Introduction

Transboundary Animal Diseases:

Epizootic diseases which are highly contagious (very rapid spread and can pass national border), causing:

- public health importance &
- serious economic importance.

Such diseases are:

- Causing high morbidity and mortality rate.
- Have significant detrimental effect on national economics.
- have a constant threat to the live stock.

Ex: RP, PPR, FMD, RVF and Brucellosis.

Biosafety or Biosecurity:

It refers to all management practices that reduce the chance of infectious diseases onset or prevent introduction & spread of infectious agents to animal farms.

It involves a number of measures & protocols designed to prevent disease causing agents from entering or leaving a property & being spread.

How diseases are spreading?

- Movements of animals, people, vehicles & equipment between farms.
- Introduction of animals of low or unknown health status.
- Contact with pets and wild animals.
- Drinking from contaminated water sources.
- Eating from contaminated foods.

Early warning system (EWS):

It study all epidemiological & predisposing factors associated with emergency of infectious diseases for early detection or diagnosis.

Ex, RVF vegetation index, rain fall rate, temperature & RH

Immunity:

it is a condition in which animal become resistant to diseases either through using vaccine or antisera or having antibodies from having disease

Vaccination:

introduction of vaccine into the body to induce immunity against specific disease.

Antigen (Ag):

is substance that induce specific protective immune response.

such substance usually protein in nature and of high M.W

Antibody:

it is protein produced by animal immunological system in response to exposure to foreign bodies.

Vaccine:

suspension of live attenuated, inactivated or killed microorganism or its products which administered in routine manner for prevention or control of infectious disease.

Colostrum:

is the first milk produced by female immediately after giving birth to young.

It is very rich in ferrous and antibodies.

Epidemiology

It is the science which dealing with study of the health status & disease frequency in a population including all factors etiology, establishment & spreading of diseases in animals population.

Purposes of epidemiology:

- Determination the extent of a problem (animals affected, location and time of outbreak).
- Identification of etiologic agents and their distribution.
- Control measures

  Diseased animals: Exootic & notifiable diseases slaughter of all animals under complete hygienic measures. Endemic, quarantine and treatment.

  Healthy animals: vaccination

Mode of transmission:

It is the mechanism or the way by which an infectious agent is transferred from reservoir to susceptible host.

2 main modes Horizontal & vertical

I. Horizontal transmission → direct
- indirect
- Air born infection

II. Vertical transmission →
- trans ovarian
- trans placental
- trans clostral

I. Horizontal transmission

1- Direct Horizontal transmission

Transfer of an infectious agent or its secretion from an infected individual to susceptible host either by:

- **actual direct contact with infected animal.**
- **Indirect contact with contaminated fomites.**
- **direct aerosol inhalation during sneezing or coughing of infected animals.**

2- Indirect Horizontal transmission

A) Vehicle born transmission:

passage of infectious agent from reservoir into susceptible host through

- **the medium of inanimate substances or fomites as soil, dust, food &water through, bedding or surgical utensils.**
- **Biological materials as, serum, plasma, whole blood, milk, semen & other biologicals.**

The agent may or may not have multiplied or developed in or on the vehicle before being transmitted.

B) Vector born transmission:

Means transmission of infectious agent between animals through the non vertebrate host as insects vectors (fly. mosquitoes & ticks) either mechanically or biologically.

- Mechanical transmission: transmission of infectious agent without any multiplication EX: EIA
- Biological transmission: replication of infectious agent inside the vector before being transmitted. EX: AHS, EE & Babesiosis

3- Air-born transmission:

Means passage of infectious agent between animals through the inhalation of droplets nuclei (1-100 um size).

come directly from infected animal through cough or sneezing or inhalation of small residues which results from evaporation of droplets that remains suspended in the air or enclosed animal house.

II. Vertical transmission :

Transfer of infectious agents from parents to offspring through placenta or udder. It may be:-

1. Transovarian:-

Commonly occurs between generation of invertebrate host through eggs. EX. Babesia inside ticks.

2- trans placental

Transfer of infectious agents from parents to offspring through uterus during pregnancies, EX: BVD-MD.

3- trans clostral

Transfer of infectious agents from parents to offspring through colostrum or milk, Ex: Ascariasis.

Rates commonly used in Epidemiology

$$\text{Incidence rate} = \frac{\text{No. of new cases manifesting the disease during a certain period of time}}{\text{No of animals at risk during the same period}} \times 100$$

$$\text{Prevalence rate} = \frac{\text{No. of new \& old cases manifesting the disease during a period of time}}{\text{No of animals at risk during the same period}} \times 100$$

Morbidity rate=

$$\frac{\text{No. of animals manifesting the disease}}{\text{No of animals at risk}} \times 100$$

Mortality rate=

$$\frac{\text{No. of dead animals}}{\text{No of animals at risk}} \times 100$$

Case fatality rate=

$$\frac{\text{No. of dead animals}}{\text{No of diseased animals}} \times 100$$

$$\textbf{Sensitivity} = \frac{\text{True positive}}{\text{True positive + False negative}} \textbf{X100}$$

$$\textbf{Specifity} = \frac{\text{True negative}}{\text{False positive + True negative}} \textbf{X 100}$$

In Iunuary 2016 equine stable was visited when disease was already present , the herd was then observed for the following year and found that:

Total size in first vist was 500 racing horse
Total No of clinically ill was 70
Total NO. of developing disease between J.2016- J.2017 was 90
Total No of dead animals was 35