Infectious diseases

Introduction

Health care workers and infectious diseases

- Any person in contact with patients, body fluids, or supplies used for patient care

- All healthcare workers need basic infection control training whether or not they deliver direct care to patients

Objectives

1. What is an infectious disease??
2. What is an infection and disease??
3. Causes of re-emerging of the problem of the infectious diseases
4. Microbiological classification of infectious diseases
5. Means of transmission of infectious diseases
6. The action of pathogen in infectious process (pathogenicity)
7. What is infectivity ,virulence, immunogenicity and incubation period
8. Manifestations of infectious process (infection spectrum)
9. The immune reaction of host in infectious process
10. Common symptoms and signs

Diseases

Definition

- Disease
- Infection
- Infectious diseases

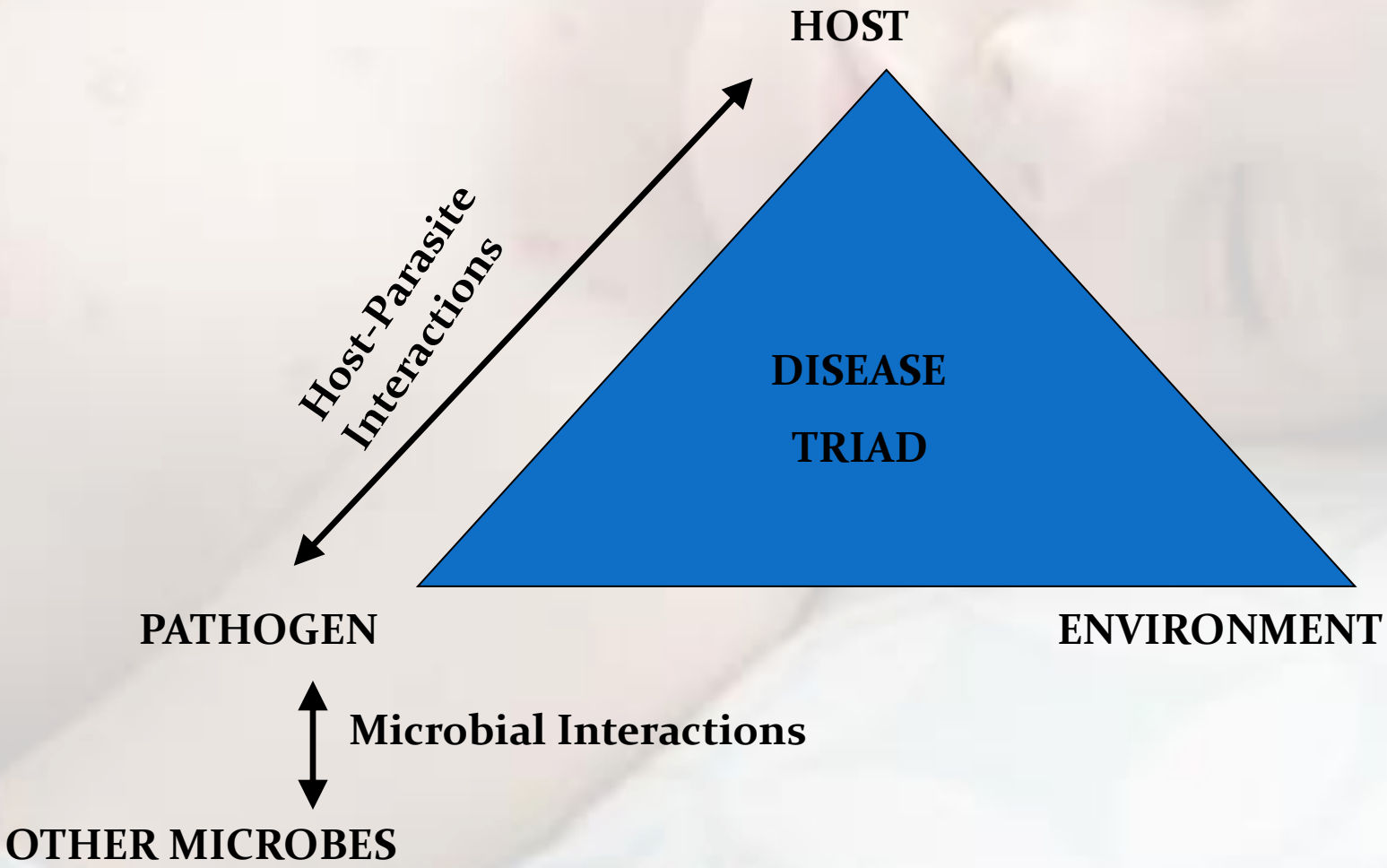
Types of diseases

- Degenerative diseases
- Immune disorders
- **Infectious diseases**
- Metabolic disorders
- Neoplasms (cancers and other types of tumors)
- Nutritional disorders
- Psychiatric disorders

Infectious diseases

- Can affect more than one anatomical site or spread
- Zoonotic diseases are infectious diseases of animals that can cause disease when transmitted to humans

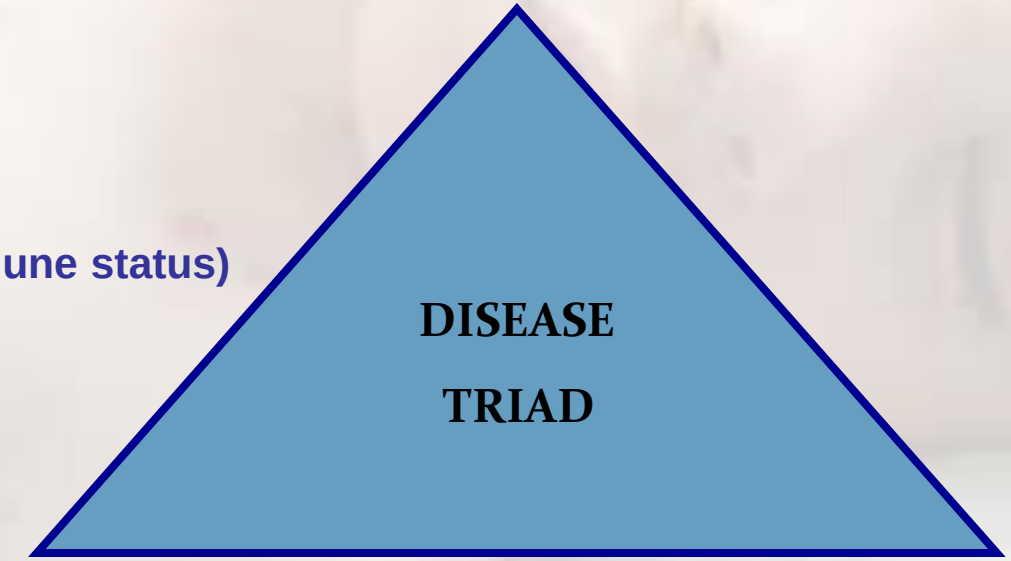
Pathogenicity of Infectious Diseases



Factors Influencing Disease

Host

- Age
- Sex
- Genotype (race)
- Occupation
- Nutritional status
- Health status (immune status)



