Foreign Animal and Zoonotic Diseases Handbook

Train-the-Trainers Curriculum for Educators

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National Center for Foreign Animal and Zoonotic Disease Defense

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Contents

FOREWORD

The *Foreign Animal and Zoonotic Diseases Handbook* is a reference for training federal, state and local educators and officials and private veterinarians in emergency preparedness and response. Each chapter includes background information and notes for the accompanying Slide presentation, which is available on the accompanying CD. After a training session, the instruments in Chapter 6 can be used to evaluate the curriculum's effectiveness and the trainer's knowledge.

Trainers will teach others who can continue this educational process in their communities. This network will enhance the ability to detect and report animal diseases quickly.

This publication was funded by the National Center for Foreign Animal and Zoonotic Disease Defense located 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. An electronic version of this train-the-trainers curriculum for educators is available at http://fazd.tamu.edu.

The authors appreciate the assistance of coworkers who contributed to this book, and to Suzanne Burnham, Jason Cleere, Morgan Farnell, Ellen Jordan, Don Klingborg, Dan Posey, Tom Sidwa, Jodi Sterle, Gary Svetlik, Dave Tomkins, Andy Vestal and Steve Wikse for their suggestions in preparing the manuscript.

Lesson Plans

Advance preparation

Before teaching each lesson, review the chapter and Slide notes in the book and the Additional Resources on the CD.

Materials needed

Computer, monitor and slide show projector

CD with Slide presentation

Time needed

Chapter 1.....*30 minutes*

Chapter 2.....*1 hour*

Chapter 3.....*1 hour*

Chapter 4.....*1 hour*

Chapter 5.....*1 hour*

Chapter 6.....*30 minutes*

Objectives

Chapter 1

Understand the terminology for the different types of diseases

Understand the threat of these diseases

Understand the roles of agencies involved in minimizing the threat of these diseases

Chapter 2

Understand the sources of diseases

Understand how diseases are transmitted

Understand the importance of education in preventing the incidence and spread of diseases

Chapter 3

Learn the symptoms of anthrax, avian influenza, botulism, classical swine fever, foot-and-mouth disease and Rift Valley fever.

Understand the epidemiology of these diseases

Understand procedures for preventing, controlling and eradicating these diseases

Chapter 4

Adopt biosecurity best-management practices against foreign animal and zoonotic diseases

Understand the importance of mitigation, preparedness and response

Understand the importance of education in preventing the incidence and spread of diseases

Chapter 5

Understand a state's response plan for dealing with the threat of foreign animal and zoonotic diseases

Understand how local planning for disease emergencies is handled in a state

Understand the importance of public awareness in dealing with the threat of these diseases

Chapter 6

Learn the importance of evaluating learner performance and methods of doing so effectively

Chapter 1

Potential Occurrences of Foreign Animal Diseases

A foreign animal disease is one that occurs in other parts of the world but not yet in the United States. An emerging animal disease is a new disease or a new form of an old disease that is endemic to the United States and increasing in prevalence. This emergence may be related to animal movement in commerce, mutation of disease-producing agents or changes in environmental conditions.

The potential for a major foreign animal disease to occur in the United States is a serious threat. In other countries, such diseases have dealt tremendous economic blows to the livestock industry and have had devastating sociological and economic effects on communities.

The emergency management of foreign animal diseases also involves preparedness for bioterrorism against people, because most biological warfare agents or pathogens such as anthrax, plague and tularemia affect both animals and people. In fact, livestock producers, county Extension agents and veterinarians might be the first to realize that a biological attack has occurred because they may see the evidence in large numbers of animals before such evidence is seen by medical doctors.

The first line of defense against biosecurity threats from foreign animal diseases will be livestock owners. They monitor livestock carefully and report any unusual signs of disease promptly. Early detection and reporting could prevent the loss of billions of dollars for our livestock industries and communities.

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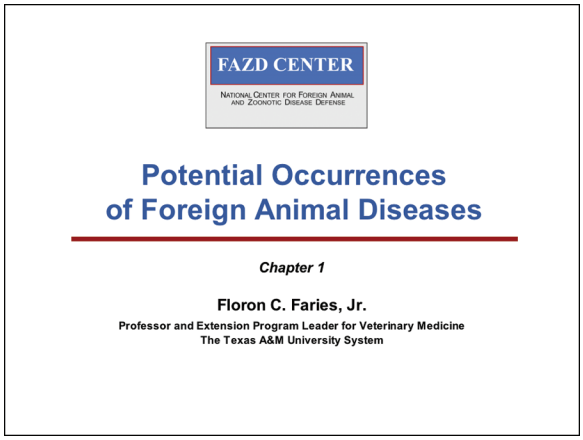
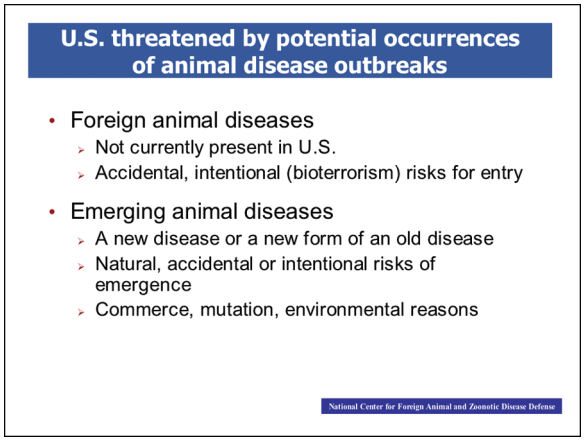
In 2004, the U.S. Department of Homeland Security established the National Center for Foreign Animal and Zoonotic Disease Defense (FAZD Center). The center is a consortium of four academic institutions—The Texas A&M University System, the University of California–Davis, the University of Texas Medical Branch and the University of Southern California. The center will develop research, education, training and communication programs to address the prevention and detection of foreign animal and zoonotic diseases (those affecting both animals and humans), as well as the response to and recovery from disease outbreaks.

Additional resources

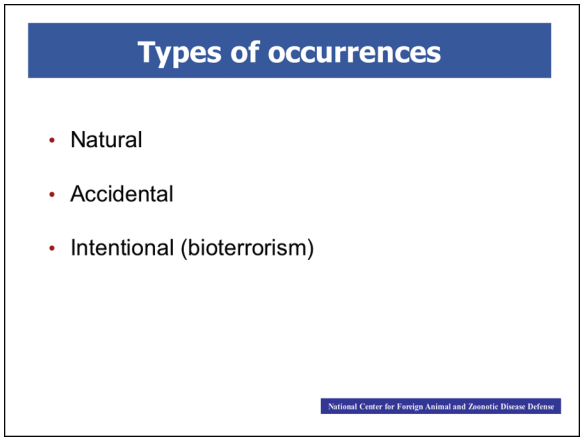
http://www.tahc.state.tx.us
http://www.aphis.usda.gov/animal_health/
http://www.aphis.usda.gov/lpa/pubs/factsheets.html
http://www.aphis.usda.gov/vs-tx
http://www.fsis.usda.gov
http://www.dshs.state.tx.us/idcu/health/zoonosis
http://www.txdps.state.tx.us/dem/pages/index.htm
http://www.cdc.gov
http://www.animaldisasters.com
http://AgriLifebookstore.org
http://av-library.tamu.edu
http://agnews.tamu.edu
http://eden.lsu.edu
http://fazd.tamu.edu
http://extensionvetmed.tamu.edu



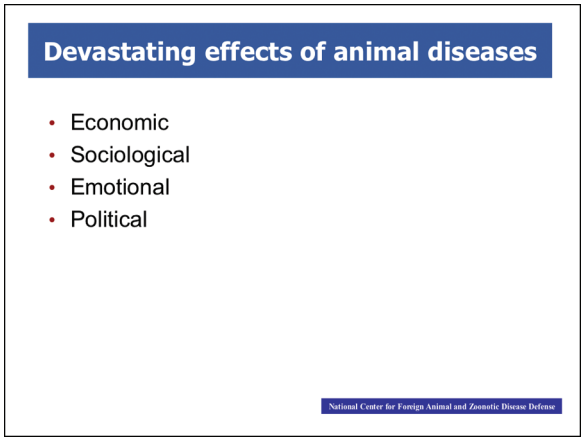
Slide 1: Potential Occurrences of Foreign Animal Diseases



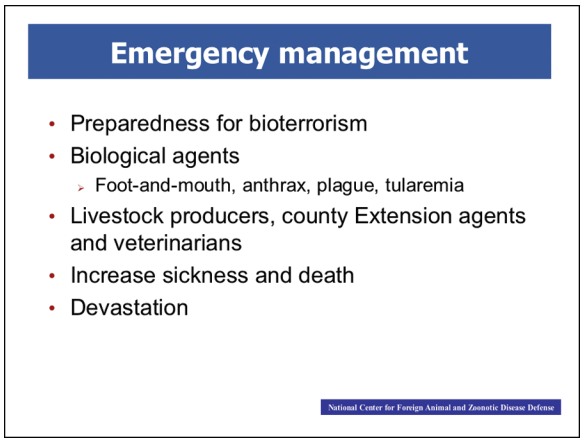
Slide 2: The United States is threatened by potential occurrences of animal disease outbreaks.



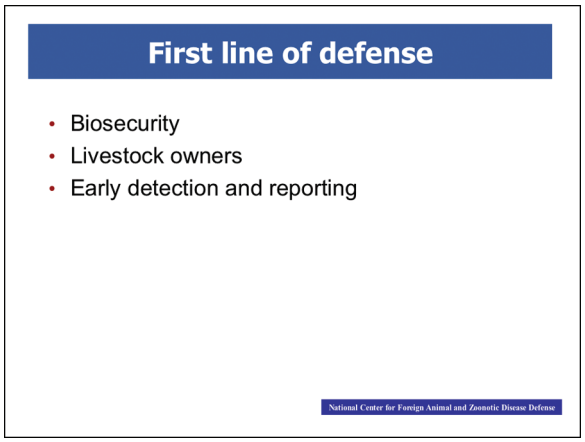
Slide 3: There are many ways that foreign animal diseases could enter the country and many ways that outbreaks of emerging animal diseases could occur.



Slide 4: The effects of foreign animal diseases can be devastating.



Slide 5: Animal owners must be alert for outbreaks of foreign animal and zoonotic diseases.



Slide 6: Animal owners are the first line of defense.

Premises and animal protection

- Brush, disinfect boots
  - Use footbaths
- Wash hands
- Wash, disinfect trailer
- Wash, disinfect tires

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Slide 7: Routinely practice strict biosecurity measures.

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- Wash, disinfect borrowed equipment
- Dispose of garbage properly
- Be alert to strangers
- Limit traffic
- Secure entrance
- Restrict interaction with other animals
  - Wild
  - Domestic

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Slide 8: Routinely practice strict biosecurity measures.

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- International visitors: >48-hour wait
- Lock gates
- Purchased livestock: >2-week isolation, tests
- Routine observations

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Slide 9: Routinely practice strict biosecurity measures.

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- Early detection of unusual signs
- Rapid reporting
- Rapid response
- Prompt quarantine
- Quick diagnosis

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Slide 10: Routinely practice strict biosecurity measures.

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- Disease surveillance
- Trace exposed animals within 48 hours

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Slide 11: To enhance control and eradication, trace exposed animals within 48 hours of a disease outbreak.

National Center for Foreign Animal and Zoonotic Disease Defense

- Established in 2004 by U.S. Department of Homeland Security
  - Four partnering institutions
    - TAMUS
    - UC Davis
    - UTMB
    - USC

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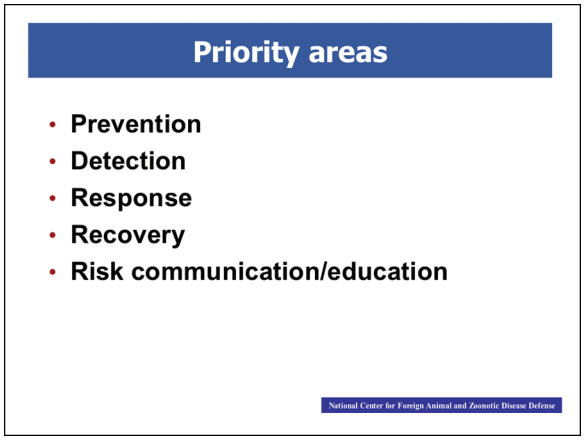
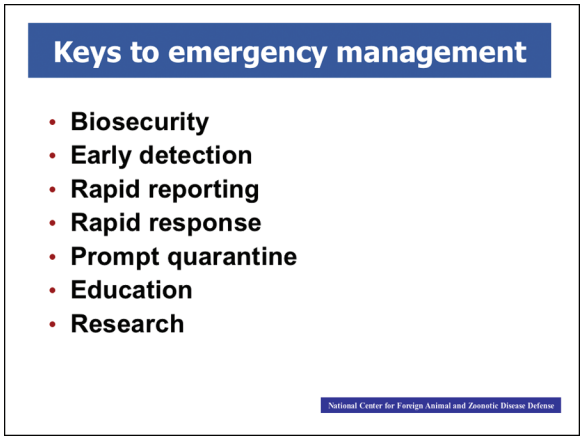
Slide 12: Four institutions are partners in the U.S. Department of Homeland Security.

Slide 13: The center's grant funds support this train-the-trainers curriculum.



Slide 14: The priority areas are prevention, detection, response, recovery, risk communication and education.



Slide 15: These keys will help lock the doors to foreign animal diseases.

Slide 16: Many other resources are available to give information on dealing with foreign animal diseases.

Chapter 2

Epidemiology of Foreign and Zoonotic Animal Diseases

Infectious diseases

Infectious diseases are caused by disease agents that enter the skin, lungs, mouth, mucous membranes or reproductive tract of an animal. Infectious agents include bacteria, viruses, fungi, protozoa, prions and rickettsiae. These germs invade and multiply inside or outside of tissue cells. Tissue is damaged by the pressure, reaction and/or toxins released by the disease agents.

As germs infect tissues, they may begin multiplying until they are numerous enough to make the clinical symptoms of the disease obvious. The amount of time from infection to the appearance of disease symptoms is called the incubation period. Some germs may remain dormant, or latent, and multiply later, which extends the incubation period.

Often, tissue damage or physical stress triggers the end of dormancy (recrudescence) and causes the germs to multiply. Some infectious diseases result from a combination of viral and bacterial infections and are precipitated by stress.

Most diseases have a primary cause as well as multiple risk factors that influence the probability of disease in an individual animal. Many diseases have a secondary cause that follows the primary cause. The primary disease may or may not be obvious, but the individual's health worsens when the secondary cause occurs. Infectious agents that need tissue damage from a primary cause in order to invade and multiply are called secondary invaders.

Risk factors may be causative or protective. Causative factors increase the probability that disease will occur. Examples of causative risk factors are inclement weather, overcrowding, pollution, commingling and inbreeding. Protective factors decrease the risk that a disease will occur. Protective risk factors include immunizations, husbandry, good management practices and crossbreeding.

Preventive measures against animal diseases focus on identifying the sources of infectious agents, which might be animals, the environment or various vectors such as insects or other organisms that transmit disease agents, and vehicles.

Zoonotic diseases

A disease common to both people and animals is known as a *zoonosis*. Some zoonoses may be transmitted by direct contact; others require vectors such as ticks or mosquitoes. Familiarity with the various zoonoses enables livestock managers and veterinarians to take precautionary measures to prevent them.

Epidemiology: how diseases are spread

Veterinary epidemiology is the study of the transmission of animal diseases and their relationships to people. Other important areas of focus are the prevention of exposure to disease agents and the development of immunity in animal populations.

A disease spreads when the primary agent escapes from an infected host and travels to a susceptible host. The place where the disease agent lives before infecting a susceptible animal is known as a *reservoir*. Reservoirs include carrier animals, ticks, people, and contaminated soil and water. Disease agents can be transmitted

from one host to another by direct or indirect means.

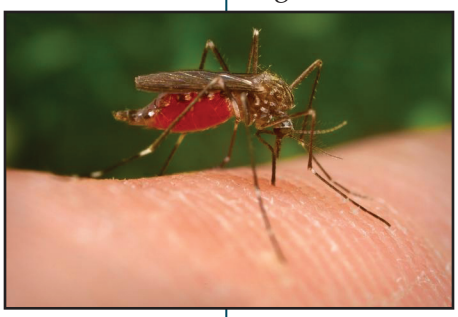
The most common means of transmission is direct disease transmission. It generally involves direct or close contact between two animals. When an animal is infected, it may shed the disease agent in its manure, urine or fetal fluid, in aerosol droplets from its lungs, or in genital fluid. Such an animal is *contagious*.

Direct contact with these fluids can transmit infections of the skin, respiratory system, digestive system and reproductive system to susceptible animals. Transmission is by skin contact, ingestion, inhalation and venereal methods, respectively. Infected animals that do not show signs of disease may not be contagious except when they are stressed.

Indirect disease transmission can involve:

- Vectors, such as flies, mosquitoes, gnats and ticks
- Vehicles, including instruments, utensils and equipment
- Fomites, such as food, water, soil and air

Although diseased and stressed animals may be contagious, the disease agent can spread to other animals only through vectors, vehicles and fomites. In the case of vectors, the arthropod picks up the disease agent from an infected animal and carries it to another animal. In the case of vehicles and fomites, germs shed by a diseased animal (or by the decaying carcass of a diseased animal) contaminate objects or the environment and then infect other animals that contact those objects or environment.



When a disease agent develops in a vector and is transferred to a new host, the vector is biological. If no development occurs in a vector, on a vehicle, or in fomites, the transmission is mechanical.

Biological transmission can occur over a period of days to months; mechanical transmission normally must occur within minutes. In fact, disease agents that infect ticks may survive in the ticks for 1 to 5 years. Some infectious agents can resist heat, sunlight and drying to survive for months in the environment.

When an infectious disease spreads, it is generally because diseased animals have been moved into a susceptible population. The United States is constantly on guard against the introduction of nonindigenous animal diseases into this country.

Regulatory animal and human health agencies

The agency responsible for controlling and eliminating livestock and poultry problems is the U.S. Department of Agriculture (USDA), specifically the Animal and Plant Health Inspection Service (APHIS). The agency responsible for eliminating human health problems is the U.S. Department of Health and Human Services, specifically the Public Health Service. These federal agencies collaborate with state agencies, state animal health commissions and state departments of health on problems common to animals and people.

In some instances, the health of animals can warn of potential human health problems. After all, animals commonly share the same environment, drink the same water and breathe the same air as do people. And, in some instances, animals are biologically or genetically more susceptible to or have greater exposure to disease agents than people.

Preventing animal disease

The battle against disease requires constant attention and the cooperation of the public, regulatory animal and human health agencies, veterinarians and medical doctors.

Preventing animal disease requires:

- Conducting surveillance to identify reservoirs of infectious diseases
- Keeping healthy animals from being exposed to disease
- Ensuring that animals have good nutrition, adequate physical activity and optimum environmental conditions to help build resistance to disease
- Implementing selection and breeding programs to enhance the productivity and economic efficiency of animals

Animal diseases reportable to state regulatory animal and human health agencies

Clinically diagnosed and laboratory-confirmed animal cases of regulatory diseases are required to be reported within 24 hours to state regulatory animal and/or human health agencies. As an example of state regulations, the diseases listed in the table on page 8 are reportable to the Texas Animal Health Commission (TAHC) and/or Texas Department of State Health Services (DSHS).[1] Conditions in animals that are reportable to both agencies can be reported to either of them; that agency will forward the information to the other one.

The zoonotic diseases in **bold-faced type** are reportable to DSHS in addition to TAHC; those in *italics* are reportable only to DSHS. Diseases in red are considered to be endemic diseases; all others are considered to be foreign animal diseases (FADs).

This is not a complete list of foreign animal diseases because many other diseases are present in other parts of the world that would and should be considered FADs if they were introduced into the United States. Many are not listed because they are unlikely to be introduced or because they would have less overall economic impact than would some of the more important diseases. Other FADs should be reported if they are suspected of being present.[2]

The agency that determines which diseases are considered to be foreign animal diseases is USDA-APHIS, specifically Veterinary Services (VS). VS also has the primary responsibility to develop trade agreements and regulations[2] to prevent the introduction of foreign animal diseases into the United States, to conduct investigations of suspected foreign animal diseases, and to respond to incursions when they are discovered. VS also responds to emerging disease incidents, which can be new diseases or new manifestations of old diseases.

[1] Adapted from the Texas Administrative Code, Title 4, Part 2, Chapter 45, Rule 45.2, Texas Animal Health Commission and Texas Administrative Code, Title 25, Part 1, Chapter 97, Subchapter A, Rule 97.3(b), Texas Department of State Health Services

[2] "Zoonoses." The Merck Veterinary Manual. 9th ed. 2005.

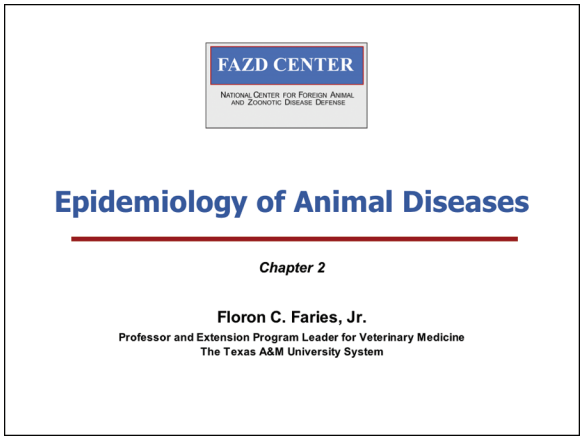
Key

Black: Foreign animal disease
Red: Endemic animal disease
Italics: Zoonotic disease reportable to DSHS only
Bold: Zoonotic disease reportable to TAHC and DSHS
All other diseases are reportable only to TAHC.

