



Biosecurity



Routes of Disease Transmission

KANSAS STATE UNIVERSITY
College of Veterinary Medicine

Disease Transmission




- Sources
 - Animal to animal
 - Environment
 - soil, water, feed
 - vectors
 - Animal to human
 - Zoonotic
 - Human to animal

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Routes of Transmission


- Direct contact
- Inhalation (Aerosol)
- Oral/Ingestion
- Fomites
 - Inanimate objects
 - Equipment, boots, vehicles
- Vectors
 - Mosquitoes, ticks, biting midges
 - Rodents or birds

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Direct Transmission


- Susceptible animal comes in contact with infected animal
- Body fluids
 - Urine, feces
 - Saliva
 - Blood, milk
- Tissues
 - Lesions
 - Carcass
- Breeding
- Mother-to-offspring



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Aerosol Transmission


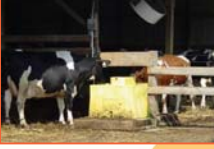
- Disease agents contained in droplets
 - Pass through air
- Most agents not stable in droplets
- Close proximity required
 - Enclosed barns
 - Coughing, sneezing
 - Contaminated soil
 - Birthing tissues
 - Feces, urine



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Oral Transmission



- Ingestion of contaminated feed or water
 - Feces, urine
 - Saliva
 - Milk
- Licking/chewing contaminated environment
- Shared feed or water sources

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Fomite Transmission




- Contaminated inanimate object
- Carries pathogens to other animals
 - Needles, balling guns
 - Buckets
 - Bedding, shovels
 - Vehicles, trailers
 - Humans, clothing

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Vector Transmission


- Living organism transfers disease between animals
 - Mosquitoes
 - Ticks
 - Biting midges
 - Flies
- Acquires pathogen from one animal
- Transmits to another animal

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Points to Keep in Mind

- Transmission routes vary with disease
 - Multiple routes
 - Single route
- Animals may not show obvious signs of disease
- Persistence in environment
 - Soil, manure, water



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Biosecurity Measures for Transmission Routes

Route of Transmission	Possible Biosecurity Measures
Direct Contact	Isolation of infected animals; personal protective equipment
Fomites	Cleaning and disinfection procedures; personal protective equipment
Aerosol	Isolation of infected animals; personal protective equipment
Ingestion	Cleaning and disinfection procedures
Vectors (e.g., insects)	Pest management procedures

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Prevention: Direct Contact



- Isolation/quarantine
 - Increase distance between sick and well animals
- Dedicated equipment to prevent spread from isolation area
- Cleaning and disinfection



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Prevention: Aerosol



- Adequate ventilation
 - Provide fresh air to all animals
 - Decrease humidity and odor build up
- Control dust
 - Wear respiratory protection in certain situations

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Prevention: Ingestion


- Keep feed and water clean
- Prevent rodent and bird access
- Proper waste management
 - Keep environment clean and dry
- Cleaning and disinfection

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Prevention: Vector Control


- Source reduction
 - Habitat reduction/elimination
 - Parasitic or predatory insects
- Control adults
 - Insecticides
 - Knockdown and residual sprays
 - Baits, fly traps
- Minimize interaction
 - Sheltering of animals



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Personal Protective Equipment

- Gloves
 - Creates barrier between you and pathogen
 - Especially hands with cuts, abrasions, chapped
 - Wash hands after removing gloves
- Coveralls, footwear
- Respiratory and eye protection




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Additional Resources

- USDA Foreign Animal Disease Preparedness (FAD PReP) Guidelines: Biosecurity
 - http://www.aphis.usda.gov/animal_health/emrs/naheems.shtml
- Just-In-Time training presentations
 - <http://www.cfsph.iastate.edu/Emergency-Response/just-in-time-training.php>

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