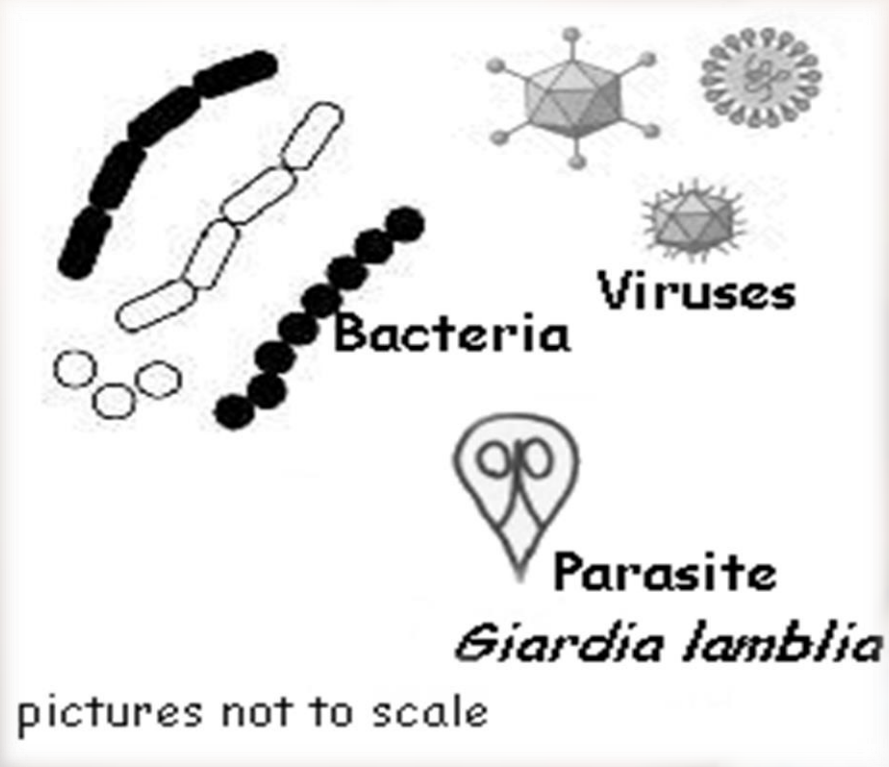
Agent

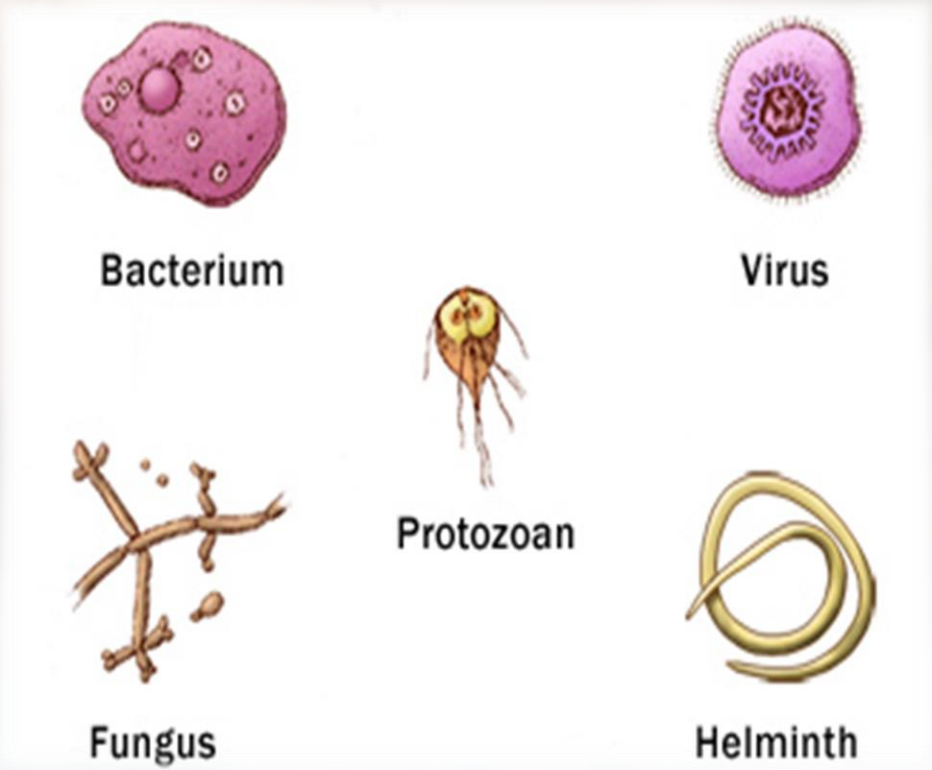
- Infectivity
- Pathogenicity
- Virulence
- Immunogenicity
- Antigenic stability
- Survival

