B-6199
06/08

General Biosecurity

for Livestock and Poultry Producers

Texas A&M University
College of Veterinary Medicine & Biomedical Sciences

AgriLIFE EXTENSION
Texas A&M System

FAZD Center
National Center for Foreign Animal and Zoonotic Disease Defense

General Biosecurity for Livestock and Poultry Producers

Senior Author

Angela I. Dement
Extension Assistant for Veterinary Medicine
Texas A&M System

Co-Authors

Teri J. Antilley
Extension Program Specialist
Texas A&M System

Jason J. Cleere
Assistant Professor and
Extension Beef Cattle Specialist
Texas A&M System

B. Frank Craddock
Professor and Extension
Sheep and Goat Specialist
Texas A&M System

Brandon J. Dominguez
Research Associate
and Veterinary Epidemiologist
Texas A&M System

Morgan B. Farnell
Assistant Professor and
Extension Poultry Specialist
Texas A&M System

Stephen P. Hammack
Webmaster Administrator
Texas A&M System

Ellen Jordan
Professor and Extension
Dairy Specialist
Texas A&M System

Joe C. Paschal
Professor and Extension
Livestock Specialist
Texas A&M System

Brett D. Scott
Assistant Professor and
Extension Horse Specialist
Texas A&M System

Jodi A. Sterle
Associate Professor and
Extension Swine Specialist
Texas A&M System

Floron C. Faries, Jr.
Professor and Extension Program
Leader for Veterinary Medicine
Texas A&M System

Editor

Judy Winn
Professor and Extension
Communications Specialist
Texas A&M System

This publication is sponsored by the National Center for Foreign Animal and Zoonotic Disease Defense and published by the Department of Agricultural Communications, Texas A&M System.

Foreword

This biosecurity manual is a compiled review of the literature for use by anyone involved in animal agriculture. It is intended to help producers develop or enhance biosecurity practices for preventing the introduction and spread of animal diseases. The general section is followed by a list of diseases that are of primary concern.

This publication was made possible by a grant from the National Center for Foreign Animal and Zoonotic Disease Defense, an academic center of excellence at Texas A&M University under the U.S. Department of Homeland Security. The conclusions are those of the authors and not necessarily the sponsor.

General Biosecurity Practices for Livestock and Poultry Operations

The animal agriculture industry in the United States has a significant economic impact on the country, so biosecurity is important to everybody. Biosecurity can be defined as those management practices that prevent infectious diseases from being introduced into or spread among a herd or flock. In order to achieve high health status within your herd or flock, biosecurity practices should be evaluated routinely. This publication

- discusses the importance of biosecurity
- defines the types of diseases and their epidemiology
- summarizes the role of immunity in preventing disease
- outlines general and specific biosecurity practices that can be implemented

Phases of Biosecurity

Biosecurity has four sequential phases: mitigation, preparedness, response and recovery.

Mitigation means making something less dangerous or harmful. One can think of mitigation as a type of prevention. Mitigation practices help secure facilities/premises against infectious diseases.

Preparedness includes planning, training for and implementing mitigation practices to ensure their usefulness. There are many ways to protect a premises, but they may not all be useful or cost-effective. For this reason, producers should analyze the weaknesses and strengths of their operations to determine the most effective ways of protecting them.

The *response* phase involves reacting to and handling a disease outbreak efficiently and effectively. The first 24 hours of a disease outbreak are crucial. Immediately report any abnormal health issues (massive die-offs, unusual symptoms including but not limited to blisters on the nose, mouth and teats, etc.) to a veterinarian or to state/federal animal health regulatory officials. The more rapidly a diagnosis is made and quarantine zones are established, the more likely it is that the spread of the disease to other animals and premises can be controlled.

Neither state nor federal animal health regulatory agencies charge producers or local veterinarians to investigate a possible disease outbreak. When these agencies respond, the officials involved will be responsible for determining quarantine areas, collecting and submitting appropriate samples for testing, and determining the appropriate fate of the diseased animals.

The *recovery* phase occurs when premises and facilities are restored to an acceptable operational level. Once a disease outbreak has been either eradicated or brought under control, the recovery phase begins. Recovery practices might include covering pits, sampling ground water and disinfecting premises. Authorities determine what needs to be done before facilities are repopulated to ensure that there is no recurrence of the disease.

The biosecurity practices in each phase rely on one another. After recovery, the process cycles back to mitigation so that areas that might need some attention can be improved. This constant cycle helps ensure that infectious diseases are prevented, controlled or eradicated.

Types of Diseases

Before discussing why biosecurity practices are important in disease prevention, the different classes of diseases should be identified. Diseases are defined as either foreign, emerging or endemic. They can also be labeled as zoonotic.

A "foreign animal disease" (FAD) is one that is not currently found in the U.S. Federal and state animal health regulatory agencies are carefully monitoring these diseases to ensure that if they occur, they will be promptly identified, controlled and eradicated. FADs have the potential to cause devastating social and economic effects.

Emerging/endemic diseases are either new to the U.S. or new forms of old diseases that are becoming more prevalent. The emergence of an animal disease may be related to animal movement in commerce, mutation of disease-causing agents, or changes in environmental conditions.

Once a disease is identified as either foreign or emerging/endemic, it can be further classified by its zoonotic potential. A zoonotic disease is one that is shared between animals and people. Several foreign and endemic animal diseases are considered to be zoonotic and can be a potential threat to human health. For this reason, the Department of State Health Services is ready to be called into action to help control disease transmission to people.