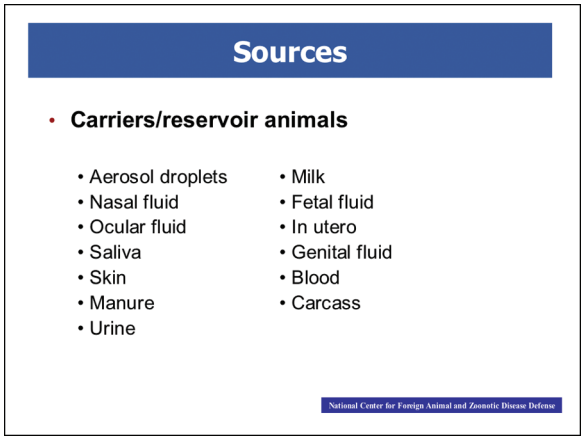
Multiple species diseases	Cattle diseases (including exotic bovidae)	Sheep and goat diseases
African trypanosomosis (Nagana)	Bovine babesiosis	Caprine and ovine brucellosis (not B. ovis infection)
Akabane	Bovine brucellosis	Contagious caprine pleuropneumonia
Anthrax	Bovine ephemeral fever	Louping ill
Aujeszky's disease	Bovine spongiform encephalopathy	Nairobi sheep disease
Foot-and-mouth disease	Bovine tuberculosis	Peste des petits ruminants
Heartwater	Contagious bovine pleuropneumonia	Scabies
Leishmaniasis	East Coast fever (Theileriosis)	Scrapie
Plague	Lumpy skin disease	Sheep pox and goat pox
Rabies	Malignant catarrhal fever (wildebeest associated)	
Rift Valley fever		
Rinderpest	Scabies	***Rabbit diseases***
Screwworm		
Vesicular stomatitis		Myxomatosis
		Rabbit hemorrhagic disease

Equine diseases	*Swine diseases*	Poultry diseases
African horse sickness	African swine fever	Avian infectious laryngotracheitis
Contagious equine metritis	Classical swine fever (hog cholera)	Avian influenza
Dourine	Porcine brucellosis	Avian tuberculosis
Epizootic lymphangitis	Pseudorabies	Duck virus enteritis
Equine encephalomyelitis (eastern and western)	Swine vesicular disease	Duck virus hepatitis
Equine infectious anemia	Vesicular exanthema	Exotic Newcastle disease (END)
Equine morbillivirus pneumonia		Fowl typhoid
Equine piroplasmosis	**Cervid diseases**	Highly pathogenic avian influenza (fowl plague)
Glanders	Brucellosis	Infectious encephalomyelitis
Japanese encephalitis	Chronic wasting disease	**Ornithosis (psitticosis)**
Surra	Tuberculosis	Paramyxovirus infections (other than Newcastle disease)
Venezuelan equine encephalomyelitis		
West Nile encephalomyelitis		Pullorum disease

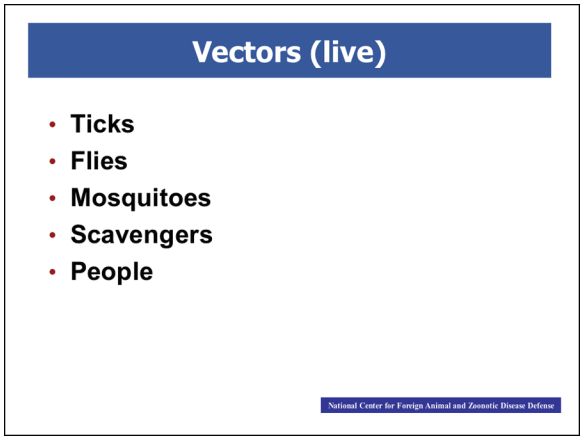
http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=3&ti=4&pt=2



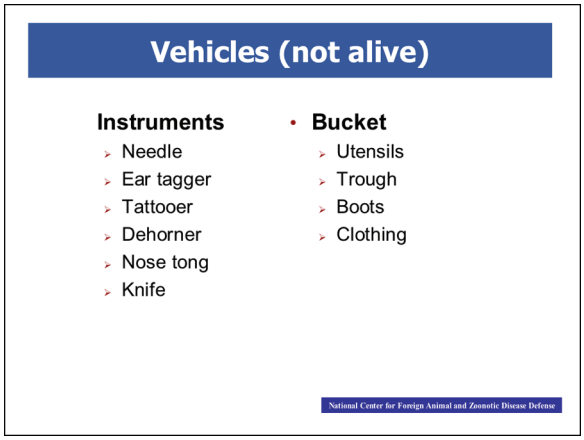
Slide 1: Epidemiology of Animal Diseases



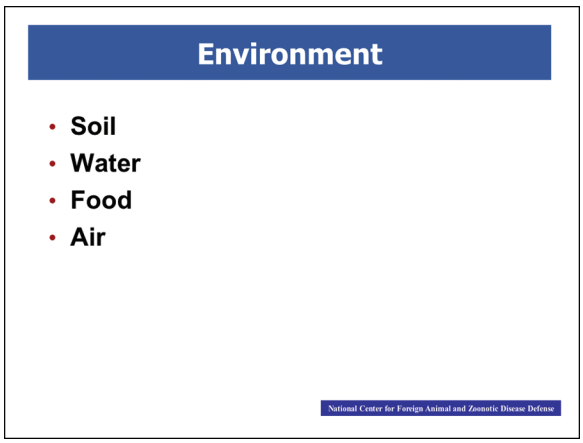
Slide 2: The primary source of a disease agent is an infected animal that becomes a carrier or reservoir. Disease agents escape by various routes.



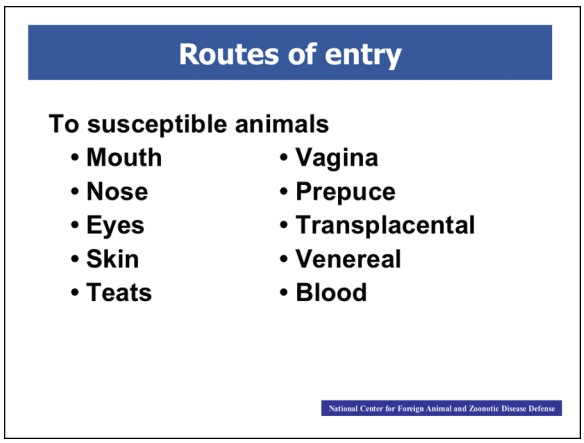
Slide 3: A secondary source of a disease agent is an infected or contaminated vector that comes in contact with a carrier's or reservoir's tissues, excreta or fluids.



Slide 4: Another secondary source of a disease agent is a contaminated vehicle that comes in contact with a carrier's or reservoir's tissues, excreta or fluids.



Slide 5: Another secondary source of a disease agent is contaminated environment that comes in contact with carrier's or reservoir's tissues, excreta or fluids. Vectors can contaminate the environment.



Slide 6: These are the routes of entry by which a disease agent can enter susceptible animals.

Incubation period

- **Long/short**
- **Exposure to symptoms**
- **Exposure to positive tests**
- **During incubation period:**
  - No symptoms
  - Negative tests

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Slide 7: Disease agents develop and/or multiply for a period before they can be detected by symptoms or tests.

After incubation period

- **Symptoms**
- **Positive tests**

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Slide 8: Disease agents are detectable by symptoms or tests after the incubation period.

Latent infections (recrudescent infections)

- **Extended incubation period**
  - No symptoms
  - Negative tests
- **After recrudescence**
  - Symptoms
  - Positive tests

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Slide 9: Some disease agents have delayed development and cannot be detected until the incubation period ends.

Trigger factors

- **Injury**
  - Blackleg
  - Malignant edema
  - Black disease
  - Black-neck disease
- **Diet change/overload**
  - Enterotoxemia

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Slide 10: Various factors trigger the multiplication of latent/dormant agents. Infection then develops into disease.

Other trigger factors

- **Flukes**
  - Redwater
- **Stress**
  - IBR/PI3/BVD/BRSV
  - Pasteurella/Haemophilus
- **Pregnancy in heifers**
  - Brucellosis

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Slide 11: These factors also can trigger the multiplication of disease agents.

Nonlatent infections

- **Normal incubation period**
  - Lepto
  - Vibrio
  - IBR/PI3 /BVD/BRSV
  - Pasteurella/Haemophilus
  - Brucellosis in cows

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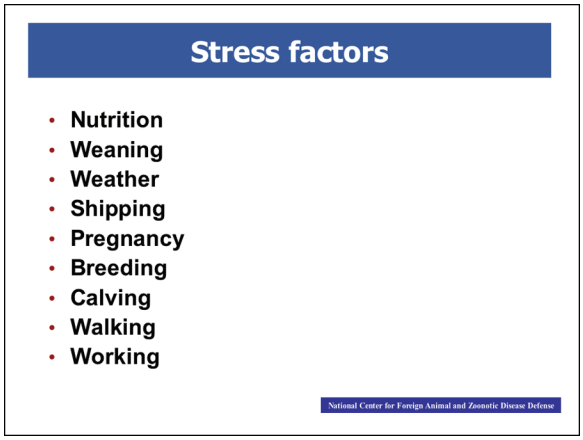
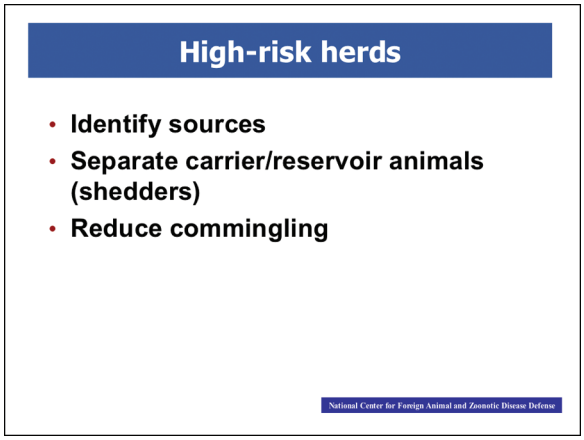
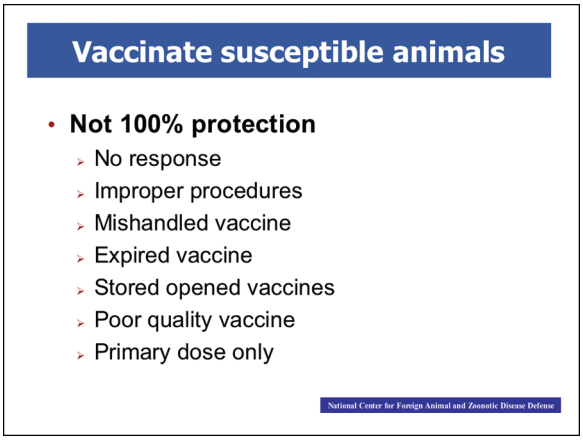
Slide 12: In nonlatent infections, the causative agents have a normal incubation period.



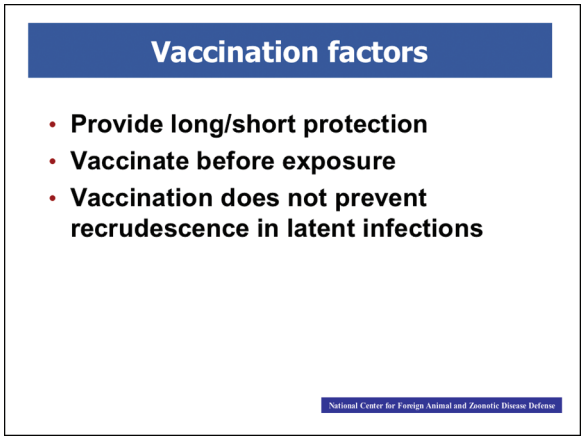
Slide 13: Stress can cause recrudescence, or renewed activity, of latent infections. It also reduces resistance to disease agents.



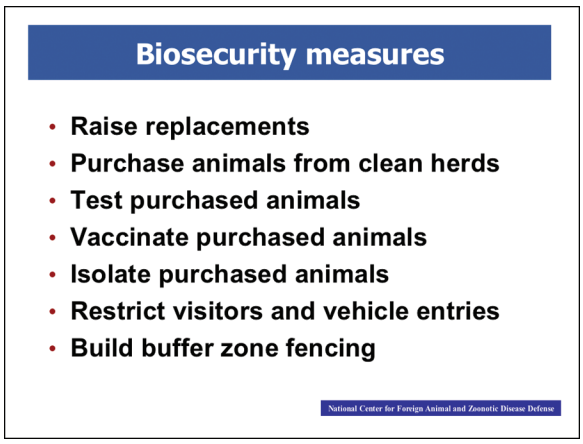
Slide 14: These are health management practices to reduce the transmission of disease agents to animals at high risk for exposure.



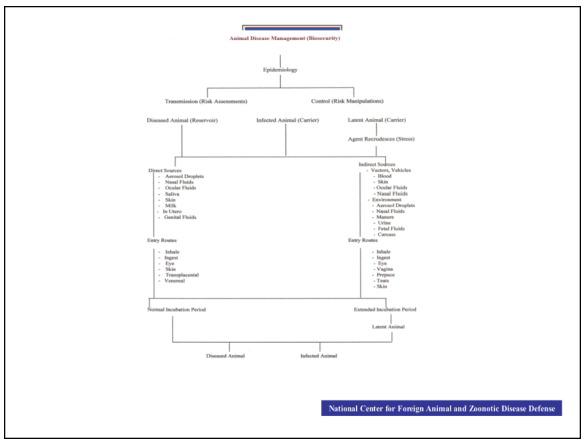
Slide 15: Susceptible animals should be vaccinated. These are some reasons why vaccination fails.



Slide 16: Consider these factors when vaccinating high-risk animals.



Slide 17: These health management practices can reduce the risk of disease transmission.



Slide 18: This diagram shows the sources of disease agents as well as direct and indirect transmission/exposure routes.

Chapter 3

Foreign Animal and Zoonotic Diseases (FAZD)

Foreign animal diseases

The United States is under the serious threat of foreign animal disease outbreaks. Based on epidemiologic studies, state and federal animal health regulatory agencies have developed safeguards to prevent the entry of these diseases into the country. Regulatory agencies are prepared to respond to an animal disease outbreak, whether accidental, natural or intentional. However, education is key to identifying these diseases so they can be detected and reported rapidly.

Zoonotic diseases

A zoonotic disease is one that is shared between animals and people. People need to be able to recognize the symptoms of zoonotic diseases so that these diseases can be detected and reported quickly, livestock owners can receive needed assistance promptly and large-scale human disease outbreaks can be prevented.

Anthrax

Causative agent: Anthrax is caused by the bacteria *Bacillus anthracis,* which is found throughout the world. In the United States, it is found primarily in Nebraska, Mississippi, Arkansas, Texas, Louisiana and California.

Transmission: Animals become infected by ingesting or inhaling anthrax spores. These spores start as regular bacteria that are released through hemorrhagic exudates (fluids from ruptured blood vessels) from the mouth, nose and anus of an infected animal. When exposed to oxygen, the bacteria develop endospores that settle on the ground and can remain viable for decades. When conditions are right (such as during a drought or after a heavy rain or some other disturbance of the environment), the spores can then be inhaled or ingested by animals.

If you suspect that an animal has died from anthrax, **do not** open the carcass. If the carcass remains closed, the bacteria are not exposed to oxygen and cannot turn into spores. In an unopened carcass, the bacteria will decompose quickly and not contaminate the soil.

Once an animal or person is infected, the incubation period is 1 to 20 days, with illness usually becoming apparent after 3 to 7 days.

Diagnosis: Different species of animals exhibit different clinical signs. In ruminants, the signs may include staggering, trembling and dyspnea, followed by rapid collapse, terminal convulsions and death. The acute signs are usually seen about 2 days before the animal dies.

Other possible symptoms include fever and excitement, followed by depression, stupor, disorientation, muscle tremors, abortion, congested mucous membranes, bloody discharge from the nose, mouth and anus, and subcutaneous (under the skin) swellings.

In horses, the symptoms include fever, chills, anorexia, depression, severe colic, bloody diarrhea and swelling. A horse

with these symptoms usually dies within a week.

Pigs infected by the anthrax bacteria may exhibit mild, chronic infections followed by fever, swelling and enlarged lymph nodes. Pigs usually recover from this type of infection, but some are suffocated by the swelling.

There is a chance of recovery in all species if the animals are treated immediately. Treatment is beneficial only in the early stages of the disease.

To diagnose anthrax definitively, blood and tissue smears must be examined under a microscope for the presence of the large, gram-positive rods that are characteristic of anthrax. Other laboratory tests include culturing the bacteria, polymerase chain reaction (PCR), immunoflorescence or a chromatographic assay.

In the field, good indicators that an animal has died from anthrax are poor blood clotting with little or no rigor mortis. The carcass also bloats and decomposes rapidly, sometimes with a dark, tar-like, bloody substance oozing from the animal's orifices. If the carcass is opened, there may be dark, thick, unclotted blood. Signs of septicemia with an enlarged, hemorrhagic, "blackberry jam" spleen also can be seen.

Prevention: Where anthrax is endemic, a live-strain vaccine should be administered. Local veterinarians know whether anthrax is present in an area. Animals develop immunity about 7 to 10 days after vaccination. Do not administer antibiotics to recently vaccinated animals because the antibiotics will kill the live vaccine. USDA–APHIS restricts the importation of animal products from countries where anthrax occurs.

Regulation and control: If a veterinarian diagnoses a case of anthrax in your herd, it should be reported immediately to state or federal animal and public health officials. These officials will place a limited quarantine on the livestock premises and release the quarantine 10 to 14 days after all livestock are vaccinated.

To reduce contamination, animals that die of anthrax must be burned. Anything that might have come into contact with fluids from the infected animal should be burned as well.

Additional resources

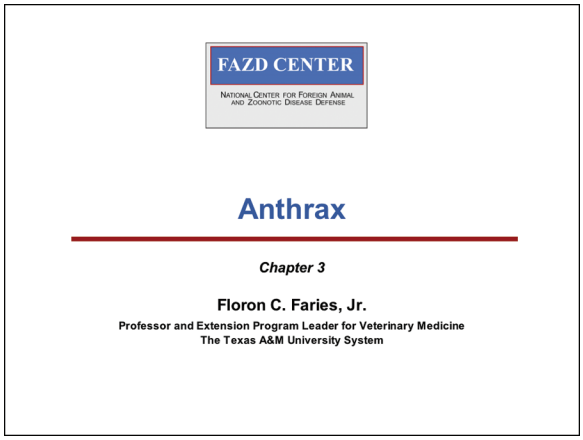
Center for Food Security and Public Health: http://www.cfsph.iastate.edu/DiseaseInfo/default.htm

USDA–APHIS: http://www.aphis.usda.gov/lpa/pubs/fsheet_faq_notice/fs_ahanthrax.html
http://www.aphis.usda.gov/lpa/pubs/fsheet_faq_notice/fs_ahanthradiag.html

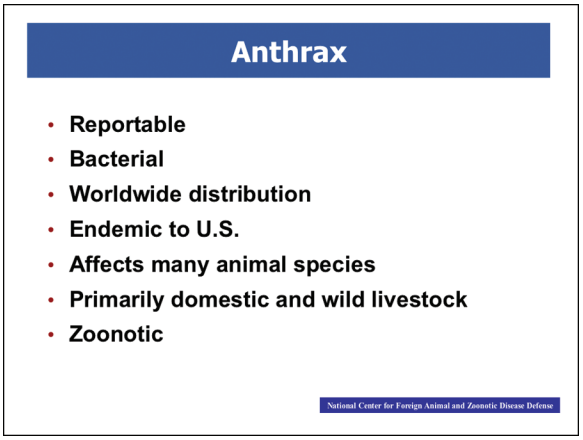
Texas Department of Health: http://www.dshs.state.tx.us/idcu/disease/anthrax/

Texas AgriLife Extension Service QuickFacts: http://extensionvetmed.tamu.edu

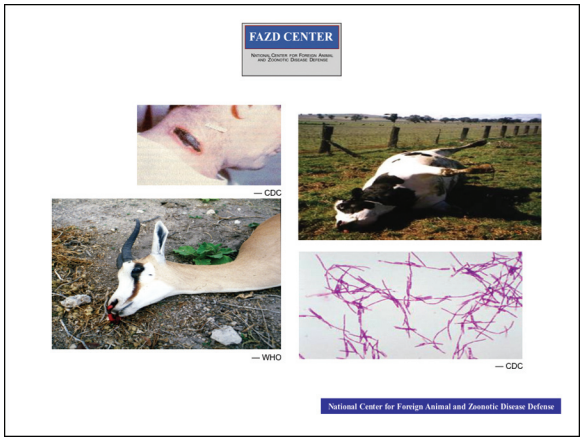
Texas Animal Health Commission: http://www.tahc.state.tx.us/animal_health/anthrax/Anthrax_facts.pdf



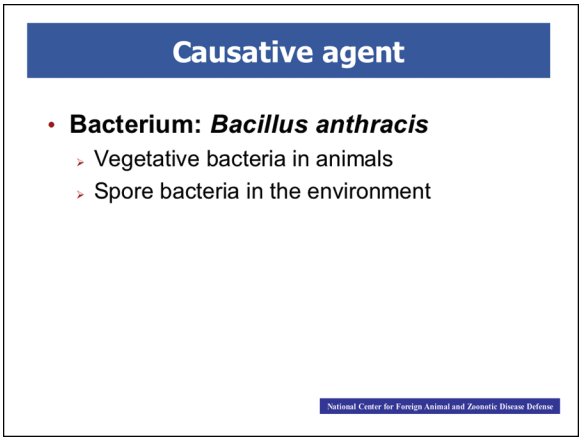
Slide 1: Anthrax



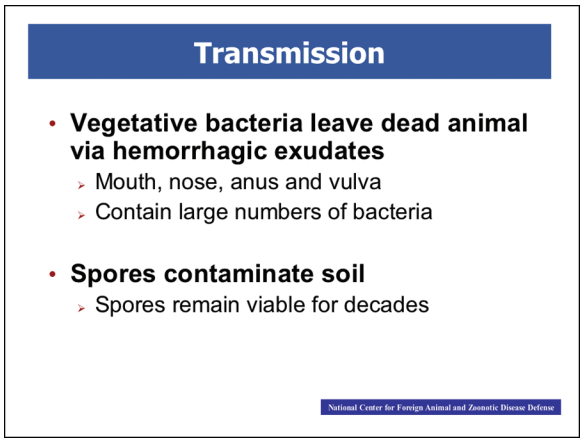
Slide 2: Anthrax is a deadly disease of livestock and primarily a skin disease of people.



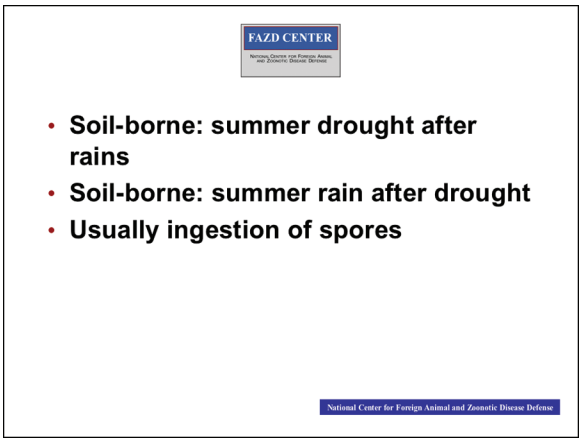
Slide 3: Anthrax causes bacterial skin infections in people. Bacterial disease in animals causes sudden death and rapid bloat decomposition. Microscopic, stained bacteria show the characteristic chains of rods like box cars.



Slide 4: In a dead animal, vegetative bacteria in the blood ooze out of the nose, mouth, anus and vulva and develop into spore bacteria for survival in the environment.



