The **constant** presence of a disease or infectious agent within a given geographic area or population group; may also refer to the **usual prevalence of a given disease** within such area or group.

e.g. Typhoid, Hepatitis A

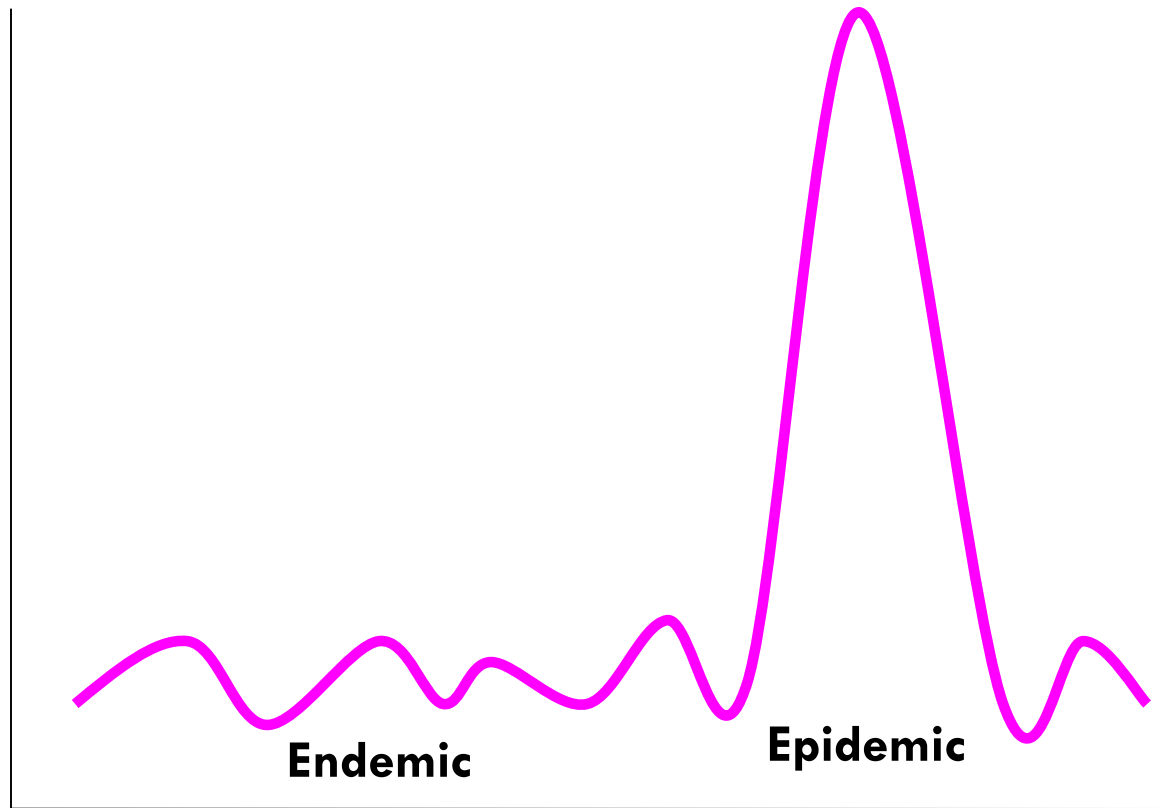


Epidemic

The occurrence of **more** cases of a disease than **expected** in a given area or among a specific group of people over a particular period of time.