Foreign, emerging and endemic diseases are infectious. An infectious disease, as the name implies, is caused by a pathogen that can invade (infect) and then multiply in a susceptible animal. Infectious disease pathogens include bacteria, protozoa, viruses, fungi and rickettsiae (e.g., anaplasmosis in cattle). These organisms enter the body of a susceptible animal (one with the potential to become infected) and cause an illness in that animal. Examples of noninfectious disorders are those caused by toxins (chemical poisoning) or by the malfunctioning of the body (as in nutritional disorders).

Epidemiology of Diseases

Disease transmission

Epidemiology is the study of the way disease is distributed in populations and the factors that influence or determine the distribution. There are two primary means of disease transmission—direct and indirect.

Direct transmission occurs when a susceptible animal comes in direct or close contact with an infected, contagious animal and is exposed to its respiratory air droplets; saliva; nasal, ocular or genital mucus; fetal fluids; feces or urine; milk; skin; or blood. Prenatal and venereal routes also are direct means of disease transmission.

Indirect transmission occurs when animals come in contact with infected or contaminated inanimate vehicles, environmental fomites and animate vectors. Inanimate vehicles that carry disease agents include needles, balling guns, dehorners, trucks, trailers, tires, shovels, wheelbarrows, etc. Environmental fomites are contaminated soil, food, water and other objects. People are animate vectors when they carry pathogens on their clothing, shoes and hands between animals and operations. Other animate vectors are arthropods (ticks, flies, mosquitoes, fleas) that transmit a pathogen from an infected animal to a susceptible animal.

There are two types of vector transmission—biological and mechanical. A biological vector is an organism that is needed for the life cycle of the pathogen. Arthropods can be biological vectors

when a disease agent multiplies or develops in the arthropods before infecting susceptible animals. Most biological vectors are considered to be persistently infected. A mechanical vector carries the pathogen but the pathogen is not altered while on the vector. Arthropods, wild and domestic animals and people can be mechanical vectors.

With direct and indirect transmission, there are five primary routes by which pathogens can enter susceptible animals—aerosol inhalation, skin contact, oral, reproductive and blood.

Aerosol inhalation occurs when pathogens are carried in tiny moisture droplets in the air. The moisture droplets come from respiration, sneezing or coughing. Because the concentration of aerosol pathogens decreases with distance from an infected animal, susceptible animals should be kept apart from infected animals.

The oral entry route is illustrated by susceptible animals consuming disease-causing pathogens in contaminated fomites (soil, food, water) or licking or chewing on contaminated objects in the environment. Nursing animals that drink the milk of infected dams may be infected in this way. Because manure and urine play a major role in contaminating the environment, it is important to routinely dispose of manure, disinfect feed and water troughs, and remove objects that animals might chew or lick.

With the skin contact route, the pathogen infects the skin or enters through breaks in the skin and then causes a systemic infection in the body.

The reproductive route is a type of direct contact because it occurs during mating (venereal) or *in utero* (transplacental). When a disease enters by the reproductive route it infects the genital organs of adults and the fetuses and placentas of pregnant dams.

A disease enters by the blood route when an animal is bitten by an infected vector (arthropod) or infected by a contaminated vehicle (needle, nose tongs, ear notcher, dehorner, balling gun).

Immunity

Immunity determines how animals are protected from contracting a disease. Immunity is an animal's ability to resist a particular disease by preventing the pathogen from developing or by counteracting the effects of its products (toxins). Animals immune to a specific pathogen have chemical substances called antibodies that attack and destroy the pathogen before it causes illness. Antibodies are specific for the pathogen they protect against. There are three types of immunity: natural, active and passive.

Natural immunity exists without exposure to a disease agent. The body has many defenses, including the skin and nasal passages, to keep disease pathogens out. There are also cells in the body that attack foreign organisms that could cause disease.

Active immunity is acquired through vaccination or when the body battles an infection. A vaccine stimulates the production of antibodies without the animal actually acquiring the disease. Active immunity decreases over time and boosters are needed to maintain it.

Passive immunity is acquired when antibodies are passed from one animal to another. This occurs when antibodies are transferred *in utero* from the dam to the fetus, or when a newborn animal drinks colostrum. Since antibodies are large molecules, their ability to cross the placenta varies with species. In fact, some types of placentas are impenetrable to antibodies. In those species, newborns must receive colostrum (about 10 percent of their body weight) within 24 hours of birth to acquire

the antibodies. After 24 hours, an animal's simple stomach matures and antibody molecules are too large to be absorbed across the epithelium.

Vaccinations

Vaccines are preparations of either killed pathogens or modified living organisms. Modified live vaccines are disease pathogens that have been altered so they stimulate immunity but do not cause disease. When an animal is vaccinated the body makes antibodies to combat the introduced foreign material. If exposed to the disease later, the body recognizes the disease agent and rapidly produces more antibodies, to supplement those it already has, to combat the disease.

Vaccines are effective in preventing certain diseases in livestock and poultry. However, it is important to remember that vaccines are not 100 percent effective. By law, all vaccines must come with instructions on their proper usage. Some vaccines require only a one-time injection, while most require that the first injection be followed by a second one 3 to 6 weeks later and that the animal have an annual booster after that. Without annual boosters the animal loses its immunity to the disease and again becomes susceptible. For best protection, animals must be vaccinated before, not after, they are exposed to a particular disease. A veterinarian should be consulted about the proper timing of vaccinations as part of an overall herd/flock health management plan.