Slide 5: The heavy, sticky, clumped bacteria contaminate soil. Bacteria are not in the air or moved by wind. There is no aerosol transmission.



Slide 6: Animals ingest the bacteria by grazing and browsing contaminated vegetation in concentrated areas (hot spots). Water erosion concentrates the bacteria. Bacteria in the soil will surface during dry conditions. Contamination of an area is not widespread.

FAZD CENTER

- **Incubation period: 1–20 days**
- **Infections apparent after 3–7 days**

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Slide 7: Animals die suddenly.

Diagnosis

- **Ruminants**
  - Sudden death
  - Staggering
  - Trembling
  - Dyspnea
  - Fever

Respiratory distress
Convulsions
Abortions
Bloody discharge

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Slide 8: Several symptoms can occur before death.

Bloated decomposition

ISU

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Slide 9: This is the typical bloated decomposition, with the four legs separated and raised.

Horses

Horses

- Sudden death
- Fever
- Chills
- Anorexia
- Depression
- Severe colic
- Bloody diarrhea
- Swelling

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Slide 10: These symptoms are seen in horses.

Swine

- **Sudden death**
- **Mild, chronic infections**
- **Fever**
- **Swelling**
- **Enlarged lymph nodes**
- **Usually recover**

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Slide 11: These symptoms are seen in swine.

Others

- **Dead animals**
  - Sudden death: blood poisoning
  - Rigor mortis absent
  - Rapid decomposition, extreme bloat
  - Dark blood
  - Enlarged spleen
  - Nonclotting blood
- **People**
  - Wound infections, carbuncles

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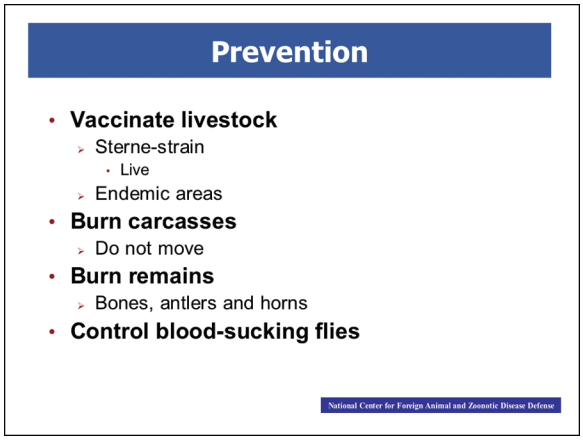
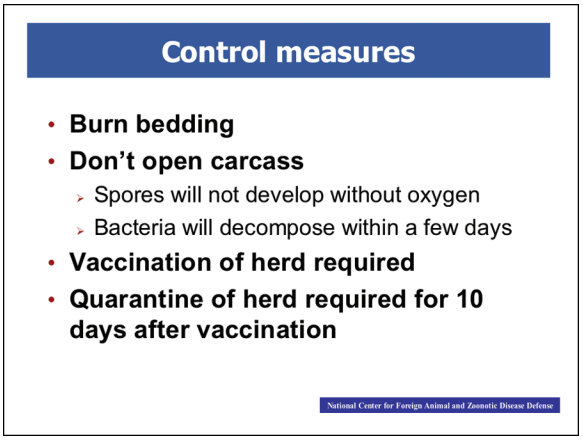
Slide 12: Ranchers usually find dead animals, not sick ones. Death is sudden.



Slide 13: Burning and vaccinating are preventive measures in endemic areas.



Slide 14: Effective control measures include the prompt quarantine of an infected herd, rapid investigations of the herd (trace in and out), vaccination and burning of carcasses.

Avian influenza

Causative agent: Avian influenza (AI) is caused by a virus and affects many bird species, including chickens, turkeys, pheasants, quail, ducks, geese and guinea fowl. The many different strains are organized into two classifications:

- Low-pathogenic avian influenza (LPAI), which is endemic to the United States
- High-pathogenic avian influenza (HPAI), which is considered a foreign animal disease

The most common strain is LPAI. It is considered to be highly pathogenic based on several criteria, one being that it results in more than 70 percent mortality within 10 days. The strain present is determined by an evaluation of the severity of the disease and clinical signs.

Transmission: The natural reservoir for the virus is migratory waterfowl. Infected birds carry the virus in their intestines and shed it, potentially infecting other birds. Susceptible birds that come into contact with the saliva, feces or nasal excretions of infected birds may become infected themselves.

Studies have shown that 1 gram of manure contaminated with an HPAI strain can contain enough virus to infect 1 million birds. The virus can also be spread by contact with contaminated equipment, vehicles, egg flats, crates and people (including their clothing and shoes).

Diagnosis: With either strain, birds can show a variety of symptoms, including:

- Sudden death without clinical signs
- Lack of energy or appetite
- Decreased egg production
- Soft-shelled or misshapen eggs
- Swelling of the head, eyelids, comb, wattles and hocks
- Purple discoloration of the wattles, comb and legs
- Nasal discharge
- Coughing and sneezing
- Incoordination
- Diarrhea
- No clinical signs

Most birds that contract the LPAI strain have few if any symptoms. LPAI is a reportable disease and is considered low risk.

HPAI, on the other hand, is highly infectious and must be reported. This strain is so virulent that it can infect and kill flocks before any clinical signs are observed. If HPAI is suspected, state and federal animal health regulatory agencies will quarantine the premises to help contain the disease.

Prevention: Producers can decrease the chance of AI being introduced into their flocks by:

- Keeping poultry houses locked
- Fastening windows from the inside
- Providing clothing (including shoes, boots, hats and gloves) for all workers to wear when caring for flocks; this clothing is kept separate from clothes worn off the farm
- Changing clothes completely and washing hands and arms before leaving the premises
- Prohibiting workers from visiting any other poultry flocks
- Prohibiting visitors from going in or near the poultry houses
- Requiring that essential visitors put on protective outer clothing,

including boots and headwear, before going near flocks; essential visitors include owners, meter readers, service personnel, poultry catchers and haulers, and fuel and feed delivery drivers

- Making sure that vehicles entering the premises (such as for poultry pickup or delivery and feed or fuel delivery) are scrubbed down and their undercarriages and tires sprayed with disinfectant
- Cleaning and disinfecting all coops, crates and other poultry containers and equipment before and after use
- Sending sick or dying birds to a state veterinary diagnostic laboratory for diagnosis
- In commercial operations, contacting the flock supervisor if birds become sick or die
- Properly disposing of dead birds by composting or incineration
- Making sure persons who have handled wild game (especially waterfowl) bathe and change their clothes completely before entering the poultry premises
- Posting "restricted" signs at drive entrances
- Preventing birds from being brought back to the farm from slaughter channels, especially live-bird markets

Some strains of HPAI, such as the H5N1 strain, can infect people. This strain causes high mortality rates among people as well as birds. For this reason, people entering infected areas should wear adequate personal protective equipment: boots, coveralls, gloves, face masks and headgear. They should follow appropriate sanitary and disinfectant procedures according to USDA–APHIS guidelines.

LPAI typically does not infect people; it poses a reduced threat to the industry. However, if an HPAI outbreak occurs, it could serious damage the industry.

Regulation and eradication: If LPAI is found in a flock, the area must be cleaned and disinfected thoroughly. The virus can be deactivated by heat and drying. It is killed by most disinfectants and detergents.

Where HPAI occurs, all infected and potentially infected animals should be destroyed and the facilities cleaned and disinfected. Notify the proper authorities immediately to help eradicate this disease.

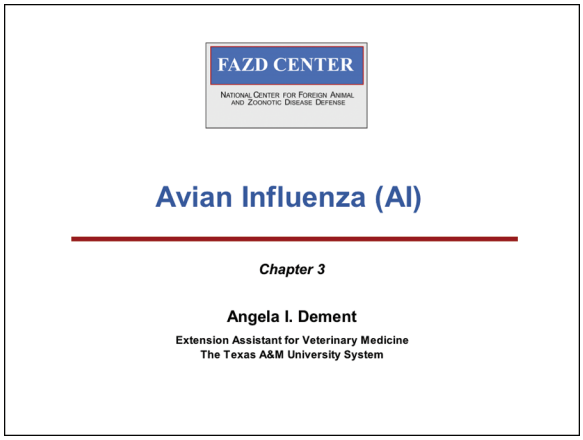
Additional resources

USDA–APHIS: http://www.aphis.usda.gov/lpa/pubs/fsheet_faq_notice/fs_ahai.html
http://www.aphis.usda.gov/lpa/pubs/fsheet_faq_notice/fs_ahlpai.html
http://www.aphis.usda.gov/lpa/pubs/fsheet_faq_notice/fs_ahavianflu.html

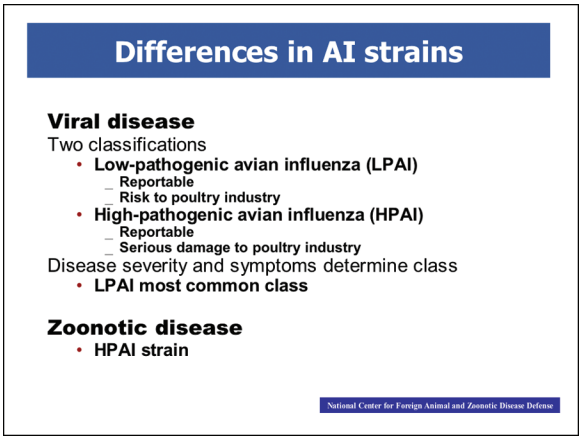
CIDRAP: http://www.cidrap.umn.edu/cidrap/content/influenza/avianflu/biofacts/avflu.html

Texas AgriLife Extension Service QuickFacts: http://aevm.tamu.edu

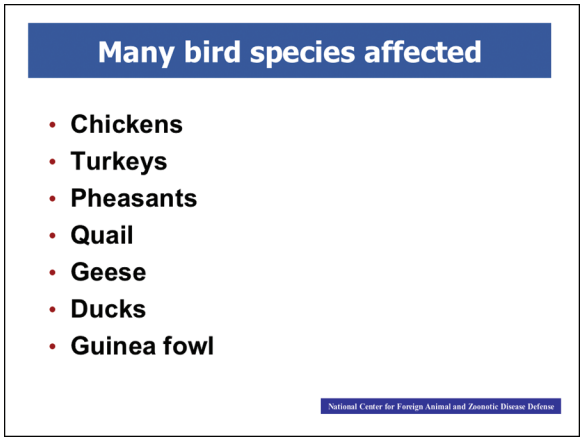
Texas Animal Health Commission (TAHC): http://www.tahc.state.tx.us/animal_health/ai/AvianInfluenza-May2006.pdf



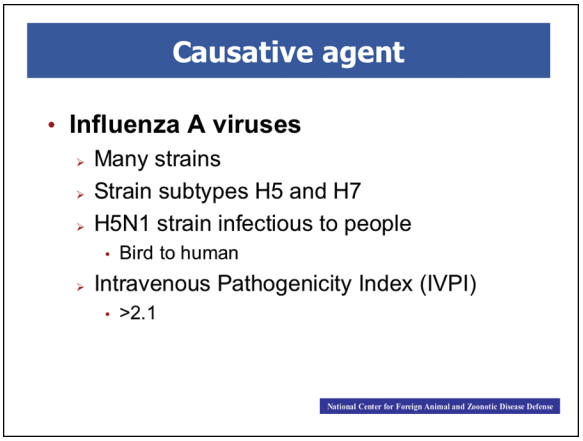
Slide 1: Avian Influenza (AI)



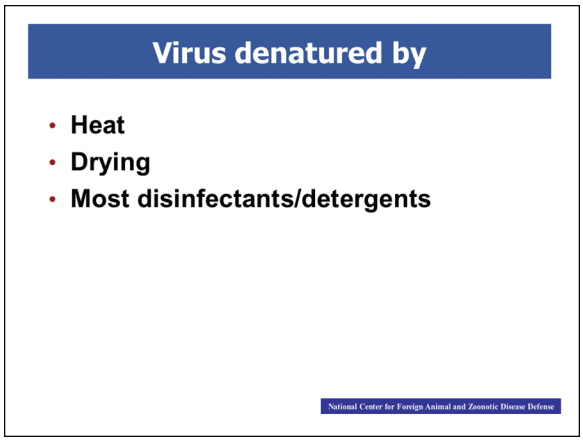
Slide 2: The different strains of AI vary in the degree of severity and the rate of spread.



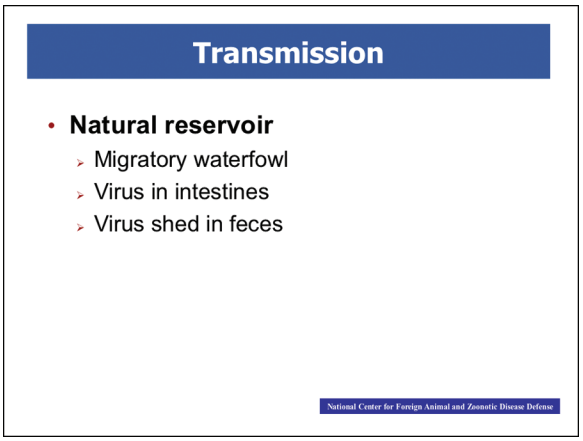
Slide 3: Reservoir hosts of AI are migratory waterfowl such as ducks, geese and shorebirds. AI affects birds in commercial production.



Slide 4: The pathogenicity, or disease-producing ability, of AI varies among different strains of the virus.



Slide 5: The virus is easily destroyed.



Slide 6: The migration of waterfowl introduces the virus into various geographic areas where it can infect bird populations.

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1 gram of contaminated manure can contain enough virus to infect 1 million birds

Slide 7: Studies have shown that 1 gram of manure contaminated with an AI strain can contain enough virus to infect 1 million birds.

Bird-to-bird direct contact

- **Bird-to-bird direct contact**
  - Feces
    - Fecal to oral transmission most common
  - Saliva
  - Nasal excretions

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Slide 8: The virus spreads easily within bird populations.

Indirect contact

- **Bird to environment to bird**
  - Mechanical contamination
    - Manure
    - Equipment
    - Vehicles
    - Egg flats
    - Crates
    - People articles

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Slide 9: The virus can be spread mechanically.

Diagnosis

- **LPAI**
  - No symptoms
  - Reportable
  - Low-risk virus
- **HPAI**
  - Symptoms
  - Sudden death before symptoms
  - Reportable
  - High-risk virus
    - Virulent
    - Highly infectious

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Slide 10: A classification of strains is determined by the severity of symptoms and the occurrences of deaths.

Symptoms

- **Sudden death**
- **Lack energy/appetite**
- **Decreased egg production**
- **Egg deformities**
- **Swellings**
- **Red and purple skin**
- **Nasal discharge**
- **Coughing/sneezing**
- **Incoordination**
- **Diarrhea**

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Slide 11: A tentative diagnosis is made by observing symptoms. A positive diagnosis is made by laboratory test.

Discoloration and swelling

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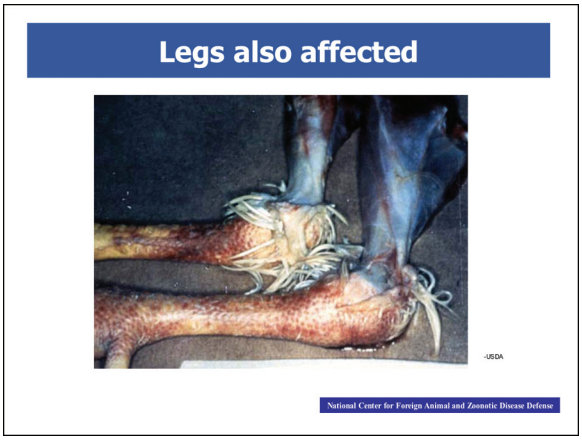
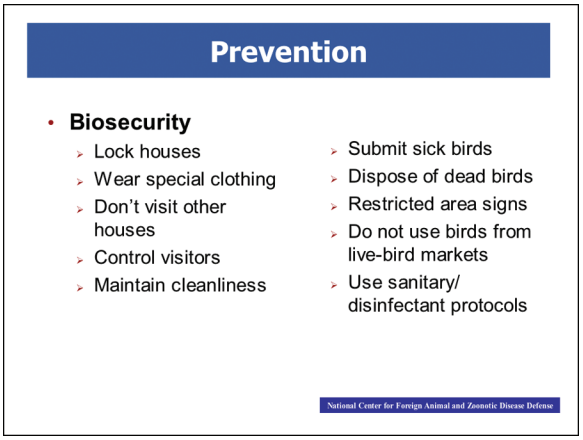
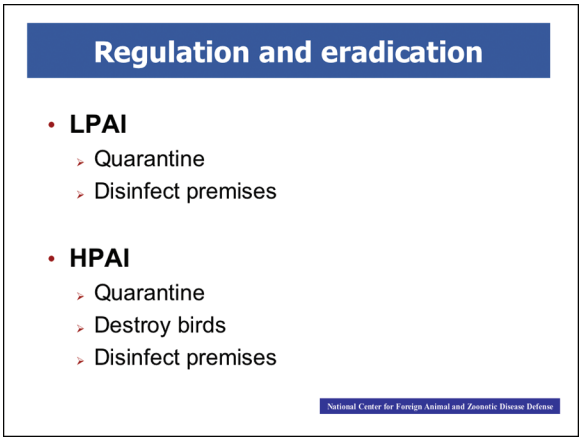
Slide 12: Anthrax causes purple discoloration and swelling of the eyelids, comb and wattles.



Slide 13: It also causes red and purple discolorations and swelling of the legs.



Slide 14: Secure the premises to keep the virus from entering.



Slide 15: Quarantine, disinfection and depopulation regulations are enforced on the basis of the classification and strain of the virus.

Botulism

Causative agent: Botulism is caused by toxins produced by the bacteria, *Clostridium botulinum*. The botulinum neurotoxin is the most toxic substance known and can affect horses, cattle, sheep, domestic and wild birds, mink, foxes and humans.

There are seven types of botulinum neurotoxin, and they vary in severity. Antitoxins are specific to the type of neurotoxin. Differences in susceptibility among species and within species are seen but unexplained.

Transmission: Botulism usually occurs after ingesting preformed toxin in contaminated feed or after ingesting *C. botulinum* spores, which produce toxins in the stomach and intestines. Contaminated feed includes improperly stored silage, spoiled brewer's grains or feed contaminated with dead animals (rodents). Wounds can become contaminated with *C. botulinum* after production of toxin, but this mode of transmission is rare.

Aerosolized botulinum toxin can cause botulism by inhalation; this is the primary means of making a weapon of the toxin.

Diagnosis: Morbidity is variable, depending on the species affected, the route of exposure and the type and amount of toxin. The predominant sign of botulism is flaccid paralysis, in which muscle tone and tendon reflexes are lost. Although symptoms are often seen between 12 and 24 hours after exposure, the incubation period can range from 2 hours to 2 weeks.

Other symptoms include:

- Depression
- Reluctance to move
- Lack of fever
- Muscle tremors
- Stiff gait
- Inability to stand
- Drooping eyelids
- Dilated pupils
- Difficulty chewing and swallowing
- Bloating
- Tongue easily pulled out of the mouth

Botulism may be presumed based on history, clinical signs and exclusion of other diseases such as rabies, eastern encephalitis, western encephalitis, West Nile encephalitis, scrapie, hypocalcemia or toxicity.

Prevention: Treatment is based on the symptoms present. Botulism can be prevented by controlling rodents and insects and avoiding spoiled silage and feed. To prevent outbreaks from spreading, remove the affected carcasses quickly and dispose of them properly by burning, deep burial or rendering. Vaccines are available for susceptible horses and mink in the United States.

Regulation and control: Human botulism is reportable to state health departments and the Centers for Disease Control. If you suspect botulism in your animals, contact your local veterinarian.

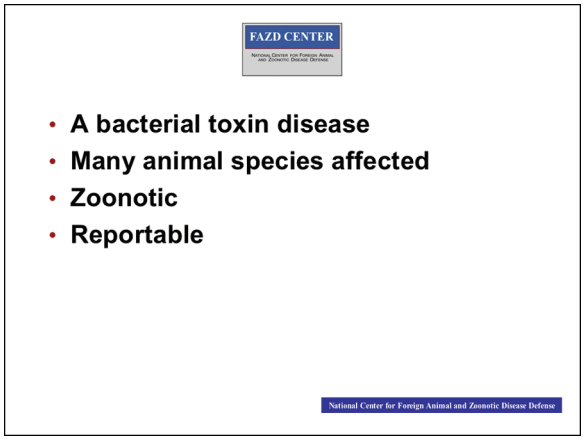
Additional resources

Centers for Disease Control: http://www.bt.cdc.gov/agent/botulism/

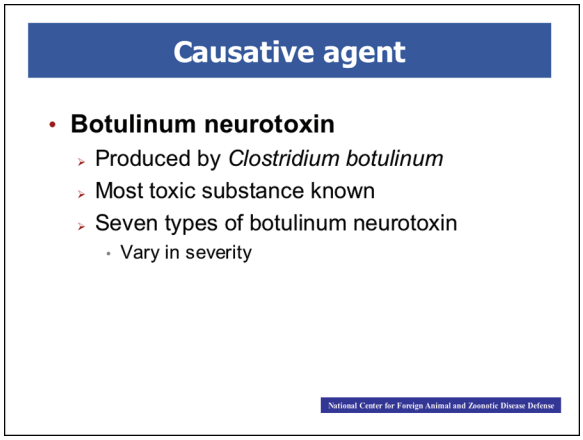
Infectious Diseases Society of America: http://www.cidrap.umn.edu/idsa/bt/botulism/biofacts/botulismfactsheet.htm

Texas AgriLife Extension Service QuickFacts: http://aevm.tamu.edu

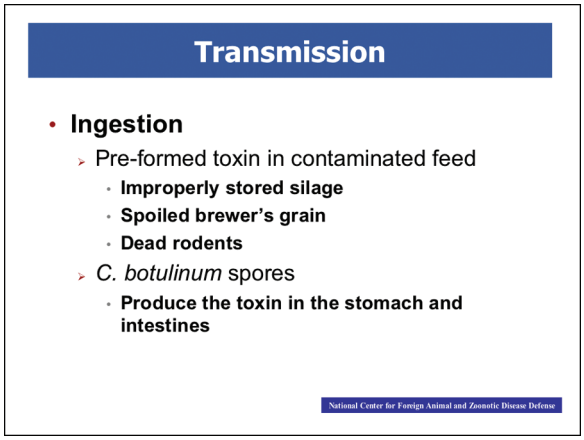
Slide 1: Botulism



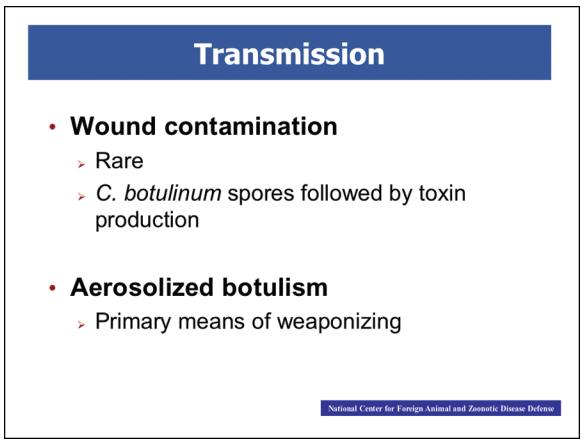
Slide 2: Botulism can affect many species of animals. Because of its role in food poisoning, it is reportable to state health departments and the Centers for Disease Control.