Environment

- Weather
- Housing
- Geography
- Occupational setting
- Air quality
- Food

Microbiological Classification of Infectious Diseases



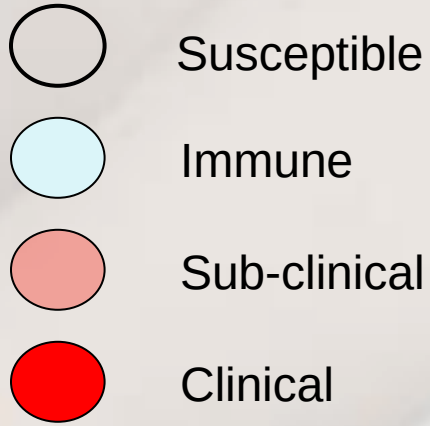


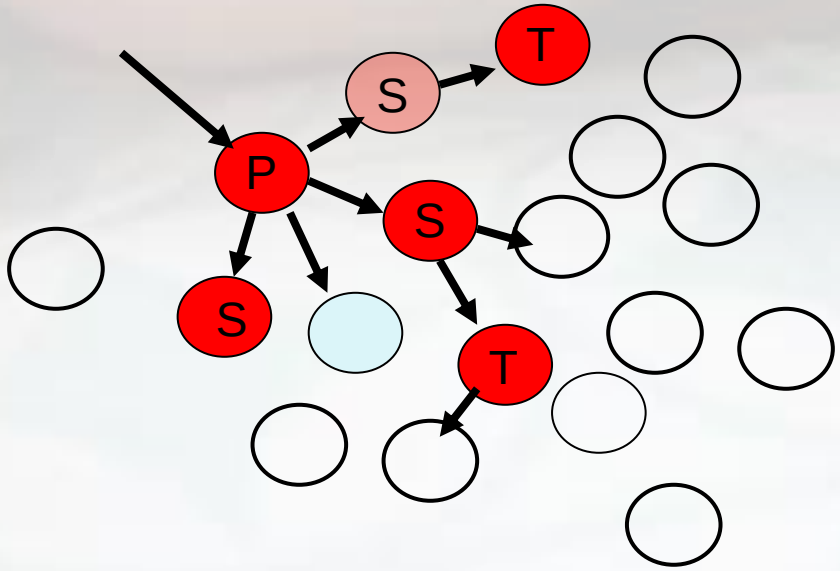
Infectious Diseases

Transmission

Cases

- Index – the first case identified
- Primary – the case that brings the infection into a population
- Secondary – infected by a primary case
- Tertiary – infected by a secondary case





Factors Influencing Disease progression

Pathogenicity

What does pathogenicity mean???

The pathogenicity of pathogen is related to :