Vaccine failures

Vaccines are fragile and must be handled according to the manufacturer's label directions. Otherwise, they lose their effectiveness and do not provide any immunity to the animals. When handling and working with vaccines follow these guidelines:

- Before vaccinating animals, consult a veterinarian and **read the label and/or package insert.**
- Note the expiration date and the instructions for storing the vaccine properly. Vaccines are fragile. Handle them with care.
- Most vaccines must be refrigerated during storage and use to remain effective. Keep refrigerator temperature at 36 to 46 °F.
- Even if vaccines or other medicines do not require refrigeration, store them out of direct sunlight in a controlled environment.
- Give the right vaccine to the right species of animal. If the label indicates it is for use in cattle, do not use it in swine. This is an off-label use and it is illegal.
- Give the proper dosage, in the recommended area on the animal, using the recommended technique (IM or SQ).
- Once a vial is open, do not insert a used needle back into the bottle. Always enter the bottle with a clean needle or a transfer needle.
- Use a clean needle for each animal. This prevents disease transmission among a herd.
- When finished vaccinating for the day, properly dispose of the remaining vaccine. It does not keep well once the vial seal has been punctured. Once a vaccine vial is opened, the expiration date is void.
- Do not use chemical sterilants to disinfect syringes for modified live vaccines.
- Properly dispose of used needles in a puncture-proof (sharps) container.
- Give boosters when a label requires it.

General Biosecurity Practices

Not all biosecurity practices will be feasible (or necessary) for everyone to implement. Producers must assess their risks when deciding which biosecurity practices to adopt. Below are some general practices that cover all commodities in the animal industry.

Disease risk assessment

- Prioritize diseases that are the greatest risk to the operation.
- Determine the cost/benefit ratio of biosecurity for your operation.
- Identify how the transmission or introduction of disease on your premises could occur.
- Consult with a veterinarian to implement vaccination and other herd/flock health management strategies.

Visitors

- Designate one area on your premises where visitors enter and congregate without coming into contact with animals, equipment or barns.
- Limit the number of people who enter your premises and keep a log of all people who come and go, including consultants, salesmen, deliverymen, maintenance workers and veterinarians.
- Require that oilfield, power, pipeline and seismic crew vehicles be cleaned and disinfected before entering or leaving your property.
- Know where people have recently been before you allow them on your premises.
- Ask visitors to log any animal contact they have had in the last 48 hours.
- Keep feed and other products away from visitors and monitor it closely.
- Require proper identification of all visitors.
- If foreign visitors are expected, determine how many days they have been in the U.S. and ensure that they have had no animal contact. Require that they have been in the U.S. for at least 5 days.
- Provide tire disinfectant baths or sprays for visiting vehicles.
- Provide disposable boots or disinfectant footbaths for visitors at entry.
- Never allow visitors unlimited access to your premises and facilities.
- Do not allow people who own other animals to come into physical contact with your animals.

Owner practices

- Keep a clean pair of shoes to wear only around your animals on one premises. If you have multiple premises, have shoes that stay at each one. If you have only one pair, thoroughly clean/disinfect those shoes before traveling to another premises. Insist that all personnel who work with you adopt the same practice.
- Carry disposable boots if you visit other premises and dispose of them before leaving that site.
- Wash your hands for at least 20 seconds with soap and water before touching any animals. If you do not have access to soap and water, use a gel that is at least 60 percent alcohol.
- If you have been off-site, change clothes (including footwear) before visiting your own animals.
- Provide disinfectant footbaths and tire baths for your employees to walk and drive through.
- Spray a disinfectant on your tires before leaving or re-entering your premises.

- Wash out and disinfect trailers before returning to your premises.
- Always clean and disinfect any vehicles that you use to transport or haul animals, especially those that transport market animals to processing facilities.
- Disinfect reusable equipment (tatooers, nose tongs, hoof tools, implant guns, ear notchers, side cutters, etc.) between animals.
- Clean and disinfect all feed delivery equipment between deliveries and between farms.
- Don't place feed on the ground. Use hay troughs, racks or feed bunks/troughs.
- Test bulk feed (corn and whole cottonseed) for mycotoxins.

Security

- Keep doors and gates locked at all times.
- Post "No Trespassing" signs around your premises and "Do Not Enter" signs outside all buildings. Replace/repair signs as needed.
- Conduct random security checks of your premises. Look for signs of unauthorized activity or entry.
- Around barns, houses and facilities, remove shrubs and other objects where people or unwanted animals could easily hide. You want things to be out in the open and not concealed.
- Keep areas around and inside buildings well lit. Install backup lighting to use in the event of an emergency.
- Install alarms, motion detector lights, cameras and other security equipment to ensure the safety of the premises.
- Maintain good perimeter fences. Remember that "Good Fences Make Good Neighbors."
- Have an outer perimeter fence and an additional fence 15 to 20 feet inside boundaries. This helps control aerosol transmission between pastures.
- Secure hazardous materials (pesticides and fertilizers), feed and nutrients.
- Secure water sources, such as wells, and identify alternative sources in the event you need a backup.
- Maintain an accurate and up-to-date inventory of anhydrous ammonia, ammonium nitrate, bulk urea, pesticides, herbicides and other hazardous materials.
- Secure storage areas for hazardous chemicals and drugs according to state and national codes. Lock the chemical containers in these storage areas even if they are empty.
- Install locks on all doors, including the ones that secure the water supply, chemicals, equipment and other supplies. A deadbolt lock with a minimum 1.5-inch throw is recommended.
- Inventory farm vehicles and equipment regularly.
- Lock all vehicles left outside.
- Ask feed suppliers about their sources, the precautions they take to ensure feed is not contaminated, and how they manage pests.
- Clean all feed storage facilities (silos, bins, etc.) before restocking them with feed.
- Clean and disinfect all feed delivery equipment between deliveries and between farms.
- Require all suppliers of feed and other products to have procedures for preventing contamination and controlling pests.

