

Biosecurity:

Routes of Disease Transmission



Understanding how pathogens can move from animal to animal or location to location can help determine biosecurity needed to prevent the further spread of disease.

Animal Disease Transmission

- **Animal to Animal**
- **Environment** (soil, water feed, vectors)
- **Animal to Human** (Zoonotic disease)
- **Human to Animal**

Routes of Disease Transmission

- **Direct contact:** Infected animal in contact with susceptible animal
 - Body fluids (urine, feces, saliva, blood)
 - Tissues (lesions, carcass, parturition)
 - Breeding or mother-to-offspring
- **Aerosol:** Disease agents contained in droplets spread through the air
 - Most are not stable and require close proximity
 - Exposure: enclosed barns, coughing, sneezing, contaminated soil or dust
- **Ingestion:** Food or water contaminated with feces, urine, saliva
 - Licking/chewing contaminated environment
 - Shared feed or water sources
- **Fomites:** Contaminated inanimate objects (e.g., equipment, vehicles, clothing)
- **Vector:** Living organism that can transfer disease between animals (mosquitoes, biting midges, rodents)

Points to Remember

- **Transmission routes vary with disease**
- **Animals may not show obvious signs of disease**
- **Some pathogens can persist in the environment**

Biosecurity for Transmission Routes

- **Prevention: Direct Contact**
 - Increase distance between sick and well animals
 - Use dedicated equipment to prevent spread from isolation areas
 - Cleaning and disinfection

- **Prevention: Aerosol**

- Provide adequate ventilation and fresh air
- Decrease humidity and odor build up
 - Affects droplet formation and persistence
- Control dust
 - Wear respiratory protection

- **Prevention: Ingestion**

- Keep feed and water clean
- Prevent rodent and bird access
- Proper waste management
- Clean and disinfect

- **Vector control**

- Source reduction/habitat elimination
- Parasitic or predatory insects
- Insecticides
- Minimize interaction with insects
 - Sheltering of animals

- **Personal Protective Equipment (PPE)**

- Gloves
 - Barrier between you and the disease
 - Wash hands after removing gloves
- Coveralls, footwear
- Respiratory and eye protection

Additional Resources

USDA Foreign Animal Disease Preparedness (FAD PrEP) Guidelines: Biosecurity
http://www.aphis.usda.gov/animal_health/emrs/nahems.shtm

Just-In-Time training presentations
<http://www.cfsph.iastate.edu/Emergency-Response/just-in-time-training.php>

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