1. Invasiveness
2. virulent
3. Number of pathogen
4. Mutation (variability)

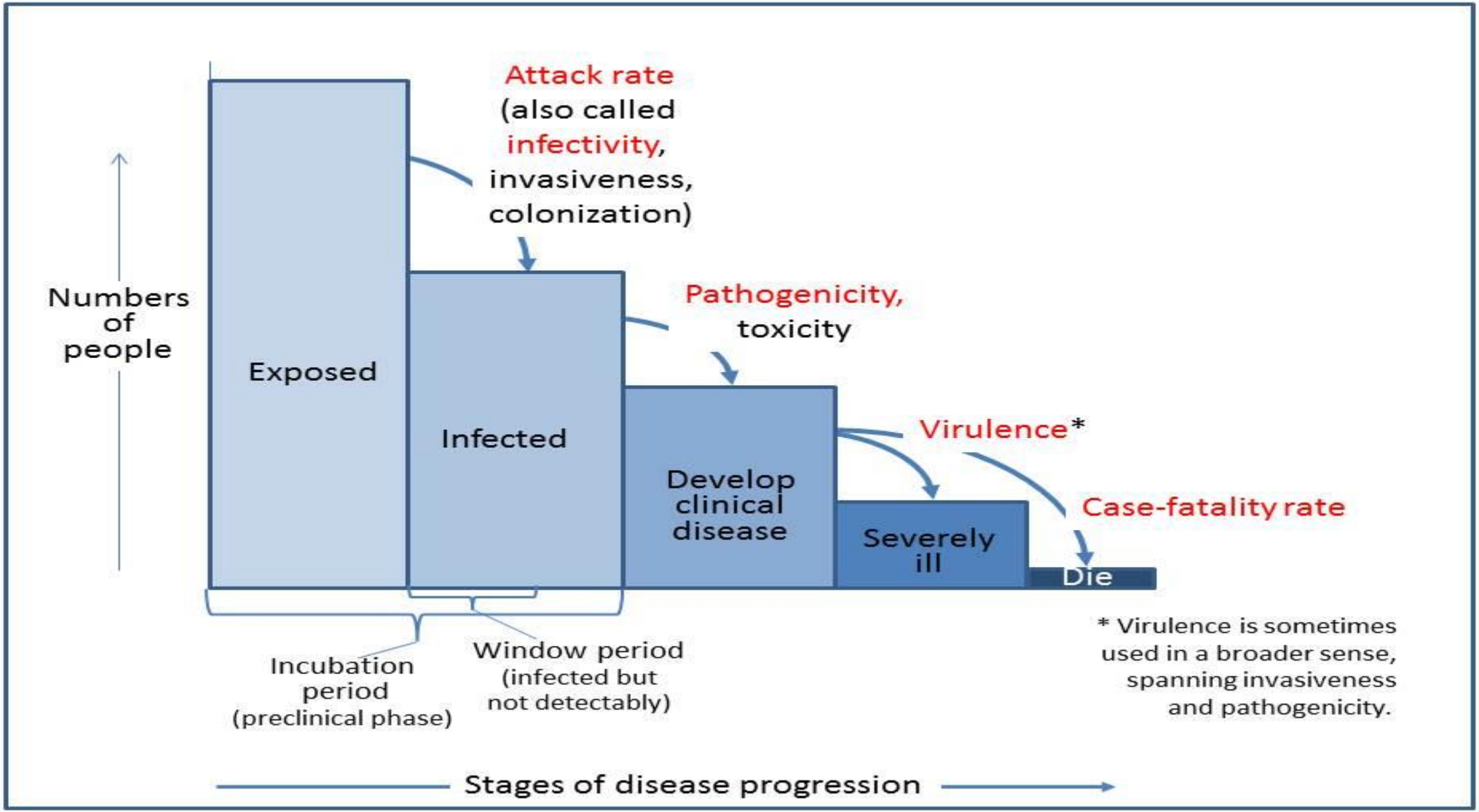
Factors Influencing Disease Progression

Infectivity:

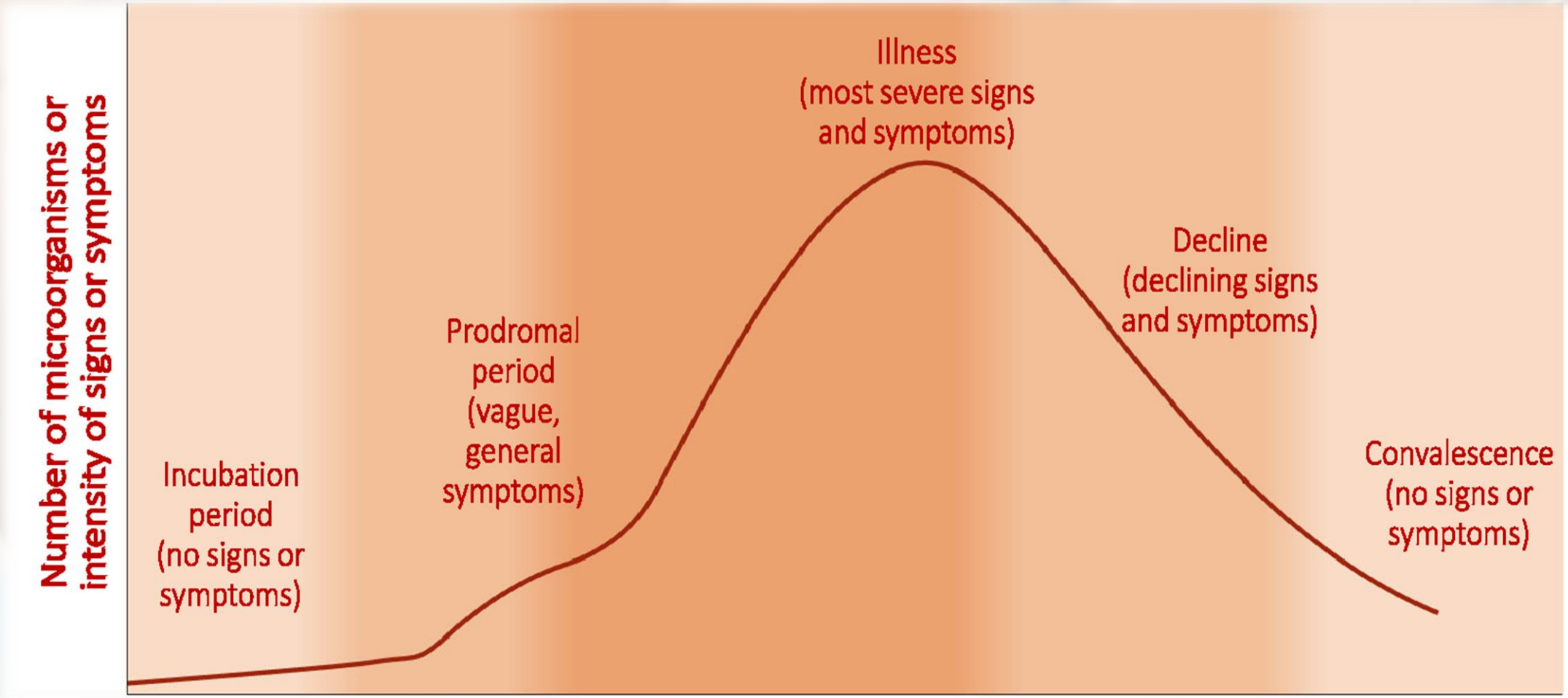
- Ability of agent to cause infection
- Number of infectious particles required
- In person-to-person transmission, secondary attack rate is a measure of infectivity

