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Introduction

Infectious disease is a disorder caused by an organism, such as bacteria, viruses, fungi or parasites.

- Single infectious disease - infection with a single agent, e.g., salmonellosis.
- Complex infectious disease - infection with more than one agent (mixed infections).

- Emerging disease: infection that has newly appeared in a population or has existed but it is rapidly increasing in incidence or geographic range.
    - Emerging reasons: genetic changes in infectious agents or their hosts, or following ecological changes.

- Non-infectious disease, such as:
    - Metabolic (e.g., bovine ketosis).
    - Nutritional deficiency (e.g., copper deficiency).
    - Neoplastic (e.g., canine mammary cancer).

- Disease of unknown cause – has not been fully elucidated – e.g., equine grass sickness.

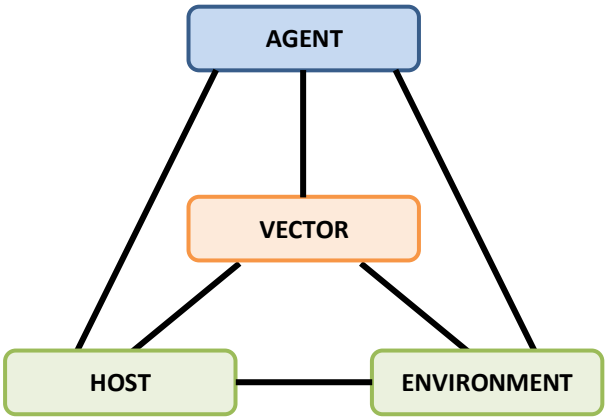
Modes of Transmission of Infectious Diseases

I. Horizontal transmission:

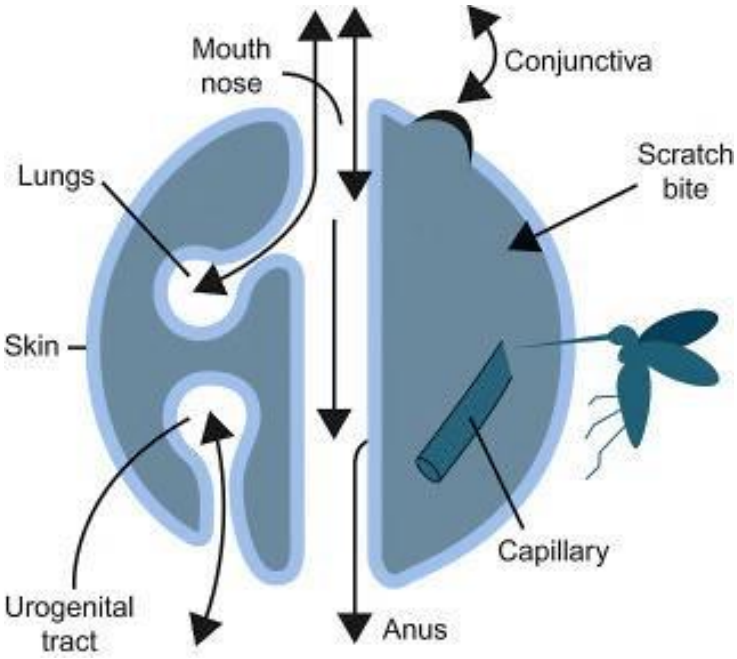
- Direct contact - from animal to animal; known as “contagious diseases”.
- Indirect contact – e.g., environmental contamination.
- Vector-borne – e.g., ticks, mosquito.

II. Vertical transmission:

- Congenital transmission - present at birth.
    - Hereditary transmission - carried within the genome of either parent.



Routes of the Infection



Gradient of the Infection

Clinical disease	• Produces clinical signs and symptoms (mild or severe) • Peracute (few hours), acute (1 or 2 days), subacute (up to a week), or chronic (more than one week).
Subclinical disease	• Infection occurs without overt clinical signs, but it can be detected by laboratory tests.
Inapparent (silent) "non-clinical"	• Infection occurs without clinical signs, and it is not possible to detect the causative agent through serology or antigen detection.

Outcome of a Clinical Disease

The clinical disease may result in the development of:

- **Long-standing chronic clinical infection** - potential sources of an infectious agent.
- **Latent infection** - persists in an animal with no overt clinical signs
- **Carrier** - any animal that sheds an infectious agent without demonstrating clinical signs - inapparently or subclinically infected animal.
    - *Convalescent carriers* - animals that shed agent when they are recovering from a disease, and the agent may then persist for prolonged periods.
    - *Incubatory carriers* - animals that excrete agent during the disease's incubation period.
- **Death** - usually removes an animal as a source of infection.
- **Recovery**.

Modes of Occurrence of Diseases (Distribution)

Sporadic	• Either a single case or a cluster of cases of a disease or infection (without obvious disease issue) that is not normally present in an area.
Endemic	• Usual frequent occurrence or constant presence of a disease in a population.
Epidemic	• Sudden, usually unpredictable, increase in the number of cases of an infectious disease in a population.
Pandemic	• A widespread epidemic that usually affects a large proportion of the population. Many countries may be affected.
Outbreak	• An occurrence of disease in an agricultural or breeding establishment, including all buildings where animals are present, i.e., "several animals are affected".

Disease Quantification (Measures of disease)

1. **Morbidity**: the number of diseased animals.

$$\text{Morbidity rate} = \frac{\text{Number of affected animals}}{\text{Total number of animals at risk}}$$

2. **Mortality**: the number of deaths.

$$\text{Mortality rate} = \frac{\text{Number of died animals}}{\text{Total number of animals at risk}}$$

$$\text{Case Fatality rate} = \frac{\text{Number of deaths}}{\text{Number of diseased animals}}$$

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References:
1. Thrusfield, M. (2007). Veterinary Epidemiology. 3rd ed. Blackwell Science Ltd.
2. Gordis, L. (2014). Epidemiology. 5th ed. Saunders Elsevier Inc.