Livestock and poultry

- Vaccinate animals regularly to increase protective immunity.
- Maintain a tracking system with current records of all your animals.
- Isolate new animals from the rest of your herd or flock for at least 2 weeks (preferably 8 weeks or 60 days for swine operations). During this time, watch them closely for symptoms of illness, unusual maggots, abnormal behavior, etc. Test the animals for known diseases of concern. Avoid contact between these animals and the primary herd/flock.
- Look for unusual signs in your herd/flock, such as odd behavior; sudden and unexplained deaths; large numbers of sick animals; unusual ticks or maggots; blisters around an animal's nose, teats, mouth or hooves; difficulty rising and walking; partial to complete drop in milk production; or a large number of dead insects, rodents or wildlife. Contact your veterinarian immediately if any of these occur.
- When possible, exclude wildlife (especially feral swine) from the premises.
- Identify animals clearly.
- Develop a carcass disposal plan that designates approved burial sites and has recommended transportation routes as well as composting and incineration plans.
- Remove animals that are "reservoirs" for certain diseases such as Johne's disease from your herd/flock. These animals continue to shed the pathogen and infect other animals on your premises.
- Clean and disinfect any feed or water source that becomes contaminated with feces or urine.

Transporting livestock and poultry

- Use a disinfectant to kill viruses and bacteria. A common disinfectant is bleach. A mixture of one part bleach to 32 parts water (½ cup bleach to 1 gallon water) is sufficient. A pump-up sprayer is ideal for applying disinfectant in most situations. Mix a new batch every few days.
- Instruct people cleaning and disinfecting trailers to wear clean, waterproof clothing and boots.
- Sweep out trailers to remove loose dirt, hay and grain, cobwebs, trash or debris. If mats are in the trailer, remove them and sweep under them as well.
- Remove mud and manure by scraping or scrubbing both the interior and exterior of the trailer, truck and equipment, before disinfecting.
- Remove all feeders, panels and grooming or cleaning equipment so the trailer can be cleaned thoroughly.
- Soak and wash vehicles and equipment using water and detergent or disinfectant. Use a brush or pressure washer if necessary to remove all debris.
- When washing the outsides of vehicles and trailers, start at the top and front and work from top to bottom and front to back. This helps wash pathogens out of the vehicle.
- Wash the wheels, wheel arches, mudguards and undercarriages of vehicles and trailers.
- When washing the insides of vehicles and trailers, start with the ceiling and work down the walls and to the floor. Begin at the front of the trailer and work toward the back.
- Clean and disinfect tail gates, lifts and ramps.

- Wash and disinfect mats in trailers and vehicles, as well as foot pedals in vehicles.
- Leave disinfectants on surfaces for 20 to 30 minutes, or as directed on the product label, to kill all pathogens.
- Rinse vehicles, trailers and equipment thoroughly to remove detergents and debris. Allow everything to dry completely.

Vectors

- Control pests (rodents, ticks, insects and birds) and limit their access to feedstuffs.

Employees

- Train employees to report sick animals, suspicious activity or people, and unusual events.
- Keep keys in a safe place and have employees check them in and out as needed.
- After foreign travel, employees should not return to work for 3 days.
- Insist that employees who have animals at home follow proper biosecurity procedures.
- Conduct safety and security meetings with all people who work or live on the premises.

General

- Get to know your neighbors and set up a crime watch program.
- Don't advertise when you will be away from your premises.
- Communicate with local law enforcement agencies and request that they randomly drive by your premises and look for unusual behavior.
- Create an emergency contact list that includes names and phone numbers of people in the community. Post copies of this list near telephones and on bulletin boards. Have employees put these numbers into their cell phones.
- Make sure critical information is readily accessible to any first responders who might be called to the scene. Such information could include maps of the premises, types and locations of chemicals, an inventory of animals, etc.
- USDA recommends having a facility map that includes emergency contacts and other information that could be critical for first responders, including:
  - The name, address and phone number(s) of the owner.
  - The relationship of the farm to adjacent fields and structures.
  - A site map with buildings/structures labeled and numbered, including houses, barns, greenhouses, nurseries, shops, outbuildings, silos, grain bins, and chemical and fertilizer storage/pits (indicate sizes and locations of entrances).
  - Transportation routes, including access roads, highways, crossroads, etc.
  - Storage areas for machinery, equipment and airplanes.
  - Fences and gates (indicate dimensions).
  - Well and/or municipal water supply, hydrants, ponds, streams, rivers, lakes and wetlands.
  - Electric, gas and phone lines and shutoff locations.
  - Septic tanks, wastewater systems and cisterns.
  - Drainage ditches, culverts and surface drains.
  - Fields/pastures.
  - Fuel storage tanks.
  - Areas where animals and/or crops of concern are located. Include the average number of animals housed in these locations.

Identification of Various Diseases

Diseases are categorized as foreign, emerging or endemic diseases. Discuss with your veterinarian the diseases in this list, and find out the risk of having these diseases in your operation.

Foreign Animal Diseases

African Swine Fever

Species: Swine
Disease-causing organism: Virus
Mode of transmission: Oral, vector and inhalation
Symptoms: Fever, lesions, vomiting, bleeding from nose and rectum, abortions and death
Vaccine: No
Treatment: No
Zoonotic: No
http://aevm.tamu.edu

Avian Influenza (High Path)

Species: Poultry
Disease-causing organism: Virus
Mode of transmission: Oral and inhalation
Symptoms: Cyanosis and edema of head, comb and wattle; greenish diarrhea; and discoloration of shanks and feet due to hemorrhages
Vaccine: Yes, requires approval of USDA
Treatment: No
Zoonotic: Possibly
http://aevm.tamu.edu

Bovine Spongiform Encephalopathy (BSE)

Species: Cattle
Disease-causing organism: Prion
Mode of transmission: Oral
Symptoms: Incoordination, abnormal posture and change in temperament
Vaccine: No
Treatment: No
Zoonotic: Associated with new variant—Creutzfeldt-Jakob Disease
http://aevm.tamu.edu

