

# Infection

## What is Infection

- An infection is the colonization of a host by Microbial species. Infecting Microbes seek to use the host's resources to reproduce, often resulting in disease. Colloquially, infections are usually considered to be caused by microscopic organisms like viruses, prions, bacteria, and viroid's, though larger organisms like macro parasites and fungi can also infect.

# Basis of Classification of Infections

They are classified by the causative agent as well as by the constellation of symptoms and medical signs that are produced.

- An infection that produces symptoms is an **apparent infection**.

An infection that is active, but does not produce noticeable symptoms, may be called **in apparent, silent, or subclinical**.

An infection that is inactive or dormant is called a **latent infection**

# What Causes an Infectious Disease?

- Infection is caused by microorganism
  
- The microorganism may be a bacteria, a virus, a parasite or a fungus

# Overview

- Types of Microorganisms
- Principles of Infection
  - Transmission
  - Host resistance
  - Virulence and pathogenicity
  - Control of transmission and infection
- Development of Infection
  - Onset and course
  - Clinical signs and symptoms
  - Diagnostic tests
- Antimicrobial Drugs
- Example of Infection: Influenza



# Conditions required for infection to spread from one person to another

1. One person must be infected with a microorganism
2. The other person must be susceptible to infection with that microorganism
3. The microorganism must be able to leave the body of the infected person and enter the body of the susceptible person.

# Types of infection

- Colonization – infection present on surface of body –
  - Organism propagating at a rate sufficient to maintain its numbers without producing identifiable evidence of any reaction in host
- In apparent or subclinical infection
  - organism not only multiplying but also causes a measurable reaction that is however not clinically detectable
- Symptomatic infection
  - Organism causes clinically detectable reaction

# Time parameters of interaction

- Latency Period = the time between infection agent and onset of infectiousness
- Incubation Period = the time between infection and onset of symptoms
- Latency period may not be the same as the incubation period

# Definitions

- Disease and Infectious Disease

- Disease

- Any deviation from a condition of good health and well-being

- Infectious Disease

- A disease condition caused by the presence or growth of infectious microorganisms or parasites



# Definitions

- Pathogenicity and Virulence

- Pathogenicity

- The ability of a microbe to cause disease

- This term is often used to describe or compare species

- Virulence

- The degree of pathogenicity in a microorganism

- This term is often used to describe or compare strains within a species

# Definitions

- Acute infection vs. chronic infection
  - Acute Infection
    - An infection characterized by sudden onset, rapid progression, and often with severe symptoms
  - Chronic Infection
    - An infection characterized by delayed onset and slow progression

# Definitions

- Primary infection vs. secondary infection
  - Primary Infection
  - An infection that develops in an otherwise healthy individual
  - Secondary Infection
  - An infection that develops in an individual who is already infected with a different pathogen

# Definitions

- Localized infection vs. systemic infection
  - Localized Infection
    - An infection that is restricted to a specific location or region within the body of the host
  - Systemic Infection
    - An infection that has spread to several regions or areas in the body of the host

# Definitions

- Clinical infection vs. subclinical infection
  - Clinical Infection
    - An infection with obvious observable or detectable symptoms
  - Subclinical Infection
    - An infection with few or no obvious symptoms

# Definitions

- Opportunistic infection
  - An infection caused by microorganisms that are commonly found in the host's environment This term is often used to refer to infections caused by organisms in the normal flora

# Defining

- The suffix “-emia”
  - A suffix meaning “presence of an infectious agent”
- Bacteremia = Presence of infectious bacteria
- Viremia = Presence of infectious virus
- Fungemia = Presence of infectious fungus
- Septicemia = Presence of an infectious agent in the bloodstream

# Definitions

- The suffix “-itis”
  - A suffix meaning “inflammation of”
- Examples:
  - Pharyngitis = Inflammation of the pharynx
  - Endocarditis = Inflammation of the heart chambers
  - Gastroenteritis = Inflammation of the gastrointestinal tract



# Definitions

- Epidemiology

- The study of the transmission of disease

- Communicable Disease

- A disease that can be transmitted from one individual to another

- Contagious Disease

- A communicable disease that is easily spread from one individual to another

- Non communicable Disease

- A disease that is not transmitted from one individual to another

# Definitions

- Endemic Disease

- A disease condition that is normally found in a certain percentage of a population

- Epidemic Disease

- A disease condition present in a greater than usual percentage of a specific population

- Pandemic Disease

- An epidemic affecting a large geographical area; often on a global scale

# Definitions

- Reservoir of Infection

- The source of an infectious agent

- Carrier

- An individual who carries an infectious agent without manifesting symptoms, yet who can transmit the agent to another individual

- Fomites

- Any inanimate object capable of being an intermediate in the indirect transmission of an infectious agent



- **Direct Mechanisms of Disease Transmission**

- Directly From Person to Person

- Examples: Direct Skin Contact Airborne (Aerosols)

- From Mother to fetus

# Indirect Transmission

- Indirect Mechanisms of Disease Transmission

- Examples: Food & Waterborne Transmission Fomites Animal Vectors

# The Normal Flora of Humans

- Types of Symbiosis

- Mutualism

- A symbiotic relationship in which both species benefit

- Commensalism

- A symbiotic relationship in which one species benefits, and the other species is neither helped nor harmed