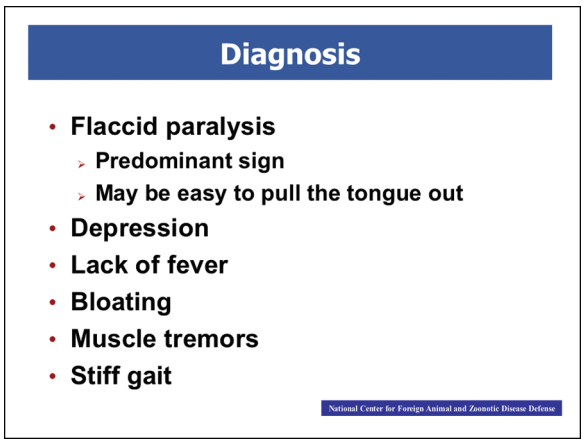
Slide 3: Botulism is caused by a neurotoxin produced by *Clostridium botulinum*.



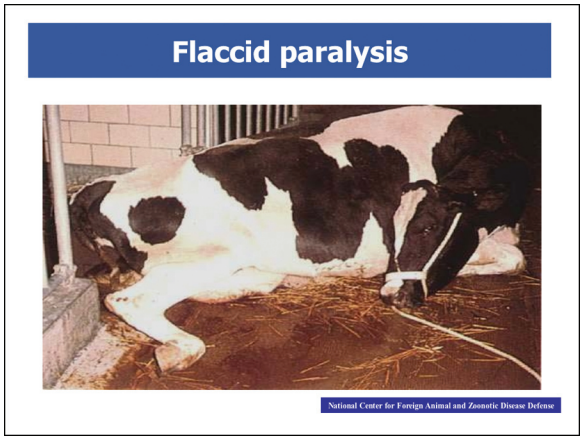
Slide 4: Botulism can occur from eating pre-formed toxin in contaminated feed or ingesting the actual bacterial spores.



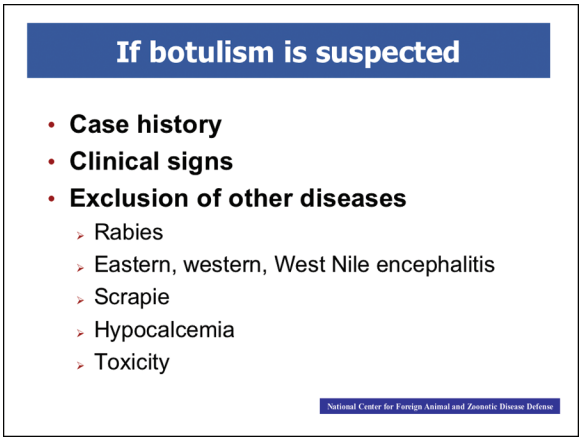
Slide 5: *C. botulinum* spores can be introduced into a wound, where they produce the toxin. Aerosolization is the primary means of creating weapons from the toxin.



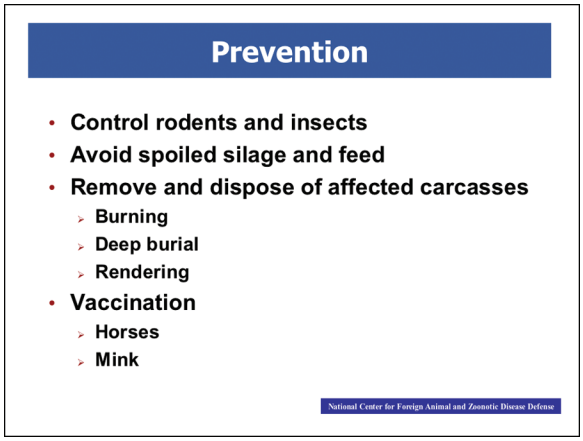
Slide 6: Flaccid paralysis is the predominant sign.



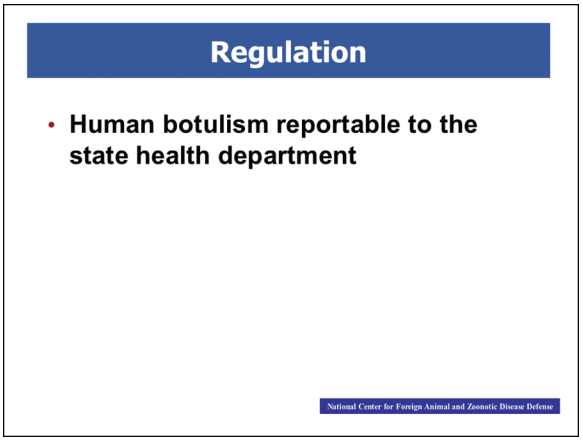
Slide 7: This cow has flaccid paralysis.



Slide 8: The effects of botulism can resemble those of several other diseases.



Slide 9: The best prevention is to avoid spoiled silage and feed.



Slide 10: Human botulism is reportable.

Classical swine fever

Causative agent: Classical swine fever (CSF), also called hog cholera, is a highly contagious viral disease of pigs. The United States and 16 other countries are currently free of the disease, which is a foreign animal disease. CSF was eradicated from the United States in 1978.

Transmission: Swine and javelina are the only animals infected by the CSF virus. The most common means of infection is direct contact of susceptible pigs with the secretions, excretions, semen or blood of infected swine. People, vehicles and other fomites can also carry the virus between infected and susceptible pigs.

The CSF virus survives in cold conditions and can withstand some forms of meat processing. Another way of transmitting the virus is by feeding insufficiently cooked meat or scraps to pigs. The CSF virus can survive for years in frozen pork. Piglets may be infected in utero and be born persistently infected, able to shed virus for months.

Diagnosis: Symptoms of infection may appear in one of three forms: acute, chronic or prenatal.

In the acute form, pigs may be febrile, lethargic and off of feed, with purplish discoloration of the skin over the ears, legs and abdomen. Death occurs in 5 to 15 days in this form with mortality in piglets approaching 100 percent.

Chronically affected pigs may have an unpredictable appetite, fever and diarrhea for up to a month. Pigs may recover only to relapse and die.

Mildly affected pigs may have a transient fever and loss of appetite. Sows can give birth to persistently infected piglets, mummified fetuses or stillbirths.

Prevention: Follow standard biosecurity practices to prevent CSF. Maintain fences to keep domestic pigs separated from feral swine. Quarantine pigs coming onto the property for at least 30 days, and isolate sick pigs from healthy ones. Properly heat waste food fed to pigs to sterilize CSF and other pathogens.

A modified live vaccine is available, but its use is prohibited in countries free of the disease.

Regulation and eradication: If CSF is suspected, report it immediately to state or federal regulatory animal health officials. The premises will be quarantined and animal movements will be traced forward and backward to determine if other herds might be affected.

Affected pigs must be euthanized and buried or incinerated along with contaminated bedding, feed and manure.

Additional resources

World Organization for Animal Health (OIE): http://www.oie.int/eng/maladies/fiches/a_A130.htm

USDA: www.aphis.usda.gov/publications/animal_health/content/printable_version/fs_ahcsf.pdf

US Animal Health Association: htpp://www.vet.uga.edu/vpp/gray_book/FAD/

Texas AgriLife Extension Service QuickFacts: http://extensionvetmed.tamu.edu

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Classical Swine Fever (CSF)

Chapter 3

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Slide 1: Classical Swine Fever (CSF)

Classical swine fever

- Also known as hog cholera
- Affects swine and javelina
- Reportable
- Viral disease
- Eradicated from the U.S. in 1978

National Center for Foreign Animal and Zoonotic Disease Defense

Slide 2: Classical swine fever affects only swine and javelina.

Means of infection



National Center for Foreign Animal and Zoonotic Disease Defense

Slide 3: The most common means of infection is direct contact of susceptible pigs with the secretions, excretions, semen or blood of infected swine.

Causative agent

- Pestivirus
- Family Flaviviridae
- Only natural reservoir
  - Domestic swine
  - Feral swine

National Center for Foreign Animal and Zoonotic Disease Defense

Slide 4: The only natural reservoirs are domestic and feral swine.

Transmission

- Routes of exit
  - Semen
  - Blood
  - Saliva
  - Feces
  - Meat

National Center for Foreign Animal and Zoonotic Disease Defense

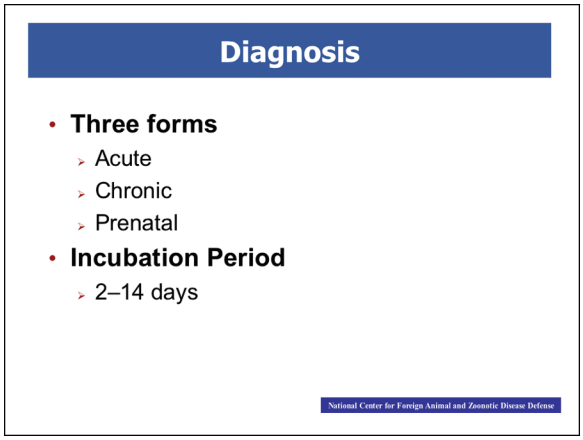
Slide 5: CSF can be transmitted in several ways.

Routes of entry

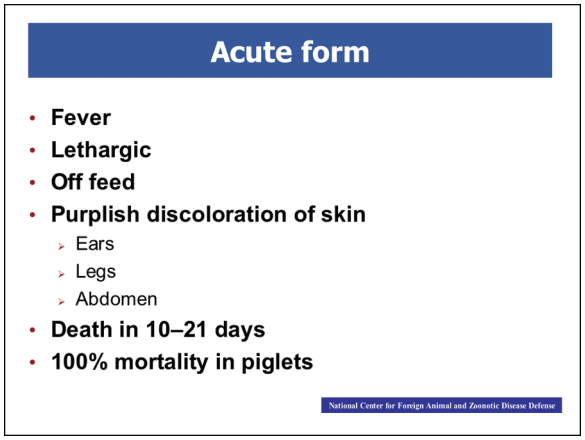
- Ingestion
- Mucous membranes
- Broken skin
- In utero

National Center for Foreign Animal and Zoonotic Disease Defense

Slide 6: Swine can become infected through various routes.

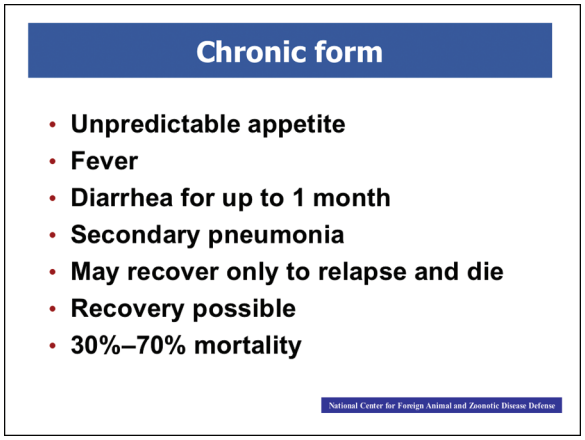


Slide 7: There are three forms of classical swine fever: acute, chronic and prenatal.



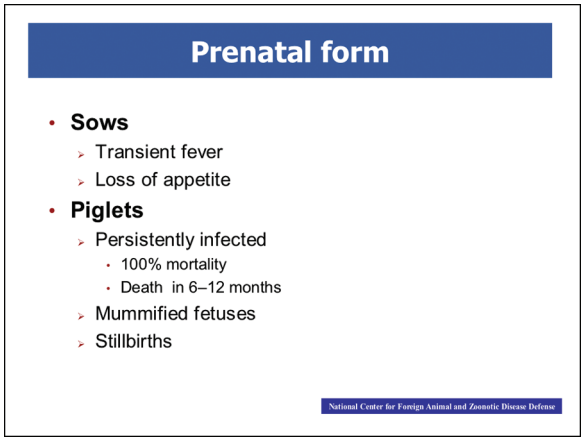
Slide 8: In the acute form of the disease, there is a high mortality rate.

Slide 9: Note the discoloration of the extremities.

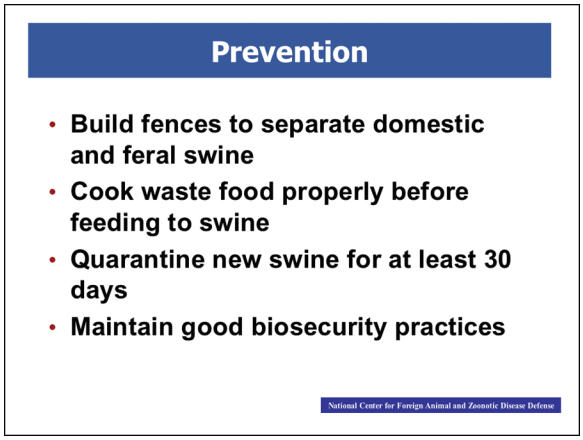


Slide 10: Swine may recover from the chronic form of CSF.

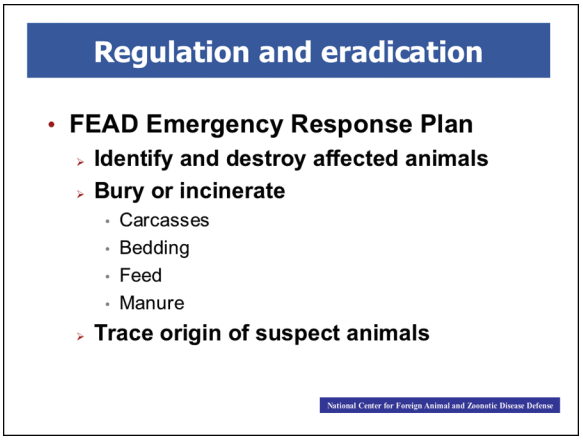
Slide 11: Pigs with diarrhea.



Slide 12: In the prenatal form, piglets can be born persistently infected and shed the virus until death at 6 to 12 months.



Slide 13: Good biosecurity practices will help prevent swine from becoming infected with CSF.



Slide 14: CSF is a reportable disease. In the case of an outbreak, everything that has come in contact with infected swine will need to be incinerated or buried.

Foot-and-mouth disease

Causative agent: Foot-and-mouth disease (FMD) is a severe, highly infectious, viral disease of cloven-hoofed animals. Although usually not fatal, it causes suffering and lowers the animals' commercial value by reducing their weight and milk output.

Cattle, swine, sheep, goats and deer are highly susceptible; they may exhibit signs of infection after an incubation period of 1 to 8 days. Animals may begin shedding the virus 4 days before symptoms appear. In sheep and goats, the incubation period may be longer and, in some cases, the disease may go undetected.

FMD is not a zoonotic disease nor does it affect horses. The disease survives in the lymph nodes and bone marrow at a neutral pH, but after death it is destroyed in muscle when the pH is less than 6 (rigor mortis).

There are at least seven types and many subtypes of the FMD virus. An animal that is immune to one type is not immune to other types. FMD virus is an aphthovirus from the family Picornaviridae.

Transmission: FMD virus can persist in contaminated fodder and in the environment for weeks to months if the temperature and other conditions are favorable. The virus can be spread by animals, people, materials, wind, excretions, secretions, milk and semen. The most important method of spreading FMD is contact with infected animals or contaminated objects. All fluids and tissues are infectious.

Anything that brings the virus into contact with susceptible animals can spread the disease, such as:

- Wearing contaminated clothes or footwear or using contaminated equipment
- Introducing virus-carrying animals into susceptible herds
- Holding susceptible animals in contaminated facilities
- Moving susceptible animals in contaminated vehicles
- Feeding raw or improperly cooked garbage containing infected meat or animal products to susceptible animals
- Exposing susceptible animals to materials such as hay, feedstuffs, hides or biologics that are contaminated with the virus
- Allowing susceptible animals to drink from a contaminated water source
- Inseminating susceptible cows with semen from infected bulls

Diagnosis: Diagnosis of FMD is not easy because its symptoms are similar to those of other diseases such as swine vesicular disease. The main symptom is blisters or erosions on the tongue and lips, in the mouth, on the teats and between the hooves. Blisters are usually not observed because they rupture easily, which leads to erosions.

Other signs of FMD are:

- A temperature that rises markedly, then falls in 2 or 3 days
- Ruptured vesicles that discharge clear or cloudy fluid and leave raw, eroded areas surrounded by ragged fragments of loose tissue
- Sticky, foamy, stringy saliva
- Reduced feed consumption
- Lameness and reluctance to move
- Abortion
- Abrupt drop in milk flow
- Low conception rate
- Myocarditis (inflammation of the muscular walls of the heart)

- Death, especially in newborn animals

Animals may show signs after an incubation period of 1 to 8 days. Young animals may die before showing any symptoms. If FMD is suspected, contact a veterinarian and the proper authorities before collecting any samples. The samples will be sent to a diagnostic laboratory where a series of tests will be run to identify the disease.

Prevention: Many preventive measures are in place to help protect the United States from an outbreak of foot-and-mouth disease, and, in fact, the United States has been FMD-free since 1929. To help maintain that status, any unusual animal health symptoms should be reported to a veterinarian and to state or federal animal regulatory agency.

The USDA prohibits the entry of live animals and animal products from areas known to be infected with FMD. Other safeguards include:

- Alerts at U.S. land and maritime ports of entry to check passengers, luggage, cargo and mail for prohibited agricultural products or other items that could carry FMD
- Inspectors and teams of dogs at airports to check incoming international flights and passengers
- The requirement that international passengers declare all food items and other material of plant or animal origin in their possession
- The requirement that international passengers report visits to farms or other livestock facilities
- The requirement that people traveling from FMD-affected areas have their shoes disinfected if they have visited farms or other high-risk areas

Ranchers can do the following to prevent the introduction of FMD to their livestock:

- Ask all visitors to wear shoes that have never been on international soil. Provide them with clean shoes if necessary.
- Wash or dry clean visitors' clothes immediately.
- Disinfect visitors' jewelry, eyeglasses and other items.
- Never allow meat or animal products from FMD-affected countries on the livestock premises.
- Discourage international visitors from handling or having close contact with susceptible livestock.

Regulation and eradication: Prompt diagnosis is necessary to eradicate the disease. If FMD is suspected, contact a local veterinarian and the state animal health regulatory agency.

If the disease were confirmed, APHIS would move quickly to trace infected or exposed animals, establish and maintain FMD quarantines and destroy infected and exposed animals. APHIS would work with state and local officials to humanely euthanatize animals and dispose of carcasses by approved methods.

As a further precaution against a widespread outbreak, agency officials would also evaluate the need to receive FMD vaccine from the North American Foot-and-Mouth Disease Vaccine Bank. There is a vaccine that can be used in case of an FMD outbreak, but the vaccine administered must match the type and subtype present in the affected area. Otherwise, the vaccine will not work.

If an outbreak should occur, emergency vaccination could play an important role in controlling it. Samples would be collected and sent for diagnosis so that all susceptible livestock within a certain radius could be vaccinated with the correct vaccine.

Although APHIS does not promote widespread vaccination as an appropriate first step against the disease, recent exercises simulating an FMD outbreak have shown that vaccinating animals may aid in eradication.

Additional resources

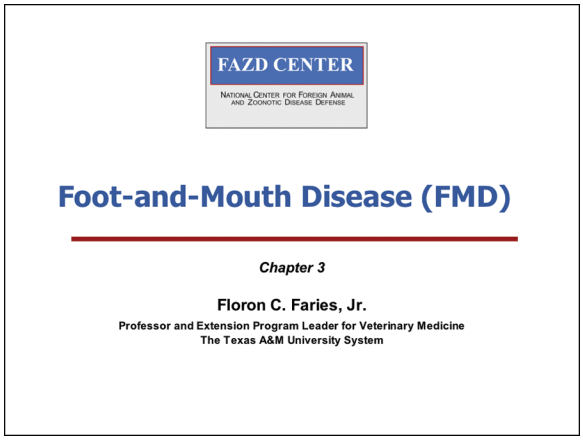
USDA–APHIS

http://www.aphis.usda.gov/publications/animal_health/index_ah_f.shtml

Texas Animal Health Commission (TAHC): http://www.tahc.state.tx.us/news/brochures/FMD_Travel.pdf

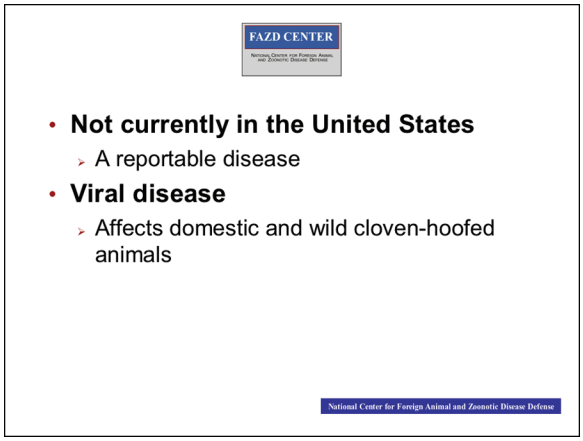
Biosecurity: http://www.cdfa.ca.gov/ahfss/ah/biosecurity.htm

Texas AgriLife Extension Service QuickFacts: http://extensionvetmed.tamu.edu

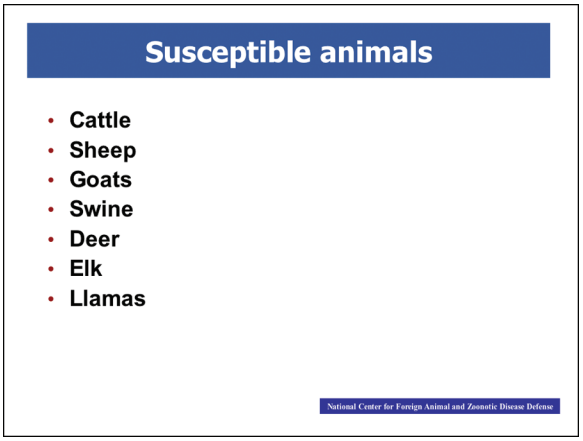


Slide 1: Foot-and-Mouth Disease (FMD)

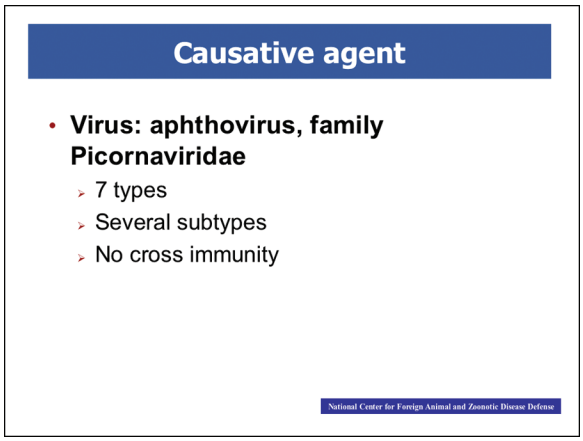
Slide 2: FMD is not currently in North America, Australia or Antarctica.