Classical Swine Fever

Species: Swine
Disease-causing organism: Virus
Mode of transmission: Oral and inhalation
Symptoms: Fever, diarrhea, convulsions, generalized vasculitis, anorexia and death
Vaccine: Yes, emergency vaccination
Treatment: No
Zoonotic: No
http://aevm.tamu.edu

Exotic Newcastle Disease

Species: Poultry
Disease-causing organism: Virus
Mode of transmission: Oral and inhalation
Symptoms: Coughing, tremors, paralyzed wings and watery, greenish diarrhea
Vaccine: Yes
Treatment: No
Zoonotic: Yes
http://aevm.tamu.edu

Foot and Mouth Disease

Species: Cattle, goats, sheep and swine
Disease-causing organism: Virus
Mode of transmission: Oral and inhalation
Symptoms: Blisters or erosions on mouth, lips, tongue, hooves and teat
Vaccine: Yes, emergency vaccination
Treatment: No
Zoonotic: No
http://aevm.tamu.edu

Rift Valley Fever
Species: Cattle, goats and sheep
Disease-causing organism: Virus
Mode of transmission: Vector (mosquitoes)
Symptoms: Fever, anorexia, evident abdominal pain, jaundice, nasal discharge, excessive salivation, abortions and diarrhea
Vaccine: No
Treatment: No
Zoonotic: Yes
http://aevm.tamu.edu

Swine Vesicular Disease
Species: Swine
Disease-causing organism: Virus
Mode of transmission: Oral and inhalation
Symptoms: Vesicles on feet, snout and in the mouth—similar to FMD
Vaccine: No
Treatment: No
Zoonotic: No
http://aevm.tamu.edu

Venezuelan Equine Encephalomyelitis (VEE)
Species: Horses
Disease-causing organism: Virus
Mode of transmission: Vector (mosquitoes)
Symptoms: Stiffness, tremors, seizures, paralysis, colic and diarrhea
Vaccine: Yes
Treatment: Yes
Zoonotic: Yes
http://www.merckvetmanual.com

Emerging/Endemic Diseases

Anthrax
Species: Cattle, horses, sheep, goats and swine
Disease-causing organism: Bacterium
Mode of transmission: Oral, inhalation and vector
Symptoms: Staggering, trembling, collapse, terminal convulsions, bloody discharges from orifices and death
Vaccine: Yes
Treatment: Yes
Zoonotic: Yes
http://aevm.tamu.edu

Botulism
Species: Horses, cattle, sheep, goats, swine and poultry
Disease-causing organism: Bacterial toxin
Mode of transmission: Oral
Symptoms: Paralysis, weakness and tremors
Vaccine: Yes
Treatment: Yes
Zoonotic: Yes
http://aevm.tamu.edu

Bovine Brucellosis
Species: Cattle
Disease-causing organism: Bacterium
Mode of transmission: Oral and reproductive
Symptoms: Abortions, still births and weak calves
Vaccine: Yes
Treatment: No
Zoonotic: Yes
http://aevm.tamu.edu

Bovine Coronavirus Enteritis
Species: Cattle
Disease-causing organism: Virus
Mode of transmission: Oral
Symptoms: Dark green to black mucoid diarrhea
Vaccine: No

Treatment: Yes
Zoonotic: No
http://www.merckvetmanual.com

Bovine Leukosis
Species: Cattle
Disease-causing organism: Virus
Mode of transmission: Vector, vehicle, reproductive and oral (milk)
Symptoms: Enlarged lymph nodes
Vaccine: No
Treatment: No
Zoonotic: No
http://www.merckvetmanual.com

Bovine Neosporosis
Species: Cattle
Disease-causing organism: Protozoan
Mode of transmission: Oral and reproductive
Symptoms: Abortions
Vaccine: Yes
Treatment: No
Zoonotic: No
http://www.merckvetmanual.com

Bovine Trichomoniasis
Species: Cattle
Disease-causing organism: Protozoan
Mode of transmission: Reproductive
Symptoms: Infertility and abortions
Vaccine: Yes
Treatment: No
Zoonotic: No
http://aevm.tamu.edu

Bovine Tuberculosis
Species: Cattle
Disease-causing organism: Bacterium
Mode of transmission: Inhalation
Symptoms: Lesions in organs and body cavities and chronic emaciation
Vaccine: No
Treatment: No
Zoonotic: Rarely
http://aevm.tamu.edu

Bovine Vibriosis
Species: Cattle
Disease-causing organism: Bacterium
Mode of transmission: Reproductive
Symptoms: Abortions and infertility
Vaccine: Yes
Treatment: Yes
Zoonotic: No
http://aevm.tamu.edu

Bovine Viral Diarrhea (BVD)
Species: Cattle
Disease-causing organism: Virus
Mode of transmission: Oral and reproductive
Symptoms: Severe diarrhea, fever and abortions
Vaccine: Yes
Treatment: Yes
Zoonotic: No
http://www.merckvetmanual.com

Caseous Lymphadenitis
Species: Sheep and goats
Disease-causing organism: Bacterium
Mode of transmission: Gains entry though break in skin
Symptoms: Swelling of superficial lymph nodes
Vaccine: Yes
Treatment: Yes
Zoonotic: No
http://www.merckvetmanual.com

Chlamydia (Enzootic Abortion of Ewes)
Species: Sheep
Disease-causing organism: Bacterium
Mode of transmission: Vector, vaginal and uterine secretions
Symptoms: Abortions, stillbirths, weak kids and lambs, neonatal pneumonia
Vaccine: Yes
Treatment: Yes
Zoonotic: Yes
http://www.merckvetmanual.com