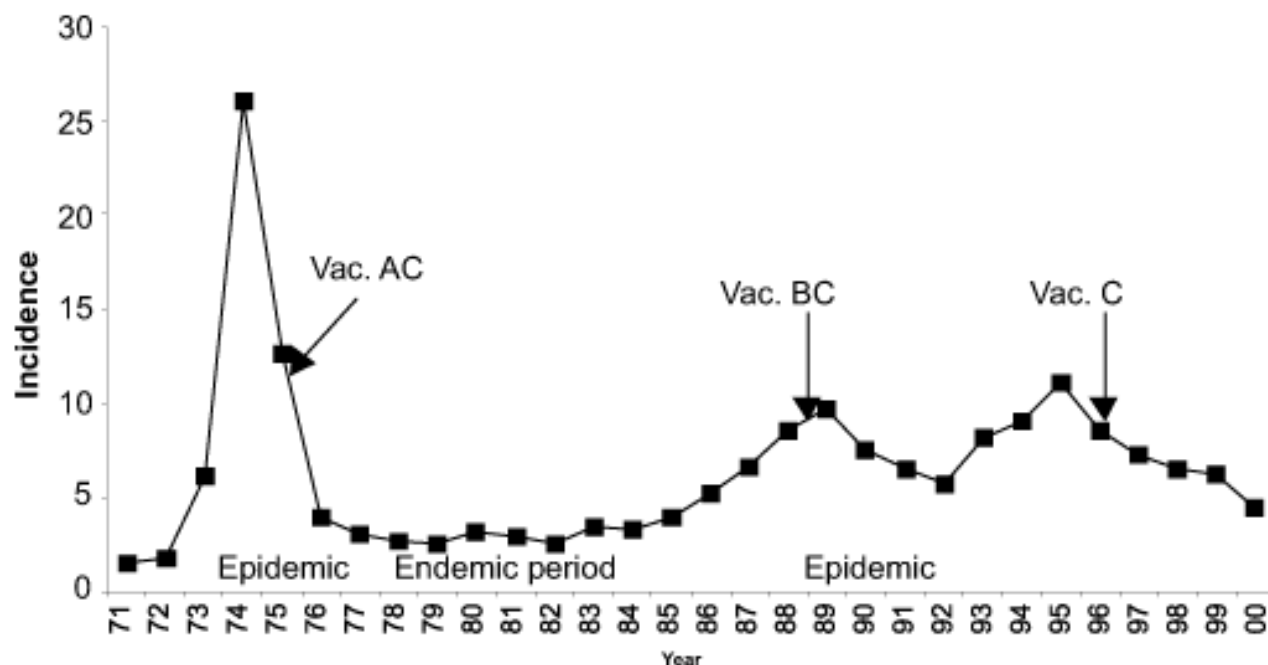
Endemic vs Epidemic

Number of Cases of a Disease



Time 

Figure 1. Annual incidence of meningococcal disease per 100,000 inhabitants and mass vaccination campaigns (vac.) against specific serogroups in Santa Catarina, 1971-2000.





Pandemic

An epidemic occurring over a very wide area (several countries or **continents**) at the same time and usually affecting a large proportion of the population.

e.g. Influenza A H1N1 in 2009



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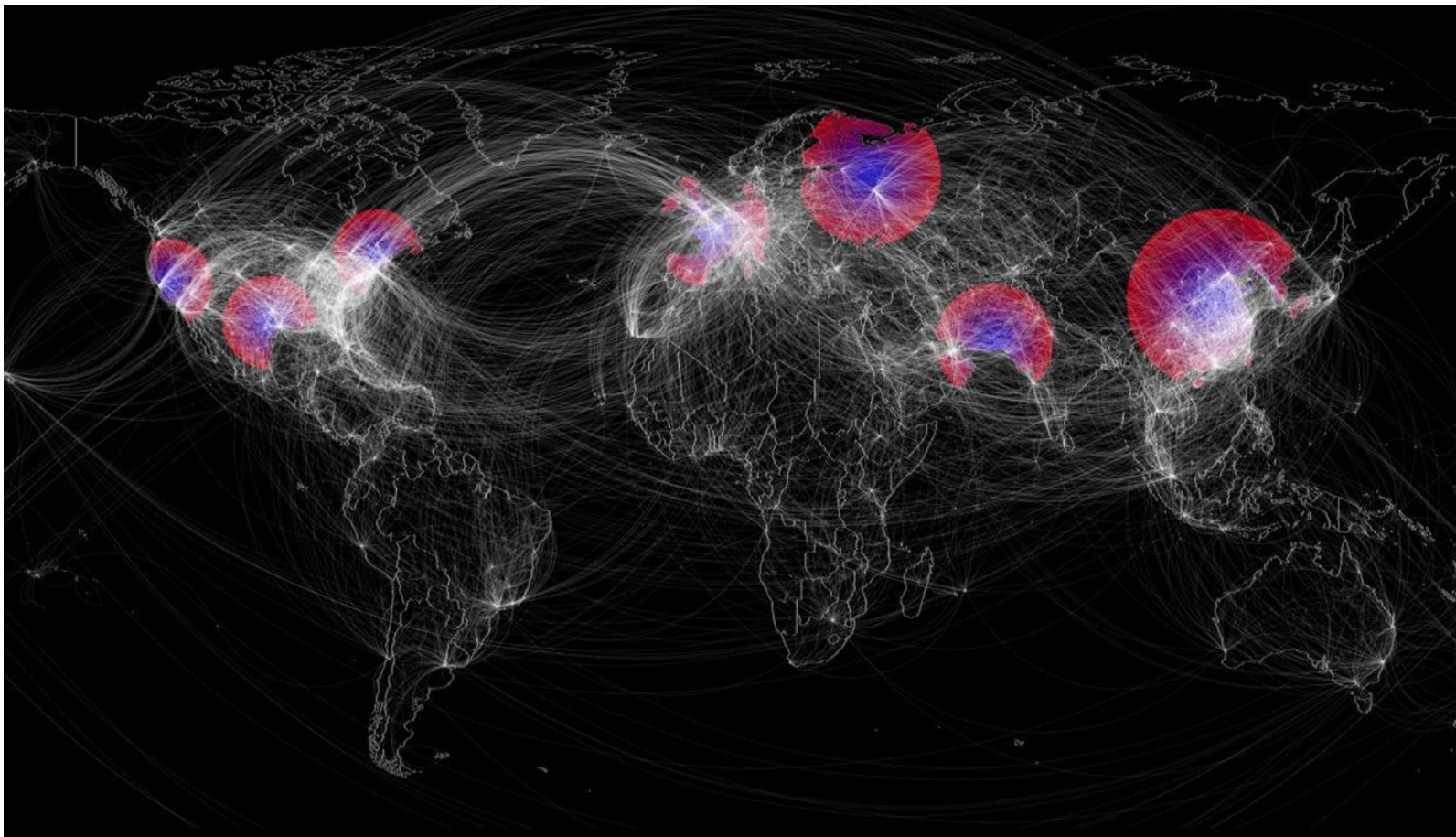
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Outbreak