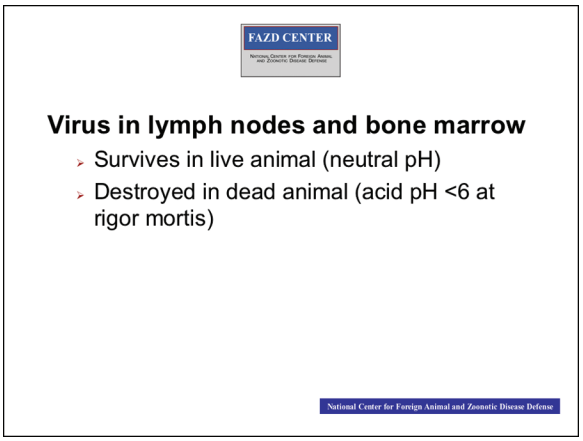
Slide 3: FMD affects two-toed animals, not one-toed (horses) or five-toed (dogs, cats, people) animals.



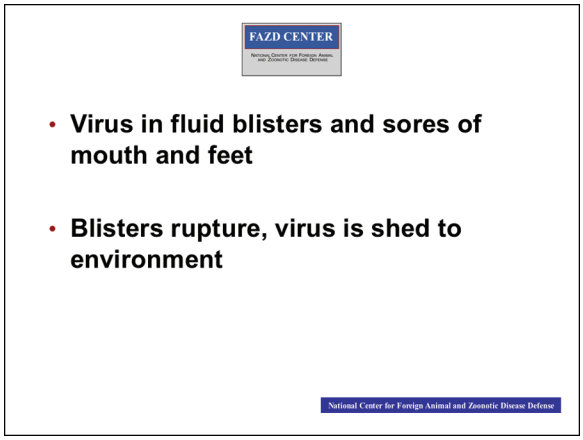
Slide 4: These animals are susceptible.



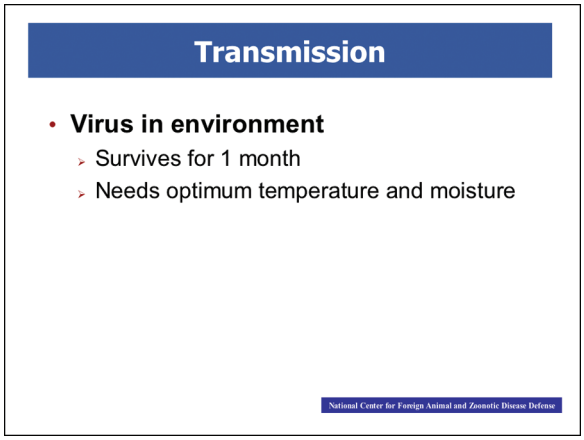
Slide 5: This is a fragile, highly contagious virus.



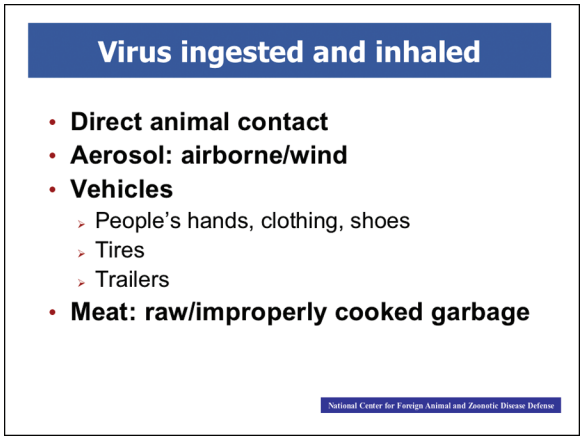
Slide 6: The virus has survived in livestock slaughtered for human food in FMD countries.



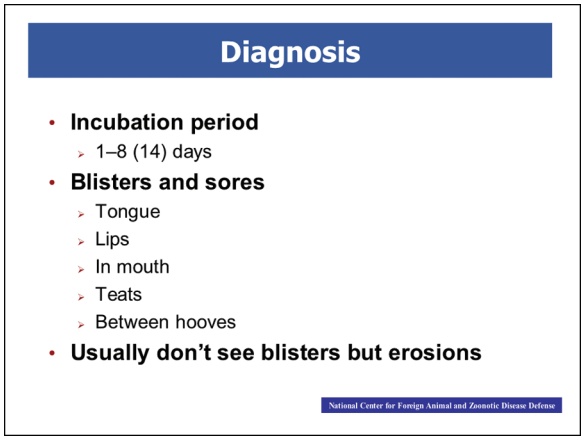
Slide 7: Blisters rapidly deteriorate and tissue sloughs, leaving erosions and sores.



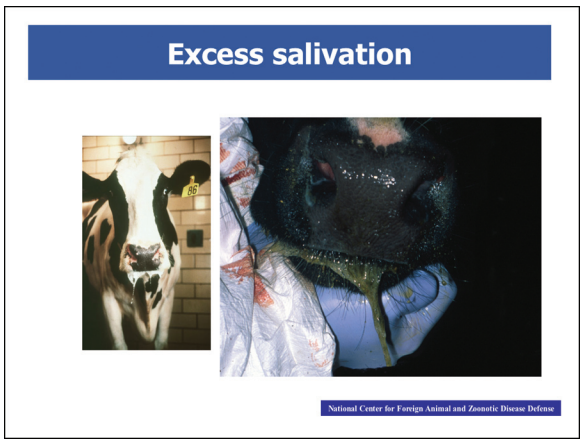
Slide 8: One source of infection is a contaminated environment.



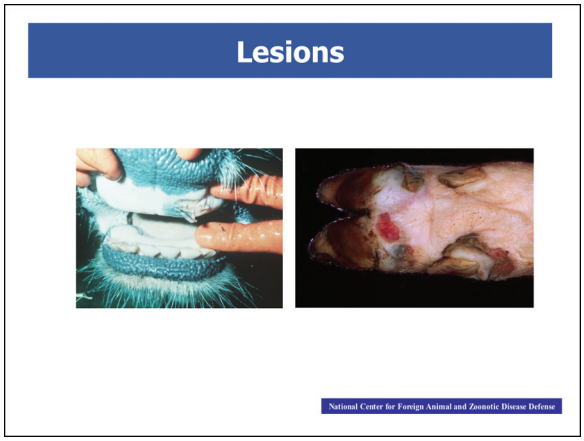
Slide 9: After ingestion, the virus spreads by blood to the mouth and feet. FMD is the most highly contagious disease of livestock.



Slide 10: The incubation is short in swine that have severe lesions. There is a long incubation in sheep with mild lesions. The virus rapidly multiplies in swine (multiplier).

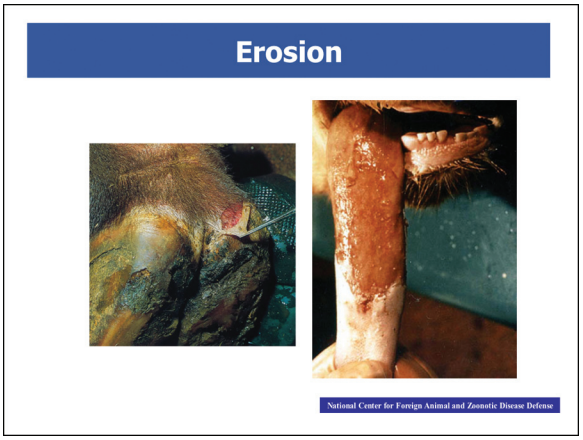


Slide 11: There is an excess salivation with or without blood.

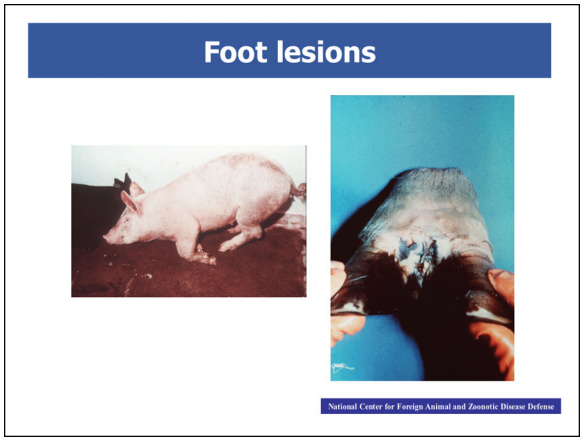


Slide 12: Mouth and foot lesions.

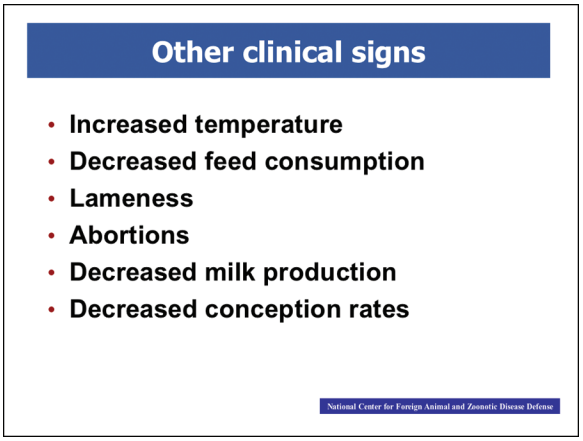
Slide 13: Snout and tongue lesions.



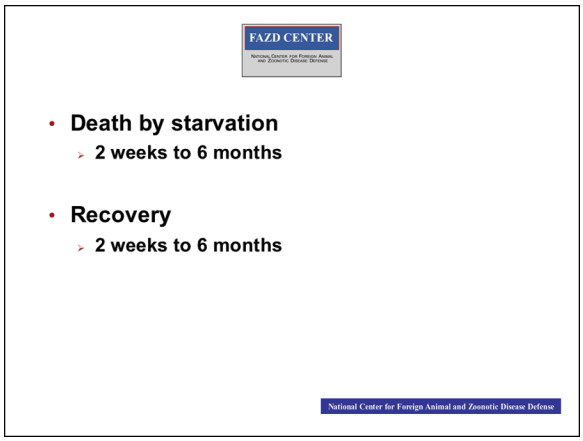
Slide 14: Erosion on the hoof of a steer (left). Large erosion on the tongue of a steer.



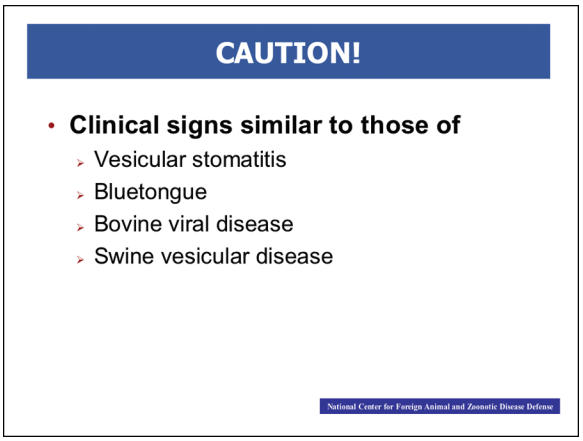
Slide 15: Foot lesions.



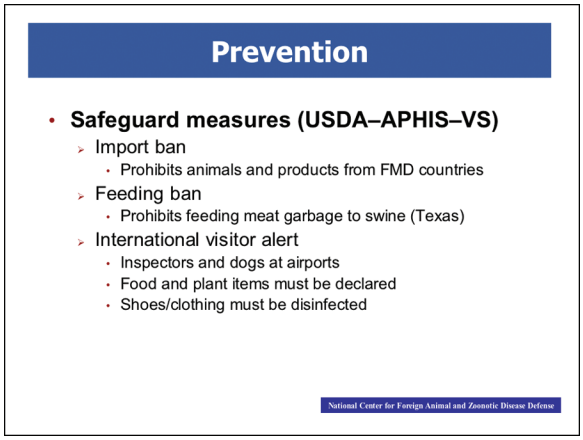
Slide 16: There are other clinical signs of the disease.



Slide 17: FMD does not kill the animal. The animal either recovers or dies of starvation.

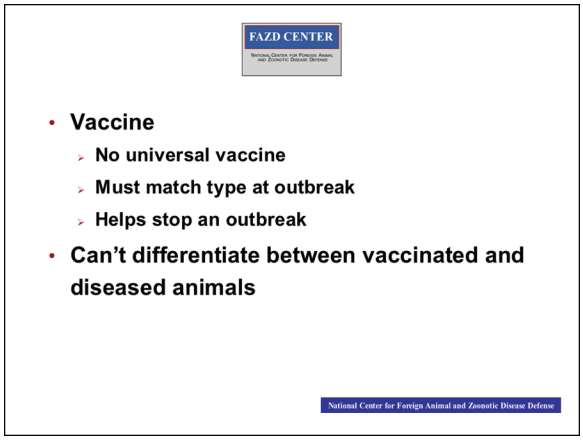


Slide 18: These diseases have similar lesions.



Slide 19: Safeguards are in place to prevent entry of the disease into the United States.

Slide 20: These are the steps that ranchers should take to prevent entry and spread of the disease.



Slide 21: Once a vaccine is used, the United States is declared an FMD country, and exports to other countries are banned.

Rift Valley fever

Causative agent: Rift Valley fever (RVF) was first diagnosed in Kenya in 1930 and has since spread to most of southern and eastern Africa, Egypt, Saudi Arabia and Yemen. RVF is caused by an RNA virus in the family Bunyaviridae.

The virus is zoonotic because it can transfer from animals to humans and vice versa. The disease affects sheep, cattle, goats, buffalo, camels, monkeys and gray squirrels and other rodents. Species such as adult cats, dogs and horses may be viremic (have the virus in the blood stream) but do not show severe signs of the disease.

Transmission: The RVF virus is transmitted by mosquitoes, ticks and biting midges. The virus multiplies in ruminant animals such as sheep and cattle. When a mosquito bites an infected animal, it picks up the virus and can then transmit it to other animals.

The virus also survives in mosquito eggs, primarily the *Aedes* mosquito until the next rainfall, when the eggs hatch. This pattern is why epidemics occur about every 5 to 15 years.

The virus can survive for more than an hour in aerosols, under optimal conditions of 25 degrees C. It can survive in the environment for up to 8 years under optimal weather conditions.

Humans can become infected with the virus by contact with aerosols or with animal tissues during parturition, necropsy, slaughter, laboratory procedures or meat preparation for cooking. The incubation period is about 3 days in animals and 4 to 6 days in humans.

Diagnosis: An animal infected with RVF may show several symptoms that can vary with the age, species and breed of the animal. The most common symptom in endemic areas is a high incidence of abortion and high mortality of newborn animals in a herd.

Infected calves have a mortality rate of 10 percent to 70 percent. Clinical symptoms in calves:

- Fever
- Depression
- Icterus (jaundice)
- Anorexia and weakness
- Listlessness
- Evident abdominal pain

Adult cattle have a mortality rate of less than 10 percent. Symptoms in adult cattle:

- Excessive salivation
- Anorexia and weakness
- Fetid diarrhea
- Reduced milk yield
- Abortion
- Nasal discharge

Symptoms in sheep and goats are similar to those in cattle. Lambs and kids less than a week old have little chance of survival. Those more than a week old have a 20 percent mortality rate. Clinical symptoms in lambs and kids:

- Fever
- Anorexia and weakness
- Listlessness
- Evident abdominal pain

Adult sheep and goats have a 20 percent to 30 percent mortality rate, with symptoms such as:

- Fever
- Mucopurulent nasal discharge
- Vomiting
- Anorexia
- Listlessness
- Diarrhea
- Icterus

- Abortion, which may be the only sign of disease

For the diagnosis to be confirmed, the virus must be isolated and identified from blood or other tissues (liver, spleen, brain) of aborted fetuses.

Prevention: The best way to prevent RVF from entering the United States is to maintain good biosecurity protocols. Control of insect vectors will help prevent the spread of disease.

Several preventive vaccines are used in endemic areas around the world. The vaccine used most often is a live-virus from the Smithburn strain. This strain requires revaccination only every 3 years. The disadvantage of this vaccine is that it causes abortions in pregnant ewes.

Other types of vaccine are made from inactivated virus, but they require that two shots be given before the animal is protected. Another live vaccine, called MV P12, is under development. It seems not to cause pregnant ewes to abort.

Regulation and eradication. RVF is a reportable disease in the United States; if it is suspected, animal health regulatory agencies should be notified. Once RVF is introduced into an area, it is very difficult to eradicate. If an outbreak occurs, several steps must be taken to reduce the number of animals infected:

- Control mosquitoes.
- Restrict livestock movement.
- Prevent human exposure to infected animal tissues or aborted fetuses through educational campaigns.
- Prevent human exposure to mosquitoes by encouraging people to wear protective clothing, use insect repellents and avoid outdoor activities when mosquitoes are most active.

Additional resources

Center for Food Security and Public Health: http://www.cfsph.iastate.edu/DiseaseInfo/default.htm

Center for Infectious Disease Research and Policy: http://www.cidrap.umn.edu/cidrap/content/biosecurity/ag-biosec/anim-disease/rvf.pdf

Food and Agriculture Organization: http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/rvf.html

Texas AgriLife Extension Service QuickFacts: http://aevm.tamu.edu

FAZD CENTER
National Center for Foreign Animal and Zoonotic Disease Defense

Rift Valley Fever (RVF)

Chapter 3

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

Slide 1: Rift Valley Fever (RVF)

Rift Valley Fever

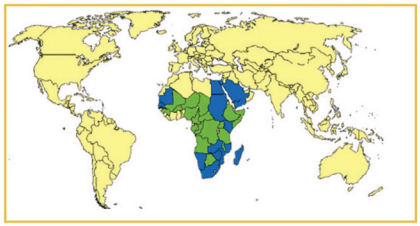
- Not in U.S.
- Reportable
- Zoonotic
- First diagnosed in Kenya, Africa, in 1930

National Center for Foreign Animal and Zoonotic Disease Defense

Slide 2: Rift Valley fever is not currently in the United States.

Distribution

Distribution of Rift Valley fever, 2002



-CDC

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Slide 3: Distribution of Rift Valley fever in Africa:
-- Blue countries have endemic disease and substantial outbreaks of RVF
-- Green countries are known to have some cases, periodic isolations of virus or serologic evidence of RVF.

Susceptible animals

- Cattle
- Sheep
- Goats
- Camels
- Monkeys
- Cats
- Dogs
- Buffalo
- Horses

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Slide 4: Many species are susceptible to RVF.

Causative agent

- RNA virus, family Bunyaviridae
- Cattle and sheep amplify virus

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Slide 5: There are high levels of virus in the blood of cattle and sheep.

Transmission

- Transmitted by
  - Mosquitoes
    - Aedes mosquito
    - 14 species in U.S.
    - Transovarial transmission
    - Virus in eggs in soil
    - Heavy rains cause eggs to hatch
  - Ticks and biting midges

-CDC, James Gathany

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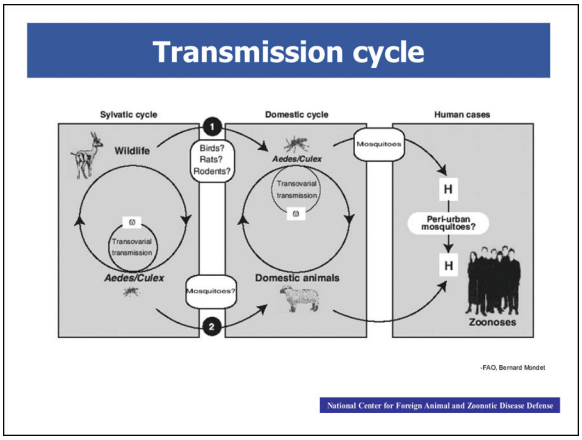
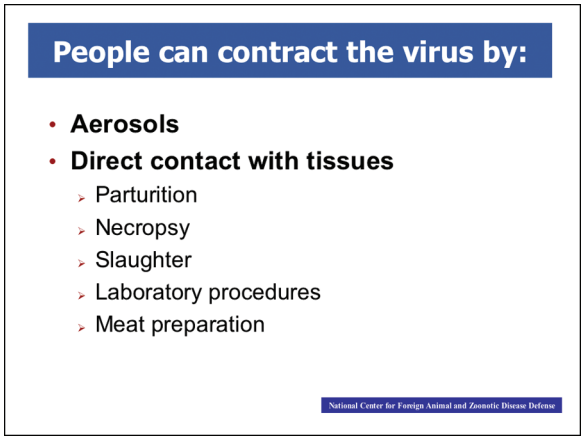
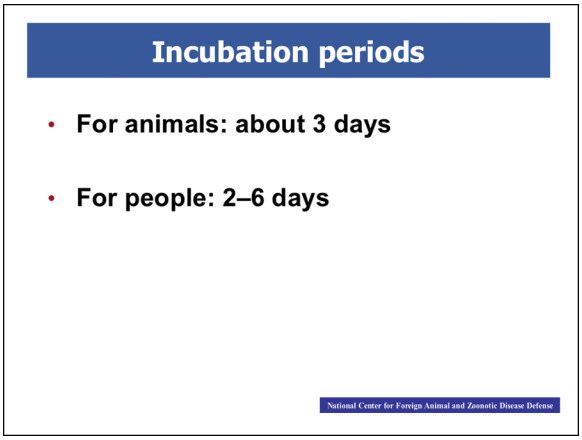
Slide 6: The disease is transmitted by insect vectors.



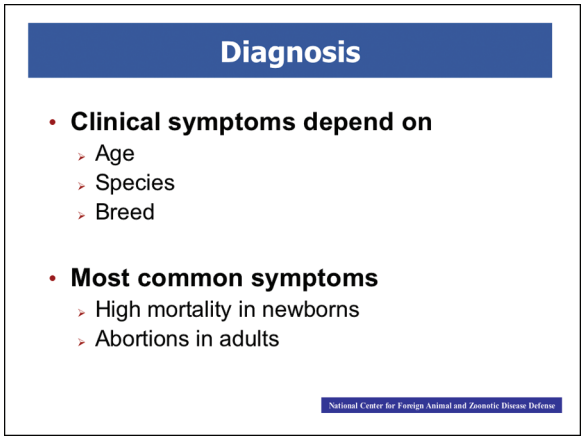
Slide 7: The RVF transmission cycle.