Virulence :

- Severity of the disease after infection occurs.
- Measured by case fatality rate or proportion of clinical cases that develop severe disease.


Attack rate
(also called
infectivity,
invasiveness,
colonization)
Pathogenicity,
toxicity
Virulence*
Case-fatality rate
Numbers
of
people
Exposed
Infected
Develop
clinical
disease
Severely
ill
Die
Incubation
period
(preclinical phase)
Window period
(infected but
not detectably)
* Virulence is sometimes
used in a broader sense,
spanning invasiveness
and pathogenicity.
Stages of disease progression

Stages of infectious diseases

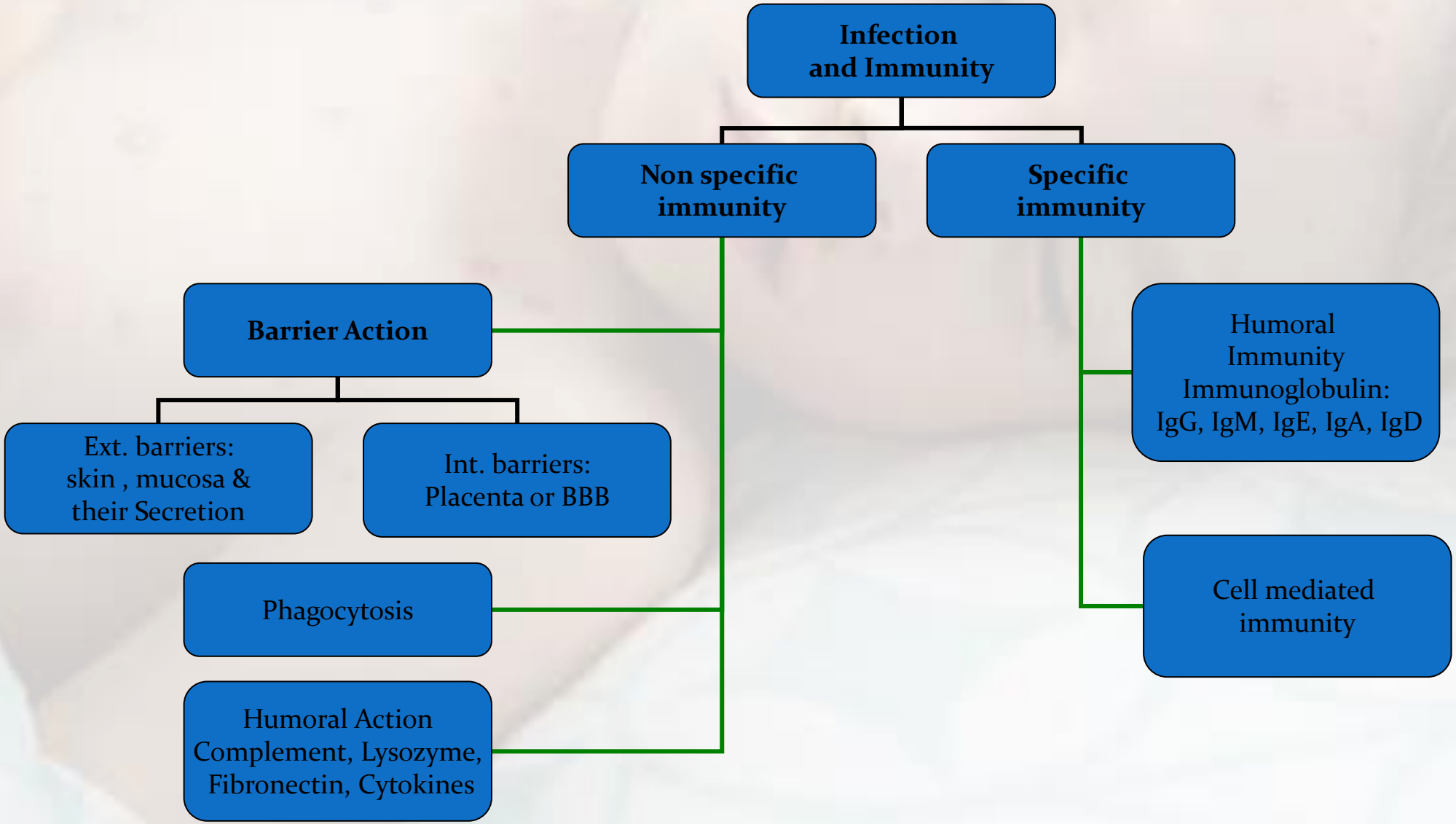


Factors Influencing Disease Progression

Immunogenicity

- Ability of an organism to produce an immune response that provides protection against reinfection with the same or similar agent
- Can be life long or for limited periods
- Important information for development of vaccines

The immune reaction of host in infectious process



Barriers for Defense Against Infection

1. **Skin:**
2. **Mucus membrane:**
3. **Cilia:**
4. **Coughing**

Infection and immunity

Manifestations of infectious process (infection spectrum):

1) Clearance of pathogen (no infection)
2) Covert infection (subclinical infection)
3) Overt infection (clinical infection or apparent infection)
4) Carrier states
   - Health carrier after covert infection
   - Convalescent carrier after overt infection
   - Incubatory carrier before onset of disease

5) Latent infection.

Classification of infectious diseases

By duration

- **Acute** – Common cold
- **Chronic** – Tuberculosis
- **Latent** – Herpes zoster (cold sores)

Classification of infectious diseases

By location

- **Local**
- **Systemic**

By timing

- **Primary**
- **Secondary**