- **Outbreak** is a more or less localized epidemic affecting large number of a group, in the community

e.g. outbreak of food poisoning



Sporadic

Cases occur irregularly, haphazardly **from time to time** and generally **infrequently**.

Cases are few and separated widely in space and time showing no connection to each other.

Nosocomial infections (hospital-acquired infection)

An infection originating in a medical facility; e.g., occurring in a patient in a hospital or other health care facility in whom the infection was not present or incubating at the time of admission.

It includes infections acquired in the hospital but appearing after discharge; it also includes such infections among staff.



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.

Virulence is a pathogen's or microbe's ability to infect or damage a host.



Reservoir of infection

The **reservoir of an agent** is the habitat in which an infectious agent normally lives, grows, and multiplies.

Reservoirs include: Humans, animals, or the environment.

Zoonosis:

An infection or infectious disease transmissible under natural conditions from *vertebrate animals* to humans.

Zoonotic diseases include:

- brucellosis (cows and pigs),
- anthrax (sheep),
- plague (rodents),
- rabies (dogs, bats and other mammals).



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.



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Carriers: Infected person or animal that harbours a specific agent in the absence of discernible clinical disease, & serves as a potential source of infection for others

– *Carriers are less infectious than cases but are more dangerous epidemiologically*





Carriers by type:

- **Incubatory Carriers:** shed infectious agent during incubation period of disease, e.g. Measles, Mumps, Polio, Pertussis, Influenza, Diphtheria, Hepatitis-B
- **Convalescent Carriers:** shed the disease agent during the period of Convalescence, e.g. Typhoid, Bacillary Dysentery, Amoebic Dysentery, Cholera, Diphtheria & Pertussis (Clinical recovery does not coincide with bacteriological recovery)
- **Healthy carriers:** emerge from subclinical cases without suffering from overt disease, e.g. Poliomyelitis, Cholera, Meningococcal Meningitis, Diphtheria & Salmonellosis





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Carriers by duration:

- **Temporary Carriers**: shed infectious agent for short periods of time, e.g. Incubatory carriers, Convalescent carriers, Healthy carriers
- **Chronic Carriers**: excretes infectious agents for indefinite periods, e.g. Typhoid, Hepatitis-B, Dysentery, Meningococcal Meningitis, Malaria, Gonorrhoea, etc





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Carriers by portal of exit:

- **Urinary carriers**, e.g. typhoid
- **Intestinal carriers**, e.g. typhoid, cholera, amoebiasis
- **Nasal carriers**, e.g. Diphtheria, staphylococcal food poisoning
-
- **Respiratory carriers**
- **Nasopharyngeal carriers**, e.g. Meningococcus