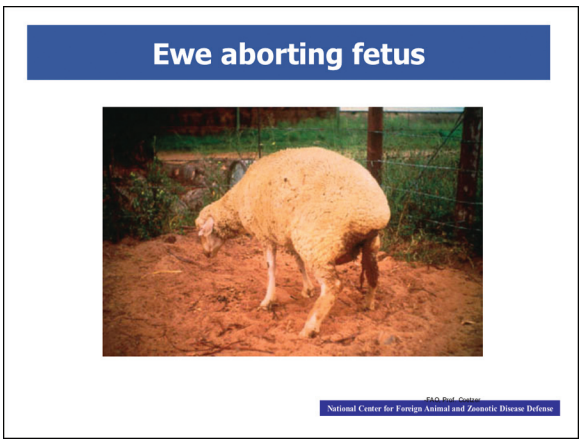
Slide 8: In addition to mosquito bites, people can contract the virus in other ways.



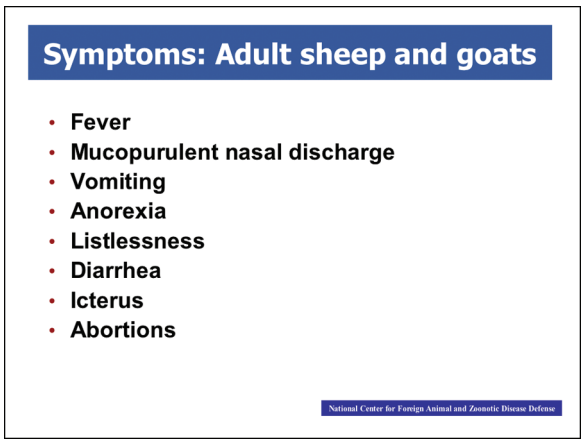
Slide 9: Here are the incubation periods for animals and people.



Slide 10: Symptoms may vary by age, species and breed.



Slide 11: Ewe aborting fetus.



Slide 12: Mouth and foot lesions.

Symptoms: Kids and lambs

- **Fever**
- **Anorexia and weakness**
- **Listlessness**
- **Evident abdominal pain**
- **Death**

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Slide 13: These are the symptoms in kids and lambs.

Symptoms: Adult cattle

- Fever
- Excessive salivation
- Anorexia
- Weakness
- Fetid diarrhea
- Fall in milk yield
- Abortions
- Nasal discharge

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Slide 14: These are the symptoms in adult cattle.

Symptoms: Calves

- **Fever**
- **Depression**
- **Icterus**
- **Anorexia and weakness**
- **Listlessness**
- **Evident abdominal pain**
- **Death**

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Slide 15: These are the symptoms in calves.

Mortality rates

- **Calves: 10%–70%**
- **Adult cattle: <10%**
- **Adult sheep and goats: 20%–30%**
- **Kids and lambs: 90%**

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Slide 16: Mortality rates vary by species.

Prevention

- **Biosecurity measures**
- **Control mosquito populations**
- **Restrict livestock movement**
- **Prevent human exposure to infected animal tissues or fetuses**
- **Prevent human exposure to mosquito vectors**
  - Wear protective clothing
  - Use insect repellents
  - Avoid outdoor activities during times of peak mosquito activity.

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Slide 17: These practices can reduce the risk of disease transmission.

Regulation and eradication

- **Identify and destroy positive animals**
- **Reduce amount of time to get back test results**
- **Track origin of suspect animals**

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Slide 18: Effective eradication procedures include the prompt quarantine of an infected herd, rapid investigations of animals in (trace-in) and animals out (trace-out) of the herd, and depopulation of animals.

Chapter 4

Biosecurity Best Management Practices

Biosecurity is a set of management practices that prevent the introduction of infectious diseases into a herd or flock. Everyone involved in the animal production circle needs to be aware of biosecurity. This includes event planners, producers, industry workers, food processors, foreign travelers and the local hosts of foreign travelers. Biosecurity should be of utmost importance in any animal operation, large or small.

The key concepts in biosecurity are mitigation, preparedness, response and recovery.

Mitigation

Mitigation is the methods used to make something less harsh or harmful—a type of prevention. Some best management practices include:

- All people entering the facility should disinfect their hands and feet. Outside the entrance to the facility, provide a brush and a small tub containing a disinfectant such as bleach. Make sure the disinfectant is fresh each day.
- Spray disinfectant on all vehicles driven onto the premises. Disinfect the tires of the vehicle, which were in contact with the ground at other locations.
- When bringing trailers into a facility, spray the tires with a disinfectant to eliminate germs from the tires. If the trailer is dirty (such as with manure), clean it out at a car wash before driving it into the facility. Harmful germs can be picked up almost anywhere—on roads, in parking lots or in other people's pastures.
- All workers should have shoes designated specifically for the facility. They should put them on when entering and take them off when leaving.
- When lending or borrowing tools or equipment, wash and disinfect them as they enter and exit the premises.
- Do not haul unbagged trash from one site to another. Seal it in a plastic bag.
- Follow the guidelines for regulated feed. It is dangerous and illegal to feed meat scraps to livestock, as these products can carry diseases such as foot-and-mouth disease and BSE.
- Know about the people who enter the property. Who are they? Where have they been? Why are they there? Beware of individuals lingering near barns, fence lines, water sources or anywhere else. If an individual seems suspicious, call the local law enforcement agency.
- Lock the gates when entering and leaving the facility.
- Keep livestock feed and veterinary supplies in a secure location even at home.
- When at a show, do not leave feed sitting in the barn. Lock any excess feed or equipment in the trailer or truck. Do not leave water buckets unattended. Fill the buckets every time the animals are watered. To prevent the spread of disease, do not share feed or water buckets with other exhibitors.
- Before buying animals, request information about the disease and vaccination status of the herd of origin. Test the animals for diseases before shipment.

- Isolate/quarantine all new animals for a minimum of 2 weeks. Animals that have been at a show or fair should also be isolated for 2 weeks. Isolation helps prevent diseased animals from infecting your herd.
- Animals brought in from out of state must be inspected by a veterinarian; use this same practice with animals bought within the state to ensure that they are healthy.
- Develop a list of standard tests for all incoming animals. Complete the testing of all animals while they are in isolation/quarantine.
- Create a vaccination plan. Vaccination is the basic step in prevention. Vaccinate all animals appropriately and follow up as directed with yearly boosters.
- Prevent animals' bodily fluids from contaminating feed, equipment and other animals.
- Look for signs of disease in animals. These might include unexplained death; a high percentage of animals sick with the same symptoms; blisters around the animals' mouths, noses, teats or hooves; and central nervous system problems such as staggering or falling. In poultry, the signs could be lack of energy or appetite; watery, green diarrhea; decreased egg production; swelling around the eyes, neck and head; sneezing, gasping or coughing; discoloration of wattles, combs and legs; and tremors, circling or other nervous system problems.

These practices are just as important for owners of backyard poultry flocks or a small number of livestock as they are for large, commercial operations.

Preparedness

Preparedness is the planning, training and practicing the mitigation practices to ensure their usefulness. Although there are many ways to protect a premises, all of them may not be useful or cost effective.

One important part of preparedness is knowing which diseases could affect your animals and being familiar with symptoms of those diseases, so that if problems occur you can respond quickly. Producers should practice the plan and analyze the weaknesses and strengths of the facilities to determine what should be done to protect it.

Response

The *response phase* is the reaction to and handling of an event as efficiently and effectively as possible. The first 24 hours of a disease outbreak are crucial. Producers should immediately report any abnormal health issues to a veterinarian or to state/federal animal health regulatory officials.

Do not implement the "Shoot, Shovel and Shut Up" method, as this would delay the response and could cause more damage. The more quickly a diagnosis is made and quarantine zones established, the more likely officials will be able to control the spread of the disease to other animals and premises.

Report anything that is suspicious to a veterinarian or state or federal animal health regulatory agency. These agencies do not charge you or your local veterinarian to investigate possible disease outbreaks. When these agencies respond, the individuals involved will be responsible for determining quarantine areas, collecting and submitting appropriate samples and deciding what to do with diseased animals.

Recovery

Once a disease outbreak has either been eradicated or brought under control, start the recovery phase of the process. Activities during this phase help restore the premises to an acceptable and operational level. Some practices might include covering pits, sampling ground water and disinfecting. Authorities can help determine what needs to be done before the animals are restocked to ensure that the disease does not recur.

These practices all rely on one another, and after the recovery phase, the process cycles back to the mitigation phase to improve on areas that might need some attention. This continuous cycle helps ensure that infectious diseases are prevented, controlled or eradicated.

Additional resources

Texas Animal Health Commission: http://www.tahc.state.tx.us/

Texas AgriLife Extension Service Biosecurity Manuals: http://aevm.tamu.edu

Biosecurity in Practice Series. Institute of Agriculture and Natural Resources. Great Plains Veterinary Educational Center. University of Nebraska–Lincoln: http://www.farmandranchbiosecurity.com

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Biosecurity Best Management Practices

Chapter 4

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The Texas A&M University System

Slide 1: Biosecurity Best Management Practices

What is biosecurity?

A set of best management practices that prevent infectious diseases from being carried into a herd/flock

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Slide 2: Biosecurity measures help you prevent and prepare for natural, accidental or intentional animal disasters and emergencies.

Who should be on the lookout?

- Livestock event planners
- Livestock producers
- Animal industry workers
- Food processors
- Foreign travelers or local hosts expecting foreign visitors
- Backyard flock owners
- Hunters/sportsmen

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Slide 3: Everyone should share the responsibility of ensuring the safety of the livestock and agriculture industry. Everyone plays a key role.

4 key steps

- **Mitigation**
- **Preparedness**
- **Response**
- **Recovery**

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Slide 4: The key components of biosecurity are mitigation, preparedness, response and recovery. Producers have important responsibilities in each area.

Mitigation

- **Simple best management practices**
  - Disinfect
  - Clean
  - Remove trash
  - Know who is on your property
  - Lock gates
  - Isolate/quarantine
  - Test
  - Vaccinate
  - Report
  - Rotate disinfectants

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Slide 5: Preventive measures help keep premises safe and disease free.

Prevent sharing of body fluids

- Between animals
- From animals to feed
- From animals to equipment

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Slide 6: Learn basic epidemiology and how diseases are transmitted.

Poultry-specific prevention

6 steps for 'backyard' biosecurity for birds

- **Limit unwanted traffic**
- **Keep clothing and hands clean**
- **Keep trucks and equipment clean**
- **Don't borrow**
- **Know symptoms of diseases**
- **Report**
- **Limit interaction with wild birds and birds from other farms**

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Slide 7: These are biosecurity tips for poultry operations.

Infectious disease warning signs

- Sudden increase in bird deaths
- Sneezing, gasping for air, nasal discharge, coughing
- Watery and green diarrhea
- Lack of energy and appetite
- Decreased egg production
- Swelling around eyes, neck and head
- Discoloration of wattles, combs and legs
- Tremors, drooping wings, circling, twisting of head and neck, or lack of movement

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Slide 8: Be able to recognize the warning signs that an outbreak might be occurring. Report anything out of the ordinary.

Preparedness

- **Develop a biosecurity team**
  - Operation supervisors
  - Veterinarian
  - Nutritionist
  - Extension specialist
  - Suppliers
  - Others necessary to operation

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Slide 9: These key people can help you develop and implement biosecurity practices for your premises.

Major components of biosecurity

- **Resistance**
- **Isolation**
- **Traffic**
- **Control**
- **Sanitation**
- **Testing**

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Slide 10: These are the major components of biosecurity.

Develop a biosecurity program

- **Risk assessment**
- **Risk management**
- **Communication/records**

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Slide 11: Establish protocols to help prevent problems. Being prepared will reduce your chances of disease transmission.

Biosecurity measures

- **Establish standard operating procedures**
- **Know the symptoms of diseases**

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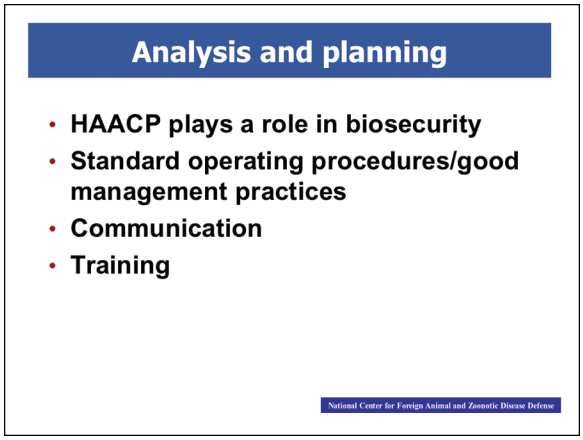
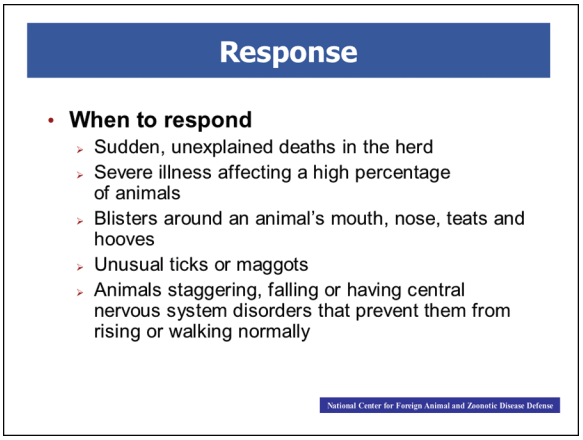
Slide 12: Work with local veterinarians, team members and others to determine the biosecurity measures that would benefit your operation the most. While preparing a plan, also learn about the different symptoms of diseases that might affect your operation.

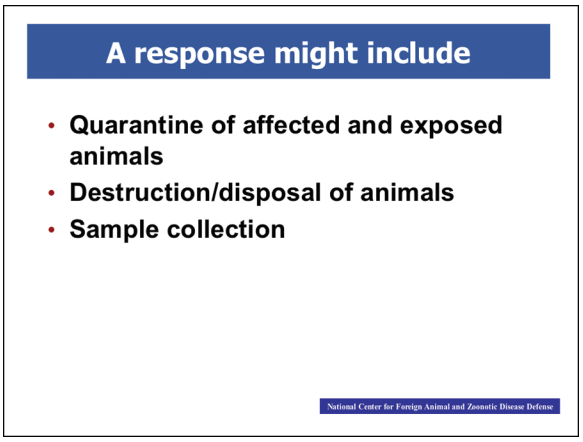


Slide 13: Learn what hazard analysis and critical control points planning does and the best management practices for your establishment. Communicate with and train employees so all are following the same procedures.

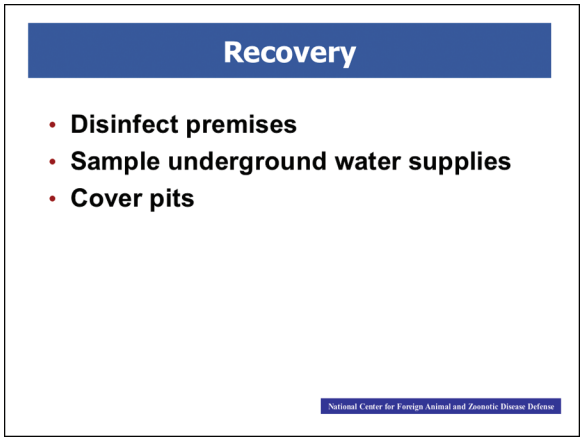


Slide 14: The more rapid the response to a possible disease outbreak, the more quickly you can implement quarantine or eradication procedures. Watch for these symptoms.

Slide 15: If you see something suspicious, contact your veterinarian and your state or federal animal health regulatory agency. One of these will then contact the USDA–Veterinary Services unit.



Slide 16: State and federal agencies will determine the proper response for the particular outbreak.



Slide 17: These are some procedures that can be followed to help to restore the premise to an acceptable state.

Chapter 5

State and Local Emergency Management Plans

The state foreign animal disease (FAD) response plan is an integral part of the overall emergency management planning structure coordinated by each state's emergency management system. The plan is operated under an identified incident command system (ICS), with incident command posts and incident commanders.

This plan provides guidance for mitigating against, preparing for, identifying, responding to and recovering from any infectious or highly contagious animal disease affecting the poultry, exotic and domestic livestock, and wildlife. Each agency or organization in the plan will be represented, as needed, in both the state operations center and at the field ICS post(s). It also will have a standard operating procedure relative to its assignment of identified responsibilities for a potential or actual FAD outbreak.

A foreign animal disease is one not currently present in any animals within the United States. A zoonotic disease is a shared disease between animals and people. FADs may affect livestock, poultry and wildlife. These diseases may be extremely difficult to identify, isolate, control and eradicate.

A disease may also spread to animals in other states and other countries. The existence of a FAD in the United States will severely affect the intrastate, interstate and international movement of live animals and animal products.

If sick or dying livestock and wildlife are observed, a veterinarian, game warden, game biologist or other professional who deals with animals should be notified. Suspected FAD outbreaks are to be reported to state animal health authorities and to the Veterinary Services unit of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA–APHIS–VS).

A foreign animal disease diagnostician will be assigned to investigate the condition of the animal(s) and will begin a complete investigation. If the diagnostician suspects a foreign or emerging animal disease, he or she will:

- Obtain samples and submit them for analysis to the National Veterinary Services Laboratories at Ames, Iowa, or the Foreign Animal Disease Diagnostic Laboratory at Plum Island, New York.
- Mitigate the risk of spreading the suspected disease by establishing sound biosecurity precautions and implementing movement restrictions.
- Notify the state veterinarian and the USDA-APHIS-VS area veterinarian-in-charge about the need for activation of a first assessment and sampling team to come to the site and assist in the field diagnosis.

Based on laboratory and other findings, the first assessment and sampling team will recommend to the state animal health agency whether or not to activate the emergency response team, which would then establish and operate an incident command post.

Once the FAD is identified, control and eradication of it will involve many local,

state and federal agencies, and not just those associated with agricultural activities. Response to a FAD is generally a "top down" provision of assistance rather than a "bottom up" request for assistance as seen in other emergency management operations. Once one animal is infected with an FAD, the federal government and trading partners around the world are involved.

The state animal health regulatory agency should be the lead agency for FAD response, and the emergency response team will provide the expertise to carry out the FAD surveillance and response operations in the field, using the ICS. If the introduction of a FAD is suspected or confirmed to be a criminal or terrorist act, federal and state law enforcement personnel will play a key role in the FAD-related response actions and activities.

This plan may be activated incrementally. It relies on the ICS concept, in which an incident command post may be as small or as large as necessary. The response may involve only state and possibly federal animal health personnel, or it may include many local, state and federal organizations.

Each incident command post will be jointly commanded by a state animal health regulatory agency or USDA–APHIS–VS employee and the appropriate department of public safety disaster chairperson or designee. The preassigned membership of agencies and associations will be convened as necessary during the incident to consider and evaluate selected issues regarding mitigation, preparedness, response and recovery issues, as well as ongoing emergency response team operations.

To stop the spread of an FAD, government authorities must act promptly to quarantine and depopulate privately owned animals and wildlife before the FAD is positively identified or confirmed. Because highly contagious diseases may spread quickly, the best method of stopping them is to establish containment zones (with a several mile radius) around the infected herds or flocks, and take immediate actions to contain the disease. These actions could include selective sampling of all animals in the zone, and/or humane euthanasia of certain animal populations, depending on the disease.

Other FADs may move very slowly, in which case the best response may be a slow, methodical surveillance and investigative process to determine both the source of the disease and the most appropriate way of eradicating it.

Although the recovery process may be fairly short-lived, the response operations may take months or even years to complete. Surveillance and testing must be conducted over a designated period to ensure that the disease has been eradicated.

Owners whose animals are revenue property will expect to be reimbursed by the government for their losses. Immediate market value indemnity to owners for their depopulated animals is essential. Because local governments and state agencies will not have enough funds for all the opera-

tions and activities involved in a large-scale, contagious animal disease response, the federal government will need to provide assistance from the outset to help stop the spread of the disease.

Local emergency management

Each county should have its own emergency management program or participate in a jurisdictional program for the entire county. The program should address such events as:

- Hurricanes
- Floods
- Tornadoes
- Terrorist activities
- Fires
- Explosions
- Transportation accidents

Counties should have updated emergency management plans to address potential hazards, protect citizens and assist in the recovery process. It should also address such issues as the need to rescue or apprehend stray animals, provide shelter for animals, quarantine those that might be diseased, dispose of diseased or nondiseased carcasses and provide medical help for sick and injured animals.

Each county should designate at least one local emergency management coordinator. This person will work with the mayor and/or county judge, who may request assistance from the state if a situation is too much for the local jurisdiction to handle. The coordinator will work with others at the local level to address issues unique to that city and/or county and to determine what should be done before, during and after a disaster.

Each county should also have an animal issues committee to help develop the local animal issues plan. Committee members might include county Extension agents, veterinarians, veterinary technicians, agricultural science teachers, animal control officers and any others who can contribute knowledge and experience to the group. At least one veterinarian in each county is ideal to have as a contact person.

The committee will advise the emergency management coordinator, help anticipate problems and develop action plans for dealing with natural, accidental or intentional animal disasters.

The committee uses the animal issues plan as a guide in developing its own procedures for responding to various animal disasters. The committee should start by discussing and making a list of the different types of disasters that might affect the county. Members will need to address all animal disease issues and the nondisease animal issues that might occur in their area.

It is important for them to distinguish between outbreaks of an animal disease and other disasters. If a foreign or regulatory animal disease is diagnosed, the USDA–APHIS–VS and/or the state animal health regulatory agency will direct the response. The role of the local animal issues committee will be to support the animal health authorities on the scene.

However, if the animal disaster is not disease related, local authorities will be in control and respond as planned. State and federal animal health authorities, in turn, will provide the support.

Once the local committee has addressed the types of disasters, it must identify the types of animals in the county and divide them into three categories:

- Livestock, such as cattle, sheep, goats and swine
- Companion animals, such as dogs, cats, horses, pocket pets and caged birds
- Wildlife, such as deer and feral swine

This is an ideal point at which to divide the committee into three sections. Each section could take a category of animals and develop local plans for the assigned group in the event of nondisease and disease emergencies. The three plans could then be merged into a single plan.