Circovirus Disease
Species: Swine
Disease-causing organism: Virus
Mode of transmission: Oral, inhalation and reproductive
Symptoms: Stillbirths, mummies, anorexia, agalactia and chronic pneumonia
Vaccine: Yes
Treatment: No
Zoonotic: No
http://www.merckvetmanual.com

Coccidiosis
Species: Poultry, sheep and goats
Disease-causing organism: Protozoa
Mode of transmission: Oral
Symptoms: Diarrhea
Vaccine: Yes
Treatment: Yes
Zoonotic: No
http://www.merckvetmanual.com

Contagious Mastitis
Species: Dairy cattle
Disease-causing organism: Bacteria
Mode of transmission: Fomite, direct contact and vector
Symptoms: Swollen, hot, hard udder and thick milk, possibly with clumps and blood
Vaccine: No
Treatment: Yes
Zoonotic: Yes
http://www.merckvetmanual.com

Cryptosporidiosis
Species: Cattle
Disease-causing organism: Protozoan
Mode of transmission: Oral
Symptoms: Diarrhea
Vaccine: No
Treatment: Yes
Zoonotic: Yes
http://www.merckvetmanual.com

Eastern Equine Encephalomyelitis (EEE)
Species: Horses
Disease-causing organism: Virus
Mode of transmission: Vector (mosquitoes)
Symptoms: Stiffness, tremors, seizures, paralysis, colic and diarrhea
Vaccine: Yes
Treatment: Yes
Zoonotic: Yes
http://aevm.tamu.edu

Equine Infectious Anemia
Species: Horses
Disease-causing organism: Virus
Mode of transmission: Vector (horsefly) and vehicle (needle)
Symptoms: Anemia, depression, weight loss and dependent edema
Vaccine: No
Treatment: No
Zoonotic: No
http://aevm.tamu.edu

Equine Influenza
Species: Horses
Disease-causing organism: Virus
Mode of transmission: Inhalation
Symptoms: Fever, cough, nasal discharge and enlarged lymph nodes
Vaccine: Yes
Treatment: Yes
Zoonotic: No
http://aevm.tamu.edu

Equine Rhinopneumonitis
Species: Horses
Disease-causing organism: Virus
Mode of transmission: Inhalation
Symptoms: Abortions, purulent nasal discharge, pneumonia and cough
Vaccine: Yes
Treatment: Yes
Zoonotic: No
http://aevm.tamu.edu

Equine Rotavirus A Enteritis
Species: Horses
Disease-causing organism: Virus
Mode of transmission: Oral
Symptoms: Diarrhea, anorexia and depression
Vaccine: Yes
Treatment: Yes
Zoonotic: Yes
http://www.merckvetmanual.com

Equine Viral Arteritis
Species: Horses
Disease-causing organism: Virus
Mode of transmission: Inhalation and reproductive
Symptoms: Serious nasal discharge and cough
Vaccine: Yes
Treatment: Yes
Zoonotic: No
http://aevm.tamu.edu

Fowl *Campylobacter Enteritis*
Species: Poultry
Disease-causing organism: Bacterium
Mode of transmission: Oral
Symptoms: Diarrhea
Vaccine: No
Treatment: Yes
Zoonotic: Yes
http://www.merckvetmanual.com

Fowl Cholera
Species: Poultry
Disease-causing organism: Bacterium
Mode of transmission: Oral
Symptoms: Fever, septicemia, depression, anorexia, diarrhea, increased respiration and death
Vaccine: Yes
Treatment: Yes
Zoonotic: No
http://www.merckvetmanual.com

Fowl Colibacillosis
Species: Poultry
Disease-causing organism: Bacterium
Mode of transmission: Oral
Symptoms: Diarrhea
Vaccine: No
Treatment: Yes
Zoonotic: Yes
http://www.merckvetmanual.com

Fowl Listeriosis
Species: Poultry
Disease-causing organism: Bacterium
Mode of transmission: Oral and vector
Symptoms: Depression, listlessness, peracute death, diarrhea and paralysis
Vaccine: No
Treatment: Yes
Zoonotic: Yes
http://www.merckvetmanual.com

Fowl Necrotic Enteritis
Species: Poultry
Disease-causing organism: Bacterium
Mode of transmission: Oral
Symptoms: Bloody diarrhea
Vaccine: No
Treatment: Yes
Zoonotic: No
http://www.merckvetmanual.com

Fowl Pox
Species: Poultry
Disease-causing organism: Virus
Mode of transmission: Vector and inhalation
Symptoms: Lesions on non-feathered regions, decreased egg production and asphyxia
Vaccine: Yes
Treatment: Yes
Zoonotic: No
http://www.merckvetmanual.com

Fowl *Staphylococcus aureus* Disease
Species: Poultry
Disease-causing organism: Bacterium
Mode of transmission: Oral
Symptoms: Lameness and infections of the navel and yolk sac
Vaccine: No
Treatment: Yes
Zoonotic: Yes
http://www.merckvetmanual.com

Fowl Typhoid
Species: Poultry
Disease-causing organism: Bacterium
Mode of transmission: Oral and reproductive
Symptoms: Diarrhea, pale birds, whitish fecal paste, dehydration and death
Vaccine: No
Treatment: Yes
Zoonotic: No
http://www.merckvetmanual.com

Gangrenous Dermatitis
Species: Poultry
Disease-causing organism: Bacteria
Mode of transmission: Oral and skin contact
Symptoms: Sudden death, depression, feather loss, necrotic skin over breast, abdomen wing tips or thighs and lethargy
Vaccine: No
Treatment: Yes
Zoonotic: No
http://www.merckvetmanual.com

Infectious Bovine Rhinotracheitis (IBR)
Species: Cattle
Disease-causing organism: Virus
Mode of transmission: Inhalation and reproductive
Symptoms: Abortions, cough, eye infection and genital infections
Vaccine: Yes
Treatment: Yes
Zoonotic: No
http://www.merckvetmanual.com

