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)

**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

**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

**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

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Just-In-Time training materials can be found at http://www.cfsph.iastate.edu/Emergency-Response/just-in-time-training.php