When writing a plan to address nondisease emergencies, the committee should consider:

- Establishing the operations and communications system for the local incident command post for animal nondisease response activities
- Establishing a phone bank to respond to calls from the public
- Creating a process for handling offers of help from the public, such as donations and volunteers
- Developing appropriate procedures for responding to requests for help in sheltering, feeding, rescuing animals and repairing such areas as animal enclosures
- Providing administrative and logistical support for animal-related emergencies or disasters, such as an overturned livestock truck or a hazardous materials accident near animals
- Developing county profiles—including locations, types, sizes and other agricultural demographics—of animal-related production, processing, marketing and carcass disposal facilities/operations
- Disseminating public information about animal-related issues
- Evacuating and transporting animals from actual or impending disaster locations
- Sheltering and caring for animals in holding or other types of animal facilities, such as shelters that are pet friendly, established or temporary, during disasters
- Defining the search-and-rescue capabilities of teams
- Capturing and holding of stray or lost animals affected by a disaster
- Planning for animal identification and relocation activities
- Providing medical care or humane euthanasia for animals injured in an emergency or disaster
- Handling wildlife nuisance situations
- Examining local economic impact issues
- Reporting animal-related damage assessment information to the animal issues representative in the local emergency operations center

In disease-related emergencies, the animal issues committee should follow state or USDA guidelines for livestock, companion animals and wildlife in the county.

The local plan addressing these emergencies will cover many issues that are also in the nondisease plan. It will also tackle other issues that are unique to disease-related issues and will provide key support to a state or deferral ICP for any regulatory disease situation.

For a disease-related issue that is either considered a foreign animal disease or a regulatory animal disease, the state and federal agencies will have the lead roles and will activate parts of the local animal issues plan as needed.

For the disease portion of the plan, consider:

- Obtaining an appropriate facility and equipment, including telephones, phone lines and high-speed Internet lines and connections for a state/federal incident control post

- Establishing a phone bank for taking calls from the public
- Establishing a process for handling offers of assistance from the public, such as donations and volunteers
- Developing appropriate procedures for responding to requests for help in sheltering, feeding and rescuing animals, and repairing such areas as animal enclosures
- Developing county profiles—including location, types, sizes and other agricultural demographics—of animal-related production, processing, marketing and carcass disposal facilities/operations
- Supporting the procurement of appropriate equipment, chemicals and drugs for disease control and eradication operations
- Identifying an appropriate labor pool
- Disseminating public information
- Responding to zoonotic public health issues such as rabies vaccinations and West Nile virus prevention
- Helping to eradicate disease through cleaning and disinfection
- Supporting traffic control, including traffic flow within and nearby the quarantine area, and setting up signs and traffic barriers
- Obtaining appropriate equipment and vehicles to transport diseased animals and animal products from one location to another for slaughter and/or disposal
- Determining the number and location of appropriate local disposal sites that could be used in an emergency to dispose of diseased carcasses while minimizing the spread of the disease
- Establishing and operating inspection, cleaning and disinfection stations
- Supporting depopulation and indemnification issues
- Determining vector and scavenger control activities
- Defining local economic impact issues

Carcass disposal affects communities in disease and nondisease emergencies. In both situations, plans must include quarantining and containment activities to prevent the spread of disease.

The county animal incident committee must work with the different state agencies to determine the appropriate methods, identify resources and define the process. Several laws govern carcass disposal methods, specifying how the disposal will occur, whether the animal can be moved and which locations are more suitable for disposal.

Once the local animal issues plan is completed, some counties will then organize a county animal resource team (CART) to handle animal-related disasters that deal primarily with nondisease emergency situations. This group serves as an additional response team by identifying financial and physical resources to help with disasters. Although each county will not have a CART, some counties may have more than one, and they all must coordinate with the state animal resource team program.

Each CART needs to identify ways to support the animal issues plan. Use the following questions as a guide:

- Whom do you contact in case of an emergency?
- Is a search-and-rescue operation necessary? If so, who will handle it? Are the rescuers appropriately trained and certified? Do they have the appropriate equipment, such as catch poles and gloves? How will they be authorized to enter restricted areas?

- Do certain animals need to be captured and held for evaluation?
- Which veterinarians and animal health technicians will provide medical assistance?
- Who will triage the injured or sick animals?
- Who will determine whether the sick, injured or dead animals were affected by a particular disease or a toxic substance? Who will diagnose that disease and/or toxin?
- How will the disease be controlled and eradicated?

In many nondisease situations, a shelter needs to be established to house the animals that are evacuated or that require protection from the weather. During evacuations, all types of animals might be temporarily relocated to an area until it is safe for them to return home after a disaster. Some questions that the animal issues committee might need to address:

- Is an appropriate animal representative available at the local emergency operations center to work with shelters and other facilities?
- Does the disaster or emergency warrant an evacuation? If so, to where will the animals be moved?
- Do the animals need to be identified, tagged and photographed in order to be reunited with their owners?
- How will that be done? Is the appropriate equipment available (such as cameras and ID microchips)?
- Will the animals need shelter? If so, what type of shelter will they require, such as pet-friendly shelters when their owners are in facilities in another location? Are the shelters designated and can they accommodate small, mixed and/or large animals?
- Who will feed and care for the animals? Are there sufficient personnel for 24-hour operations?
- Is the shelter(s) appropriately equipped to support the animals and personnel? For example are there animal cages, animal runs, water and food bowls, cleaning supplies, running water, electricity, heat and/or air conditioning, cooking facilities, portable restrooms and showers?
- Have rules and procedures been established for each shelter as to how long the animals will be held before considering their possible relocation to another facility, fostering, adoption, reuniting with owners or euthanasia?
- Is 24-hour security available for the animal shelters?
- How and by whom will the animals be transported?
- Should the animals be moved to another area locally or out of state?

When developing local plans, the animal issues committee should identify people who can help with these situations if the need arises. For instance, a person in the county who transports cattle for a living would be a logical person to ask for help evacuating livestock. If the person agrees, the committee could call the contact in an emergency to take charge of moving the animals immediately.

Local residents can help determine where to house evacuated animals. This task could be handled by identifying several people who agree to shelter and care for the animals on their own properties during emergencies. The committee should keep these people's phone numbers handy so they can be reached at any time.

Once the committee develops a list of all the people who have agreed to help in an emergency, it should contact them peri-

odically to ensure that they are still willing to participate. It is also a good idea for the local animal issues committee to hold exercises to test the plan. The more comfortable people are with the plan, the more smoothly it will be carried out if a disaster occurs. During these exercises, the committee members will see their plan in action and can decide how best to communicate with one another.

The committee should prepare situation reports to ensure that the operations run smoothly. These reports are useful during exercises and actual disasters because they help the committee keep track of what is happening.

The committee should also require that activity logs be kept on all issues discussed. These logs, which should be accessible at any time, could contain the disaster scenarios developed from exercises or from real events. They might outline what the committee considered doing in each situation and the actions it took. Activity logs also can help the group critique its actions and be better prepared for emergencies.

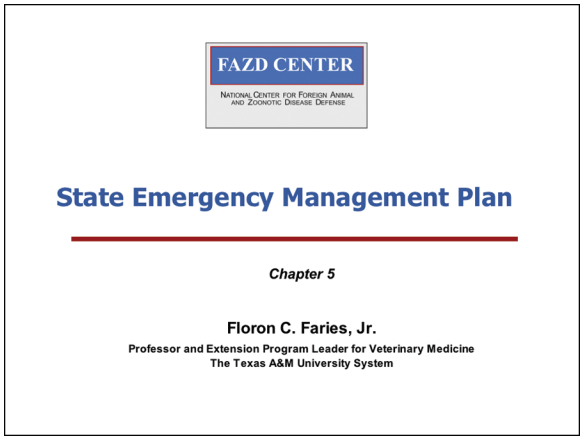
The local emergency management coordinator may at times call a meeting of all people involved in carrying out the emergency management plan. At least one member of the animal incident committee should attend these meetings to provide information if animal issues are discussed.

The ultimate objective for counties is to have a plan that will help residents prepare local officials to deal effectively with an animal disaster. A successful plan requires communication and creativity.

Additional resources

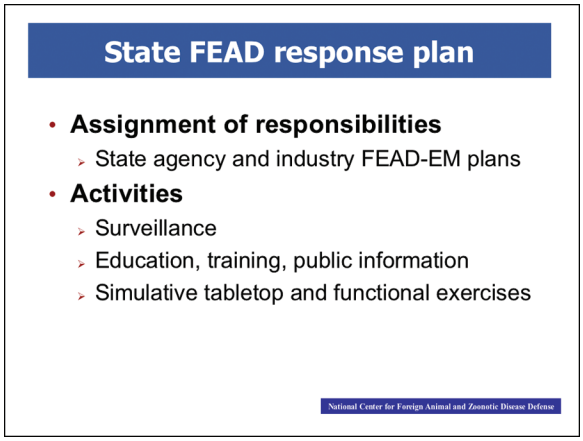
Governor's Division of Emergency Management: http://www.txdps.state.tx.us/dem/pages/index.htm

Texas Animal Health Commission: http://www.tahc.state.tx.us/emergency/planning.shtml

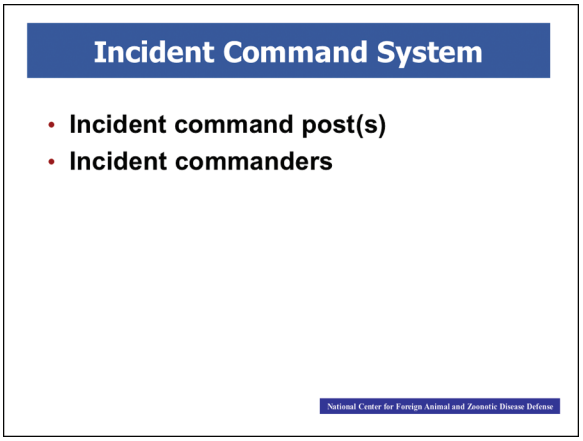


Slide 1: State Emergency Management Plan

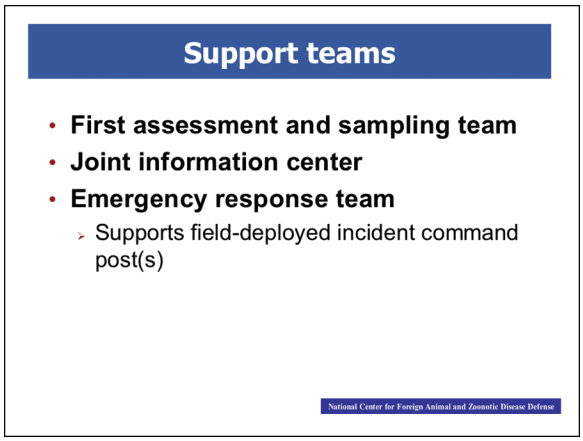
Slide 2: These are the objectives of a state response plan for foreign and emerging animal diseases.



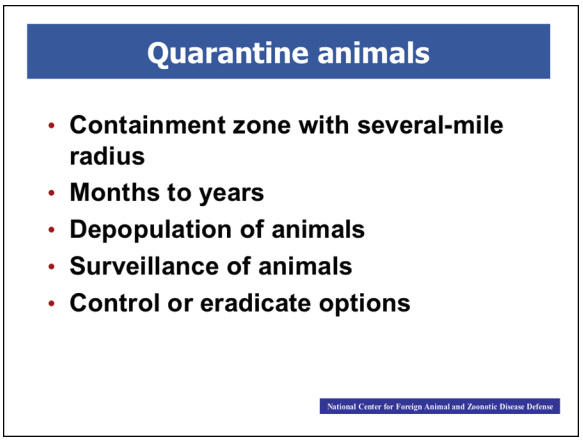
Slide 3: Responsibilities are assigned to partners in the plan. All partners participate in emergency management activities for preventing foreign and emerging animal diseases.



Slide 4: The plan will use an incident command system for controlling and eradicating outbreaks of foreign and emerging animal diseases.



Slide 5: The incident command post is supported by the first assessment and sampling team and the emergency response team. These teams help with the field investigation and diagnosis of suspected disease cases. Public information will be handled by the joint information center.



Slide 6: Infected and exposed animals are quarantined to implement control and/or eradication activities.

FAZD CENTER
National Center for Foreign Animal and Zoonotic Disease Defense

Local Emergency Management Plan

Chapter 5

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

Slide 7: A local emergency management plan also must be formulated.

Addresses issues

- Hurricanes
- Tornadoes
- Floods
- Terrorist activities
- Fires
- Explosions
- Transportation accidents

National Center for Foreign Animal and Zoonotic Disease Defense

Slide 8: The plan must address issues specific to the county. It must also specify how emergencies will be managed before, during and after disasters. Preventive, response and recovery measures are identified.

Emergency management plan

- Appoint a local emergency management coordinator
- Each county must have a plan
- Be current
- Do exercises

National Center for Foreign Animal and Zoonotic Disease Defense

Slide 9: Each county must develop and keep current a local emergency management plan.

Local animal issues committee

- Addresses animal issues (livestock and pets)
- Determines tasks for before, during and after disaster
- Committee members might include
  - County Extension agents
  - Veterinarians
  - Veterinary technicians
  - Agricultural science teachers
  - Animal control officers

National Center for Foreign Animal and Zoonotic Disease Defense

Slide 10: The local animal issues plan is developed by a county committee and approved by the local emergency management coordinator. The plan deals with potential animal disasters, for both disease and nondisease situations.

Local animal issues plan

- Committee should advise local government authorities
- Consider possible animal disasters in area
  - Natural
  - Human-caused

National Center for Foreign Animal and Zoonotic Disease Defense

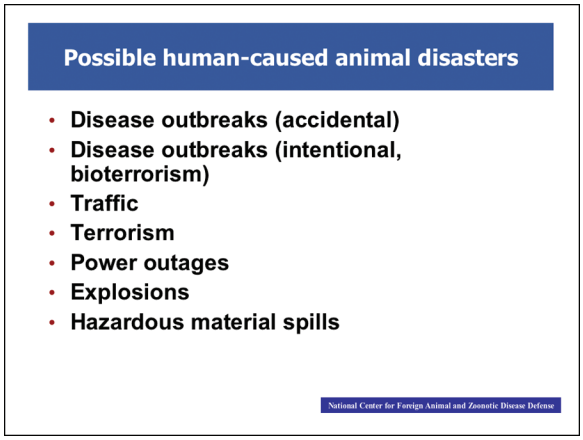
Slide 11: The animal issues plan should address all possible animal disasters specific to the county and should advise local officials of possible issues.

Possible natural animal disasters

- Disease outbreaks
- Floods
- Fires
- Hurricanes
- Tornadoes
- Winter storms
- Droughts

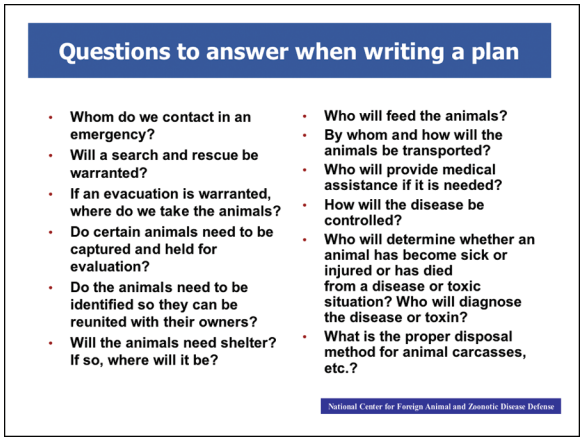
National Center for Foreign Animal and Zoonotic Disease Defense

Slide 12: The plan should address disease and nondisease situations that may occur naturally and affect animal populations.

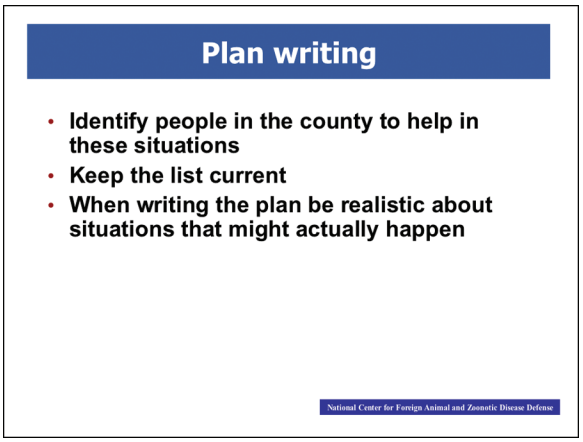


Slide 13: The plan should address disease and nondisease situations that may occur accidentally or intentionally and affect animal populations.

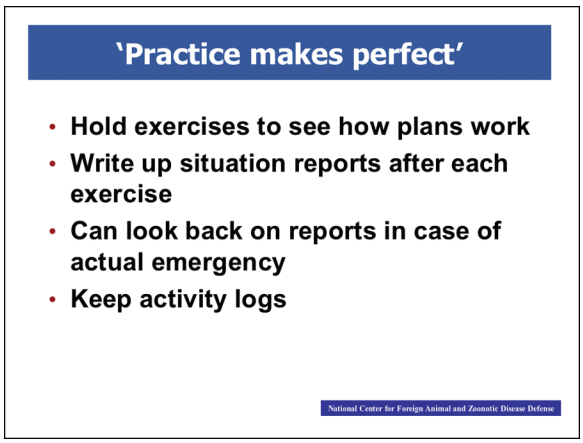
Slide 14: In cases of confirmed or highly suspected animal disease occurrences, the state/USDA has authority over the local plan to implement the state response plan and use the local plan as needed to control or eradicate the disease.



Slide 15: These questions relate to evacuations, shelters, veterinary care, food supplies, strays and carcass disposal for livestock and pets. During the discussions of these activities, consider the location of physical, human and financial resources. Subcommittees may be necessary to research these questions.



Slide 16: Develop lists of people who can be called on for help in emergencies, and keep the lists current.



Slide 17: To test the validity of the plan, the animal issues committee should conduct simulative exercises to coordinate the contributions of all committed resource people.

Slide 18: The animal issues committee must have members with long-term commitments to plan, evaluate, record and communicate, while periodically making changes in the plan to keep it current and effective.

Chapter 6

Evaluation of Curriculum

Foreign Animal and Zoonotic Diseases

Knowledge-Based Test for Trainers

Pretest

The following questions have been developed to determine current knowledge levels about foreign animal and zoonotic diseases. Your responses are completely anonymous. Please answer the following questions by circling the most appropriate answer.

1. The first line of defense for biosecurity against threats of foreign animal disease is:
   a. Livestock and poultry owners, county Extension agents and veterinarians
   b. The local media breaking the story to national outlets
   c. The local coffee shop gossip
   d. None of the above

2. A disease common to both people and animals is known as:
   a. Contagious
   b. Enzoonotic
   c. Zoonotic
   d. Epizoonotic

3. Who is most likely to recognize a zoonotic disease outbreak?
   a. Livestock producer
   b. Physician
   c. Passerby
   d. Police

4. How long can anthrax spores remain viable in the environment?
   a. 10 days
   b. 150 days
   c. Up to 1 year
   d. At least 10 years

5. Which of the following terms is not a key word associated with biosecurity?
   a. Mitigation
   b. Evaluation
   c. Response
   d. Preparedness

6. Most birds with avian influenza (AI) show:
   a. A sudden loss of feathers
   b. White discoloration of the wattles, comb, legs
   c. No clinical signs
   d. None of the above

7. Botulism is caused by a:
   a. Virus
   b. Neurotoxin
   c. Fungus
   d. All of the above

8. Which of the following is not a method of transmission for classical swine fever (hog cholera)?
   a. Direct contact between healthy swine and infected swine
   b. Healthy pigs coming into contact with contaminated vehicles, pens, feed or clothing
   c. Humans, birds and flies physically carrying the virus to healthy pigs
   d. All of the above are methods of transmission

9. A clinical symptom of foot-and-mouth disease (FMD) is:
   a. Sudden death
   b. Profuse, projectile diarrhea
   c. Drooling saliva and lameness
   d. Kicking and biting

10. All of the following must be done to reduce the number of animals infected if an outbreak of Rift Valley fever occurs except:
   a. Prevent human exposure to infected animal tissues or aborted fetuses through educational campaigns
   b. Restrict livestock movement
   c. Destroy and burn all animals within a 3-mile quarantine zone
   d. Control mosquitoes

The next questions are true / false. Please circle (T) for True or (F) for False

11. (T) – (F) Through education, we can reduce the risk of foreign animal and zoonotic diseases.

12. (T) – (F) The major vector for Rift Valley fever is migratory birds.

13. T) – (F) Domestic and feral swine and javelina are the only animals infected by classical swine fever.

14. (T) – (F) Botulism's incubation period is from 2 hours to 2 weeks.

15. (T) – (F) A person who has been infected with avian influenza virus can transmit it to other people.

16. (T) – (F) Cattle, horses, swine, sheep and goats are all affected by foot-and-mouth disease.

17. (T) – (F) County judges and mayors have the authority to request state assistance.

18. (T) – (F) An animal should not be given antibiotics until 5 days after receiving the anthrax vaccine.

19. (T) – (F) Best management practices are more important for large commercial livestock and fowl operations.

20. (T) – (F) The more comfortable individuals are with the local and state emergency management plans, the more smoothly the plans will be carried out.

Thanks for your time!

Foreign Animal and Zoonotic Diseases Knowledge-Based Test for FAD Trainers

Post-Test

The following questions have been developed to determine current knowledge levels about foreign animal and zoonotic diseases. Your responses are completely anonymous. Please answer the following questions by circling the most appropriate answer.

1. The first line of defense for biosecurity against threats of foreign animal disease is:
   a. Livestock and poultry owners, county Extension agents, and veterinarians
   b. The local media breaking the story to national outlets
   c. The local coffee shop gossip
   d. None of the above

2. A disease common to both people and animals is known as:
   a. Contagious
   b. Enzoonotic
   c. Zoonotic
   d. Epizoonotic

3. Who is most likely to recognize a zoonotic disease outbreak?
   a. Livestock producer
   b. Physician
   c. Passerby
   d. Police

4. How long can anthrax spores remain viable in the environment?
   a. 10 days
   b. 150 days
   c. Up to 1 year
   d. At least 10 years

5. Which of the following terms is not a key word associated with biosecurity?
   a. Mitigation
   b. Evaluation
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6. Most birds with avian influenza (AI) show:
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21. (T) – (F) Through education, we can reduce the risk of foreign animal and zoonotic diseases.

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25. (T) – (F) A person who has been infected with avian influenza virus can transmit it to other people.

26. (T) – (F) Cattle, horses, swine, sheep and goats are all affected by foot and mouth disease.

27. (T) – (F) County judges and mayors have the authority to declare local disasters and request state assistance.

28. (T) – (F) An animal should not be given antibiotics until 5 days after receiving the anthrax vaccine.

29. (T) – (F) Best management practices are more important for large commercial livestock and fowl operations.

30. (T) – (F) The more comfortable individuals are with the local and state emergency management plans, the more smoothly the plans will be carried out.

Thanks for your time!