Infectious Bursal Disease (IBV)
Species: Poultry
Disease-causing organism: Virus
Mode of transmission: Oral and inhalation
Symptoms: Decreased egg production, wrinkled or misshapen eggs, cough, sneezing and facial swelling
Vaccine: Yes
Treatment: No
Zoonotic: No
http://www.merckvetmanual.com

Infectious Laryngotracheitis
Species: Poultry
Disease-causing organism: Virus
Mode of transmission: Inhalation and oral
Symptoms: Coughing, rattling, extension of neck, and sometimes a bloodstained mouth and beak
Vaccine: Yes
Treatment: No
Zoonotic: No
http://www.merckvetmanual.com

Leptospirosis
Species: Cattle, swine, sheep, goats and horses
Disease-causing organism: Bacteria
Mode of transmission: Skin contact, oral, reproductive and inhalation
Symptoms: Abortions, stillbirths, weakness, fever, anorexia, decrease in performance, jaundice and anemia
Vaccine: Yes
Treatment: Yes
Zoonotic: Yes
http://www.merckvetmanual.com

Marek's Disease
Species: Poultry
Disease-causing organism: Virus
Mode of transmission: Oral (sheds in

feather follicles)
Symptoms: Depression, unilateral leg paresis, enlarged feather follicles and distorted pupils
Vaccine: Yes
Treatment: No
Zoonotic: No
http://www.merckvetmanual.com

Mycoplasmosis
Species: Poultry
Disease-causing organism: Bacterium
Mode of transmission: Inhalation and fomite
Symptoms: Coughing, sneezing, nasal discharge, frothiness around the eyes and difficulty breathing
Vaccine: Yes with permission
Treatment: Yes
Zoonotic: No
http://www.merckvetmanual.com

Ovine Brucellosis
Species: Sheep and goats
Disease-causing organism: Bacterium
Mode of transmission: Oral and reproductive
Symptoms: Late pregnancy abortion, retained placenta, mastitis, lameness and impaired fertility in rams
Vaccine: No
Treatment: No
Zoonotic: Yes
http://aevm.tamu.edu

Parainfluenza-3 Virus (PI_3) Pneumonitis
Species: Cattle
Disease-causing organism: Virus
Mode of transmission: Inhalation
Symptoms: Cough, nasal discharge and increased respiratory rate
Vaccine: Yes
Treatment: Yes
Zoonotic: No
http://www.merckvetmanual.com

Paratuberculosis (Johne's Disease)
Species: Cattle, sheep and goats
Disease-causing organism: Bacterium
Mode of transmission: Oral
Symptoms: Diarrhea, weight loss and swelling under jaw ("bottle jaw") in cattle and poor fleece quality in sheep (can be confused with parasitism)
Vaccine: No
Treatment: No
Zoonotic: Unknown
http://aevm.tamu.edu

Porcine Reproductive and Respiratory Syndrome
Species: Swine
Disease-causing organism: Virus
Mode of transmission: Oral, inhalation and reproductive
Symptoms: Stillbirths, mummies, anorexia, agalactia and chronic pneumonia
Vaccine: Yes
Treatment: No
Zoonotic: No
http://www.merckvetmanual.com

Potomac Horse Fever
Species: Horses
Disease-causing organism: Bacterium
Mode of transmission: Oral
Symptoms: Mild colic, fever and diarrhea
Vaccine: Yes
Treatment: Yes
Zoonotic: No
http://aevm.tamu.edu

Q Fever
Species: Cattle, sheep and goats
Disease-causing organism: Rickettsial bacterium
Mode of transmission: Inhalation, reproductive and skin contact
Symptoms: Abortions
Vaccine: No
Treatment: Yes
Zoonotic: Yes
http://www.merckvetmanual.com

Rabies
Species: Cattle, horses, sheep, goats and swine
Disease-causing organism: Virus
Mode of transmission: Skin contact (bite)
Symptoms: Anorexia, apprehension, nervousness, altered temperament, hyperexcitability and death
Vaccine: Yes
Treatment: No
Zoonotic: Yes
http://aevm.tamu.edu

Salmonellosis
Species: Cattle, poultry, sheep, goats, swine and horses
Disease-causing organism: Bacteria
Mode of transmission: Oral
Symptoms: Diarrhea
Vaccine: Yes
Treatment: Yes
Zoonotic: Yes
http://www.merckvetmanual.com

***Salmonella pullorum* Disease**
Species: Poultry
Disease-causing organism: Bacterium
Mode of transmission: Through the egg, oral
Symptoms: Huddle near heat source, anorexic, weak, diarrhea, and progeny have unabsorbed yolk sacs
Vaccine: No
Treatment: No
Zoonotic: Yes
http://www.merckvetmanual.com

Scrapie
Species: Sheep and goats
Disease-causing organism: Prion
Mode of transmission: Reproductive and oral
Symptoms: Convulsions, abnormal posture, increased nervousness and excitability, change in temperament and rubbed raw areas of fleece
Vaccine: No
Treatment: No
Zoonotic: Unknown
http://aevm.tamu.edu

Soremouth (Contagious Ecthyma)
Species: Sheep and goats
Disease-causing organism: Poxvirus
Mode of transmission: Skin contact
Symptoms: Crusting lesions around mouth and nose
Vaccine: Yes
Treatment: No
Zoonotic: Yes
http://www.merckvetmanual.com

Strangles
Species: Horses
Disease-causing organism: Bacteria
Mode of transmission: Oral and inhalation
Symptoms: Abscessed lymph nodes
Vaccine: Yes
Treatment: Yes
Zoonotic: No
http://aevm.tamu.edu