Manifestations of disease

Symptoms

Signs

Syndrome

Asymptomatic (subclinical)

What is a communicable disease?

- A communicable disease transmitted through direct contact with an infected individual or indirectly through a vector; people, animals, surfaces, food, water or air
- **All communicable diseases are infectious diseases, but not all infectious diseases are communicable**
- **Contagious disease** is a communicable disease that is easily transmitted from one person to another.
- Examples of infectious but non-communicable diseases
- Examples of infectious communicable/contagious diseases

Epidemiology

The study of factors that determine the frequency, distribution, and determinants of diseases in human populations, and ways to prevent, control, or eradicate diseases in populations

Terms

- **Prevalence**
  - The period prevalence
  - The point prevalence
- **Incidence**
- The morbidity rate
- **A sporadic disease**
- **The mortality rate**

Terms

- **Endemic disease**
- **Epidemic disease**
- **Pandemic disease**

Causes of re-emerging of the problem of the infectious diseases

1. Loss of Antibiotic Effectiveness
2. Increased Population Density
3. Travel
4. Global Warming
5. Biological Warfare or Terrorist Attacks
6. New Routes of transmission
7. Complacency and Ignorance

Prevention of infectious disease

- Management of source of infection
- Cut off of route
- Protect susceptible population
  - Active immunization
  - Passive immunization

Oral presentations topics

1. Pulmonary Tuberculosis
2. Influenza
3. Hepatitis B infection
4. Meningococcal Disease (Neisseria meningitidis)
5. Typhoid Fever
6. Taeniasis
7. Malaria
8. Dengue Fever
9. Middle East Respiratory Syndrome Coronavirus (MERS-CoV)
10. Rabies