ANSWER KEY

Chapter 6

Curriculum Evaluation

Pretest/Post-Test Knowledge Questions

1. A
2. C
3. A
4. D
5. B
6. C
7. B
8. D
9. C
10. C
11. T
12. F
13. T
14. T
15. F
16. F
17. T
18. T
19. F
20. T

Perceptual Knowledge Evaluation for FAD Trainers

Foreign Animal and Zoonotic Diseases

For each of the chapters listed below:

- In the left column, indicate the level that best reflects your level of understanding before completing the Foreign Animal and Zoonotic Diseases Curriculum.
- In the right column, indicate the level that best reflects your level of understanding after completing the Foreign Animal and Zoonotic Diseases Curriculum.

If you did not participate in a session on the topic, write a check in the "NA" box.

Level of Understanding

Poor	Average	Good	Excellent
1	2	3	4

NA	Chapter 1: Potential Occurrences of Foreign Animal Diseases (FAD)	Before the workshop				After the workshop			
	Understand the importance of potential occurrences of FAD.	1	2	3	4	1	2	3	4
	Understand the importance of preparedness to prevent FAD.	1	2	3	4	1	2	3	4
	Understand the importance of biosecurity measures to prevent FAD.	1	2	3	4	1	2	3	4
	Understand the importance of early detection and reporting of FAD to the proper authorities.	1	2	3	4	1	2	3	4
	Understand the importance of outreach education for awareness of FAD.	1	2	3	4	1	2	3	4

NA	Chapter 2: Epidemiology Of Animal Diseases	Before the workshop				After the workshop			
	Understand the sources of disease.	1	2	3	4	1	2	3	4
	Understand direct and indirect transmission of diseases.	1	2	3	4	1	2	3	4
	Understand preventive measures against disease.	1	2	3	4	1	2	3	4
	Understand the importance of outreach education on how diseases are spread and can be prevented.	1	2	3	4	1	2	3	4

Continue to next page

NA	Chapter 3: Foreign Animal and Zoonotic Diseases (FAZD)	Before the workshop				After the workshop			
	Understand the symptoms of FAZDs for early detection.	1	2	3	4	1	2	3	4
	Understand unusual symptoms of FAZDs.	1	2	3	4	1	2	3	4
	Understand procedures for prevention, control and eradication of diseases.	1	2	3	4	1	2	3	4
	Understand the importance of outreach education to help people identify diseases.	1	2	3	4	1	2	3	4

NA	Chapter 4: Biosecurity Best Management Practices	Before the workshop				After the workshop			
	Understand the procedures needed to adopt biosecurity best management practices against FAZDs.	1	2	3	4	1	2	3	4
	Understand the importance of mitigation, preparedness, response and recovery.	1	2	3	4	1	2	3	4
	Understand the importance of outreach education for awareness of biosecurity practices.	1	2	3	4	1	2	3	4

NA	Chapter 5: Local and State Emergency Management Plans	Before the workshop				After the workshop			
	Understand the state response plan for handling FAZDs.	1	2	3	4	1	2	3	4
	Understand local planning for disease emergencies.	1	2	3	4	1	2	3	4
	Understand the importance of public awareness in dealing with disease outbreaks.	1	2	3	4	1	2	3	4

Continue to next page

Satisfaction

Check the box for the statement that best describes your thoughts concerning the program.

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
The subject matter was timely for me.				
The speakers were effective.				
The information was practical to me.				
I can use the information I learned today.				
Overall, this was a very educational program.				

What is the most significant thing you will apply as an educator from the information provided through the Foreign Animal and Zoonotic Disease Curriculum?
(Feel free to list more than one.)

Do you believe you will be able to apply these concepts in your situation?
(Circle the best answer.)

(Yes) (No) Please explain your answer or provide an example.

Please provide any additional information in the space below.

Thank you very much for your time!

Foreign Animal and Zoonotic Diseases

Measuring Intentions to Change Teaching Behaviors

For each statement listed below, circle yes or no based on what you did ***before*** you participated in the Foreign Animal and Zoonotic Diseases Curriculum, then circle *yes* or *no* based on what you plan to do ***after*** the program. If you did not participate in a session on the topic, write a check in the "NA" box.

NA	Behavior	Before the workshop		After the workshop	
	Stay current by reading literature on potential diseases that could be introduced.	Yes	No	Yes	No
	Teach producers the importance of keeping barns and facilities sanitary.	Yes	No	Yes	No
	Teach producers the importance of proper vaccinations for disease control.	Yes	No	Yes	No
	Teach producers the importance of keeping better and more accurate records.	Yes	No	Yes	No
	Teach producers the importance of testing new livestock before arrival to the premises.	Yes	No	Yes	No
	Teach producers the importance of isolating and testing new and returning livestock before introducing them into their herds.	Yes	No	Yes	No
	Teach producers the importance of restricting visitor and vehicle entry.	Yes	No	Yes	No
	Teach producers the importance of following proper regulatory practices for individual diseases.	Yes	No	Yes	No
	Teach producers the importance of following proper procedures outlined by state FAD Response Plans.	Yes	No	Yes	No

Continue to next page

Chapter 6

Evaluation of Curriculum

Foreign Animal and Zoonotic Diseases

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   b. Restrict livestock movement
   c. Destroy and burn all animals within a 3-mile quarantine zone
   d. Control mosquitoes

The next questions are true/false. Please circle (T) for True or (F) for False

21. (T) – (F) Through education, we can reduce the risk of foreign animal and zoonotic diseases.

22. (T) – (F) The major vector for Rift Valley fever is migratory birds.

23. (T) – (F) Domestic and feral swine and javelina are the only animals infected by classical swine fever.

24. (T) – (F) Botulism's incubation period is from 2 hours to 2 weeks.

25. (T) – (F) A person who has been infected with avian influenza virus can transmit it to other people.

26. (T) – (F) Cattle, horses, swine, sheep and goats are all affected by foot and mouth disease.

27. (T) – (F) County judges and mayors have the authority to declare local disasters and request state assistance.

28. (T) – (F) An animal should not be given antibiotics until 5 days after receiving the anthrax vaccine.

29. (T) – (F) Best management practices are more important for large commercial livestock and fowl operations.

30. (T) – (F) The more comfortable individuals are with the local and state emergency management plans, the more smoothly the plans will be carried out.

Thanks for your time!

ANSWER KEY

Chapter 6

Curriculum Evaluation

Pretest/Post-Test Knowledge Questions

1. A
2. C
3. A
4. D
5. B
6. C
7. B
8. D
9. C
10. C
11. T
12. F
13. T
14. T
15. F
16. F
17. T
18. T
19. F
20. T

Perceptual Knowledge Evaluation for FAD Trainers

Foreign Animal and Zoonotic Diseases

For each of the chapters listed below:

- In the left column, indicate the level that best reflects your level of understanding before completing the Foreign Animal and Zoonotic Diseases Curriculum.
- In the right column, indicate the level that best reflects your level of understanding after completing the Foreign Animal and Zoonotic Diseases Curriculum.

If you did not participate in a session on the topic, write a check in the "NA" box.

Level of Understanding

Poor	Average	Good	Excellent
1	2	3	4

NA	Chapter 1: Potential Occurrences of Foreign Animal Diseases (FAD)	Before the workshop				After the workshop			
	Understand the importance of potential occurrences of FAD.	1	2	3	4	1	2	3	4
	Understand the importance of preparedness to prevent FAD.	1	2	3	4	1	2	3	4
	Understand the importance of biosecurity measures to prevent FAD.	1	2	3	4	1	2	3	4
	Understand the importance of early detection and reporting of FAD to the proper authorities.	1	2	3	4	1	2	3	4
	Understand the importance of outreach education for awareness of FAD.	1	2	3	4	1	2	3	4

NA	Chapter 2: Epidemiology Of Animal Diseases	Before the workshop				After the workshop			
	Understand the sources of disease.	1	2	3	4	1	2	3	4
	Understand direct and indirect transmission of diseases.	1	2	3	4	1	2	3	4
	Understand preventive measures against disease.	1	2	3	4	1	2	3	4
	Understand the importance of outreach education on how diseases are spread and can be prevented.	1	2	3	4	1	2	3	4

Continue to next page

NA	Chapter 3: Foreign Animal and Zoonotic Diseases (FAZD)	Before the workshop				After the workshop			
	Understand the symptoms of FAZDs for early detection.	1	2	3	4	1	2	3	4
	Understand unusual symptoms of FAZDs.	1	2	3	4	1	2	3	4
	Understand procedures for prevention, control and eradication of diseases.	1	2	3	4	1	2	3	4
	Understand the importance of outreach education to help people identify diseases.	1	2	3	4	1	2	3	4

NA	Chapter 4: Biosecurity Best Management Practices	Before the workshop				After the workshop			
	Understand the procedures needed to adopt biosecurity best management practices against FAZDs.	1	2	3	4	1	2	3	4
	Understand the importance of mitigation, preparedness, response and recovery.	1	2	3	4	1	2	3	4
	Understand the importance of outreach education for awareness of biosecurity practices.	1	2	3	4	1	2	3	4

NA	Chapter 5: Local and State Emergency Management Plans	Before the workshop				After the workshop			
	Understand the state response plan for handling FAZDs.	1	2	3	4	1	2	3	4
	Understand local planning for disease emergencies.	1	2	3	4	1	2	3	4
	Understand the importance of public awareness in dealing with disease outbreaks.	1	2	3	4	1	2	3	4

Continue to next page

Satisfaction

Check the box for the statement that best describes your thoughts concerning the program.

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
The subject matter was timely for me.				
The speakers were effective.				
The information was practical to me.				
I can use the information I learned today.				
Overall, this was a very educational program.				

What is the most significant thing you will apply as an educator from the information provided through the Foreign Animal and Zoonotic Disease Curriculum?
(Feel free to list more than one.)

Do you believe you will be able to apply these concepts in your situation?
(Circle the best answer.)

(Yes) (No) Please explain your answer or provide an example.

Please provide any additional information in the space below.

Thank you very much for your time!

Foreign Animal and Zoonotic Diseases

Measuring Intentions to Change Teaching Behaviors

For each statement listed below, circle yes or no based on what you did ***before*** you participated in the Foreign Animal and Zoonotic Diseases Curriculum, then circle *yes* or *no* based on what you plan to do ***after*** the program. If you did not participate in a session on the topic, write a check in the "NA" box.

NA	Behavior	Before the workshop		After the workshop	
	Stay current by reading literature on potential diseases that could be introduced.	Yes	No	Yes	No
	Teach producers the importance of keeping barns and facilities sanitary.	Yes	No	Yes	No
	Teach producers the importance of proper vaccinations for disease control.	Yes	No	Yes	No
	Teach producers the importance of keeping better and more accurate records.	Yes	No	Yes	No
	Teach producers the importance of testing new livestock before arrival to the premises.	Yes	No	Yes	No
	Teach producers the importance of isolating and testing new and returning livestock before introducing them into their herds.	Yes	No	Yes	No
	Teach producers the importance of restricting visitor and vehicle entry.	Yes	No	Yes	No
	Teach producers the importance of following proper regulatory practices for individual diseases.	Yes	No	Yes	No
	Teach producers the importance of following proper procedures outlined by state FAD Response Plans.	Yes	No	Yes	No

Continue to next page

Satisfaction

Check the box for the statement that best describes your thoughts about the program.

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
The subject matter was timely for me.				
The speakers were effective.				
The information was practical to me.				
I can use the information I learned today.				
Overall, this was a very educational program.				

Please provide any additional information in the space below.

Thank you very much for your time!

Satisfaction

Check the box for the statement that best describes your thoughts about the program.

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
The subject matter was timely for me.				
The speakers were effective.				
The information was practical to me.				
I can use the information I learned today.				
Overall, this was a very educational program.				

Please provide any additional information in the space below.

Thank you very much for your time!

Optional Supplement

Knowledge Checks

Chapters 1–5.

The following one-page quizzes are optional supplements to the preceding curriculum Evaluation **and should not be used as a replacement of the Curriculum Evaluation.**

The quizzes may be administered as either pre- or post-tests or as post-tests only.

Index of Knowledge Checks

Chapter 1 Knowledge Check

Potential Occurrences of Foreign Animal Diseases

Please answer the following questions by circling the most appropriate answer.

1. A foreign animal disease is:
   a. A disease that is in other parts of the world but not present in the U.S.
   b. In the country but increasing in prevalence
   c. In the country and constantly present
   d. A foreign disease that is now in the country but not worrisome yet

2. Who is most likely to recognize a zoonotic disease outbreak?
   a. Livestock producer
   b. Physician
   c. Passerby
   d. Police

3. The first line of defense for biosecurity against threats of foreign animal disease is:
   a. Livestock and poultry owners, county Extension agents and veterinarians.
   b. The local media breaking the story to national outlets
   c. The local coffee shop gossip
   d. None of the above

The next questions are true/false. Please circle (T) for True or (F) for False.

4. (T) – (F) Through state and federal regulations, the risk of FADs can be reduced to zero.

5. (T) – (F) The USDA operates a 24-hour phone line to report FADs.

6. (T) – (F) The first line of defense against a FAD is livestock owners.

Chapter 2 Knowledge Check

Epidemiology of Animal Diseases

Please answer the following questions by circling the most appropriate answer.

1. Which of the following is not a causative factor for risk of disease?
   a. Weather
   b. Overcrowding
   c. Inbreeding
   d. Crossbreeding

2. Which of the following is not an infectious agent?
   a. Bacteria
   b. Rickettsia
   c. Fungi
   d. All of the above are infectious agents

3. All of the following are indirect means of disease transmission except:
   a. In utero
   b. Mosquitoes
   c. Trucks
   d. Feed bunkers

The next questions are true/false. Please circle (T) for True or (F) for False.

4. (T) – (F) Epidemiology is the study of skin diseases in animals.

5. (T) – (F) Preventing animal diseases requires that animals have good nutrition, adequate physical activities and climate-controlled housing.

6. (T) – (F) The most common means of transmission is direct or close contact.

Chapter 3 Knowledge Check

Foreign Animal and Zoonotic Diseases

Anthrax

Please answer the following questions by circling the most appropriate answer.

1. An indicator that an animal has died from anthrax is:
   a. Animals piled up on each other
   b. Rapid carcass decomposition
   c. Buzzards entering quickly
   d. All of the above

2. Anthrax spores can remain viable in the environment for:
   a. 10 days
   b. 150 days
   c. Up to 1 year
   d. At least 10 years

3. The best prevention measure against anthrax in livestock is:
   a. A live strain vaccine
   b. Burning dead animals
   c. Control blood-sucking flies
   d. All of the above

The next questions are true/false. Please circle (T) for True or (F) for False.

4. (T) – (F) If you suspect an animal has died of anthrax, a veterinarian should be called to do a necropsy and send tissues to a diagnostic lab.

5. (T) – (F) Anthrax is a virus.

6. (T) – (F) An animal should not be given antibiotics until 5 days after receiving the anthrax vaccine.

Chapter 3 Knowledge Check

Foreign Animal and Zoonotic Diseases

Avian Influenza (AI)

Please answer the following questions by circling the most appropriate answer.

1. Birds infected with avian influenza (AI) may exhibit:
   a. A sudden loss of feathers
   b. No clinical signs
   c. White discoloration of the wattles, combs, and legs
   d. None of the above

2. Studies show that _____ contaminated with the HPAI strain can contain enough virus to infect 1 million birds.
   a. 1 chicken
   b. 1 gram of manure
   c. 1 poultry operation
   d. 1 pound of feed

3. Measures to prevent the introduction of avian influenza into flocks include all of the following except:
   a. Leave windows to poultry houses open at all times.
   b. Do not allow visitors in or near the poultry houses.
   c. Clean and disinfect all coops, crates and other poultry containers and equipment before and after use.
   d. Properly dispose of dead birds by burying or incinerating them.

The next questions are true/false. Please circle (T) for True or (F) for False.

4. (T) – (F) High-pathogenic avian influenza (HPAI) is the most common form of avian influenza.

5. (T) – (F) People are generally a dead-end host of the avian influenza virus.

6. (T) – (F) HPAI is a reportable disease.

Chapter 3 Knowledge Check

Foreign Animal and Zoonotic Diseases

Botulism

Please answer the following questions by circling the most appropriate answer.

1. Botulism is caused by a:
   a. Virus
   b. Neurotoxin
   c. Fungus
   d. None of the above

2. Botulism is transmitted by:
   a. Inhalation
   b. Ingestion
   c. Wound contamination
   d. All of the above

3. The clinical symptoms of botulism include:
   a. Depression
   b. Difficulty chewing and swallowing
   c. Reluctance to move
   d. All of the above

The next questions are true/false. Please circle (T) for True or (F) for False.

4. (T) – (F) Horses and sheep are not affected by botulism.

5. (T) – (F) Botulism's incubation period is from 2 hours to 2 weeks.

6. (T) – (F) It is relatively easy to diagnose botulism.

Chapter 3 Knowledge Check

Foreign Animal and Zoonotic Diseases

Classical Swine Fever (Hog Cholera)

Please answer the following questions by circling the most appropriate answer.

1. Classical swine fever may be classified as:
   a. Acute
   b. Chronic
   c. Prenatal
   d. All of the above

2. Which of the following is not a method of transmission for classical swine fever (hog cholera)?
   a. Direct contact through secretions, excretions, semen or blood of infected swine
   b. Susceptible pigs coming into contact with contaminated vehicles, pens, feed or clothing
   c. Fomites carrying the virus to susceptible pigs
   d. All of the above

3. The incubation period for classical swine fever is:
   a. 2 to 14 days
   b. 5 to 8 days
   c. 1 to 2 weeks
   d. 1 month

The next questions are true/false. Please circle (T) for True or (F) for False.

4. (T) – (F) Domestic and feral swine and javelina are the only animals infected by classical swine fever.

5. (T) – (F) Swine owners should isolate new and returning swine for at least 21 days before introducing them into the herd.

6. (T) – (F) Swine owners who suspect an animal has classical swine fever should observe it for 36 hours before contacting a veterinarian.

Chapter 3 Knowledge Check

Foreign Animal and Zoonotic Diseases

Foot-and-Mouth Disease (FMD)

Please answer the following questions by circling the most appropriate answer.

1. Which of the following are signs of foot-and-mouth disease (FMD)?
   a. Reduced feed consumption
   b. Temperature that rises abruptly
   c. Blisters and sores
   d. All of the above

2. A preventive measure against the spread of FMD is:
   a. Ban the import of horses
   b. Control mosquitoes
   c. Restrict people on property who have traveled internationally
   d. All of the above

3. Symptoms of FMD are similar to:
   a. Bluetongue
   b. Vesicular stomatitis
   c. Bovine viral diarrhea
   d. All of the above

The next questions are true/false. Please circle (T) for True or (F) for False.

4. (T) – (F) FMD can persist in the environment for up to a month.

5. (T) – (F) The USDA prohibits the entry of live animals or animal products from areas known to be affected with FMD.

6. (T) – (F) FMD is zoonotic.

Chapter 3 Knowledge Check

Foreign Animal and Zoonotic Diseases

Rift Valley Fever (RVF)

Please answer the following questions by circling the most appropriate answer.

1. The routes of zoonotic transmission for Rift Valley fever (RVF) include:
   a. Vector
   b. Contact
   c. Aerosol
   d. All of the above

2. Clinical symptoms of RVF may vary by:
   a. Species
   b. Season
   c. Weight
   d. All of the above

3. All of the following must be done to reduce the number of animals infected if an outbreak of RVF occurs except:
   a. Prevent human exposure to infected animal tissues or aborted fetuses through educational campaigns
   b. Restrict livestock movement
   c. Destroy and burn all animals within a 3-mile quarantine zone
   d. Control mosquitoes

The next questions are true/false. Please circle (T) for True or (F) for False.

4. (T) – (F) The major vector for RVF is migratory birds.

5. (T) – (F) RVF epidemics occur every 3 to 15 years in affected areas.

6. (T) – (F) The live RVF vaccine MV P12 causes abortions in ewes.

Chapter 4 Knowledge Check

Biosecurity Best Management Practices

Please answer the following questions by circling the most appropriate answer.

1. Which of the following is not a best management practice?
   a. Hauling unbagged trash or garbage from one site to another
   b. Spraying all vehicles driven onto the premises with a disinfectant
   c. Designating shoes to wear just at your facility
   d. Implementing a vaccination plan

2. Who should be contacted when you suspect a foreign animal disease?
   a. County Extension agent
   b. Feed store
   c. Veterinarian
   d. Neighbors

3. You should contact proper authorities when you see:
   a. Sudden deaths in a herd
   b. Blisters on nose
   c. Unusual ticks
   d. All of the above

The next questions are true/false. Please circle (T) for True or (F) for False.

4. (T) – (F) Animals that have been off the premises should be isolated for a minimum of 2 weeks before being reintroduced to the herd.

5. (T) – (F) Reporting unusual symptoms in the first 24 hours is crucial.

6. (T) – (F) Best management practices are more important for large commercial operations.

Chapter 5 Knowledge Check

Local and State Emergency Management Plans

Please answer the following questions by circling the most appropriate answer.

1. The purpose of the State FAD Response Plan is to:
   a. Create bureaucracy
   b. Provide guidance for mitigating against FADs
   c. Add governmental control to agricultural commodities
   d. All of the above

2. The existence of a FAD will severely affect the _____ movement of livestock and poultry.
   a. Intrastate
   b. Interstate
   c. International
   d. All of the above

3. A local animal issues plan should consider:
   a. Natural disasters
   b. Human caused disasters
   c. Animal disease outbreaks
   d. All of the above

The next questions are true/false. Please circle (T) for True or (F) for False.

4. (T) – (F) Local and state emergency management plans operate under an Incident Command System.

5. (T) – (F) Game wardens are the proper authorities to notify of dead birds.

6. (T) – (F) Prompt actions may have to be taken by government authorities to quarantine and depopulate privately owned animals and wildlife before there is a positive confirmation of a FAD.

Answer Key

Optional Supplement

Knowledge Checks: Chapters 1–5

Chapter 1

1. A
2. A
3 A
4. F
5. F
6. T

Chapter 2

1. D
2. D
3. A
4. F
5. F
6. T

Chapter 3
Anthrax

1. B
2. D
3. D
4. F
5. F
6. T

Chapter 3
Avian Influenza

1. B
2. B
3. A
4. F
5. T
6. T

Chapter 3
Botulism

1. B
2. D
3. D
4. F
5. T
6. F

Chapter 3
Classical Swine Fever

1. D
2. D
3. A
4. T
5. F
6. F

Chapter 3
Foot-and-Mouth Disease

1. D
2. C
3. D
4. T
5. F
6. F

Chapter 3
Rift Valley Fever

1. D
2. A
3. C
4. F
5. T
6. F

Chapter 4

1. A
2. C
3. D
4. T
5. T
6. F

Chapter 5

1. B
2. D
3. D
4. T
5. F
6. T

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