Swine Brucellosis
Species: Swine
Disease-causing organism: Bacterium
Mode of transmission: Oral and reproductive
Symptoms: Abortions, stillbirths and weak pigs
Vaccine: No
Treatment: No
Zoonotic: Yes
http://aevm.tamu.edu

Swine Pseudorabies
Species: Swine
Disease-causing organism: Virus
Mode of transmission: Oral and inhalation
Symptoms: Anorexia, high piglet mortality, abortion, stillbirth and even

occasional death losses in breeding and finishing hogs
Vaccine: Yes
Treatment: No
Zoonotic: No
http://aevm.tamu.edu

Swine Streptococcal Infections
Species: Swine
Disease-causing organism: Bacteria
Mode of transmission: Oral
Symptoms: Fever, meningitis, incoordination, unusual stances, wasting, cyanosis, abortions and vaginitis
Vaccine: Yes
Treatment: Yes
Zoonotic: Yes
http://aevm.tamu.edu

Swine Vesicular Exanthema
Species: Swine
Disease-causing organism: Virus
Mode of transmission: Oral and inhalation
Symptoms: Fever; blisters on the snout, oral mucous, soles of the feet, the coronary band and between the toes—similar to FMD and SVD
Vaccine: No
Treatment: No
Zoonotic: No
http://www.merckvetmanual.com

Tetanus
Species: Horses, cattle, sheep, goats and swine
Disease-causing organism: Bacterial toxin
Mode of transmission: Skin contact and oral
Symptoms: Colic and vague stiffness
Vaccine: Yes
Treatment: Yes
Zoonotic: Yes
http://aevm.tamu.edu

Vesicular Stomatitis
Species: Cattle, sheep, goats, swine and horses
Disease-causing organism: Virus
Mode of transmission: Oral, inhalation and vector
Symptoms: Blisters and erosions in mouth, tongue, palate and lips
Vaccine: Yes, but not in U.S.
Treatment: No
Zoonotic: Yes
http://aevm.tamu.edu

Western Equine Encephalomyelitis (WEE)
Species: Horses
Disease-causing organism: Virus
Mode of transmission: Vector (mosquitoes)
Symptoms: Stiffness, tremors, seizures, paralysis, colic and diarrhea
Vaccine: Yes
Treatment: Yes
Zoonotic: Yes
http://aevm.tamu.edu

West Nile Encephalitis
Species: Horses
Disease-causing organism: Virus
Mode of transmission: Vector (mosquitoes)
Symptoms: Stumbling, fever, partial paralysis and depression
Vaccine: Yes
Treatment: Yes
Zoonotic: Yes
http://aevm.tamu.edu

References

1. American Association of Equine Practitioners. 2003. Emergency & Disaster Preparedness Guidelines. *http://www.aaep.org/pdfs/Emergency.pdf*
2. Bowman, Gary L. 2005. Biosecurity Fundamentals for Extension Personnel. Ohio State University Extension.
3. Carey, John. 2005. "Poultry Facility Biosecurity." Texas AgriLife Extension Service. Publication L-5182.
4. Gordis, Leon. 2004. Epidemiology. Elsevier Saunders: Philadelphia, Pennsylvania.
5. Last, John M. 2001. A Dictionary of Epidemiology, 4th edition. Oxford University Press: New York, New York.
6. Jordan, Ellen. 2006. Protecting Our Nation's Milk Supply. *Western Dairy News,* 6:11. In: Hoard's West 151:W-195 – W-196.
7. National Pork Board. 2005. Security/ Biosecurity: Guidelines for Pork Producers.
8. National Cattle Breeders Association, Cattle Care Working Group. Guidelines for Care and Handling of Beef Cattle. *http://www.kla.org/PDFS/BQA/CattleCareGuidelines.pdf*
9. Roeber, D.L., K.E. Belk, S.B. Levalley, J.A. Scanga, J.N. Sofos and G.C. Smith. 2001. Producing Consumer Products from Sheep: The Sheep Safety and Quality Assurance Program.
10. Roth, James and Anna Spickler. 2006. Emerging and Exotic Diseases of Animals. 3rd edition. Institute for International Cooperation in Animal Biologics, Iowa State University College of Veterinary Medicine: Ames, Iowa.
11. Sellers, Rich. 2001. An Introduction to Infectious Disease Control on Farms (Biosecurity). Bovine Alliance on Management and Nutrition.
12. Texas Animal Health Commission. No "Germs" In, No "Germs" Out: Biosecurity Basics to Protect Livestock and Poultry Health. *http://www.tahc.state.tx.us/animal_health/biosecurity.pdf*
13. Texas Animal Health Commission. 2003. Tossing Table Scraps: Law for Restaurants, Schools and Other Food Establishments. *http://www.tahc.state.tx.us/animal_health/sb_pr/swine_feeding_law.pdf*
14. U.S. Department of Agriculture. 2006. Biosecurity: The Key to Keeping Your Livestock and Poultry Healthy. *http://www.mda.state.md.us/pdf/biosecur.pdf*
15. U.S. Department of Agriculture. 2006. Pre-Harvest Security Guidelines and Checklist.
16. U.S. Department of Agriculture. 2002. Protecting Our Livestock and Poultry Industries: Biosecurity Tips. *http://www.aphis.usda.gov/lpa/pubs/fsheet_faq_notice/fs_ahbiosec.html*
17. Wren, Geni. Why Vaccines Fail. *Bovine Veterinarian.* September 2006.

Produced by AgriLife Communications and Marketing, Texas A&M System
Extension publications can be found on the Web at: *http://agrilifebookstore.org*

Visit the Texas AgriLife Extension Service at *http://agrilifeextension.tamu.edu*

Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Edward G. Smith, Director, Texas AgriLife Extension Service, Texas A&M System.
300, New