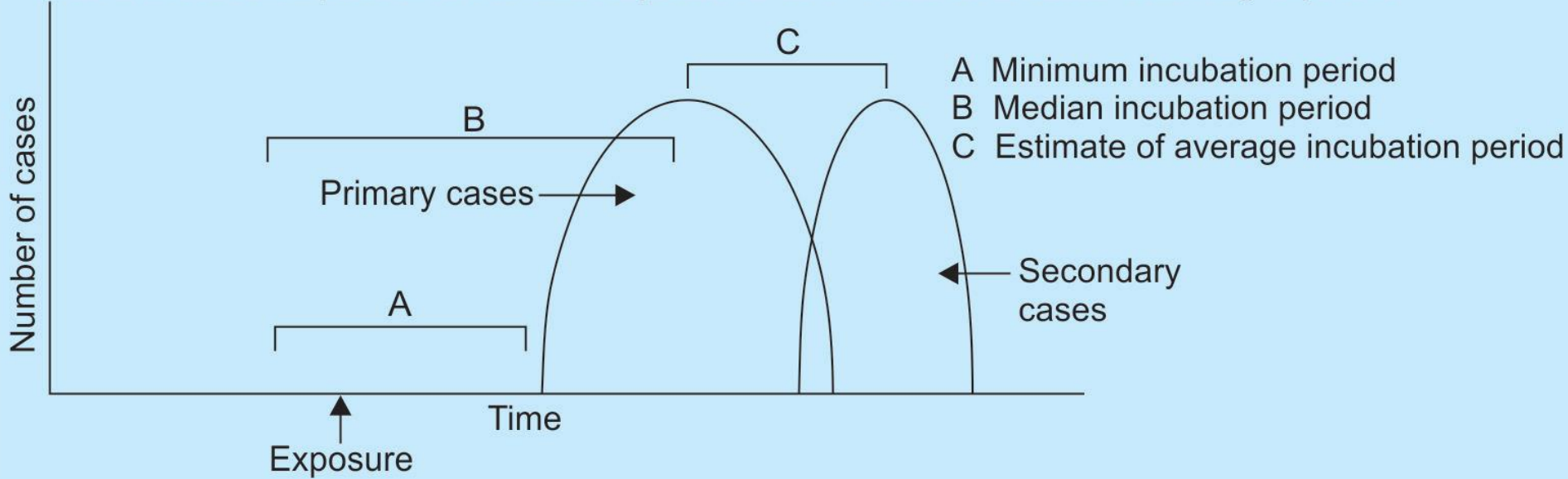


Communicable period

The **time** during which an infectious agent may be transmitted directly or indirectly from an infected person to another person or animal.



• Median incubation period: Is the time required for 50% of cases to occur following exposure



Incubation period

- The time interval from **exposure** to an infectious agent to the onset of **symptoms** of an infectious disease.



Incubation Period

- *Incubation period depends upon:*
 - Generation time of the pathogen
 - Infective dose
 - Portal of entry
 - Individual susceptibility

- *Incubation period of a disease is useful for:*
 - **Tracing the source** of infection and contacts
 - **Determining the period of surveillance**
 - Applying **immunization principles** for prevention of diseases
 - Identification of **point source or propagated** epidemics
 - Estimating prognosis of a disease





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Attack Rate (AR)

- Relates to no. of cases in the population at risk
- Reflects extent of epidemic
- Is used when 'population is exposed to risk for a limited period of time, such as epidemic'

$$\text{AR} = \frac{\text{No. of new cases of specified disease in a specified time interval}}{\text{Total population at risk during the same time interval}} \times 100$$





Secondary Attack Rate

• *Secondary Attack Rate (SAR)*: Is no. of exposed persons developing the disease within range of incubation period (IP), following exposure to the primary case

$$\text{SAR} = \frac{\text{No. of exposed persons developing disease within range of IP}}{\text{Total no. of exposed " contacts susceptible}} \times 100$$

- Denominator includes *only those susceptible in close contact*
- *Primary case is always excluded both from numerator and denominator for SAR calculation*





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Disease	Secondary Attack Rate (SAR)
Small pox	30 – 45%
Measles	> 80%
Chicken pox	~90%
Mumps	~86%
Pertussis	~90%



Chemoprophylaxis:

The administration of a **chemical**, including **antibiotics**, to prevent the development of an infection or to slow progression of the disease to a clinically manifest form.

The use of a chemical to treat a clinically recognizable disease or to limit its further progress



Reference

1. Last JM, editor. Dictionary of epidemiology. 4th ed. New York: Oxford University Press; 2001
2. Principles of EPIDEMIOLOGY in Public Health Practice *Third Edition* An Introduction to Applied Epidemiology and Biostatistics. Centers for Disease Control and Prevention (CDC) Glossary pages;1-23