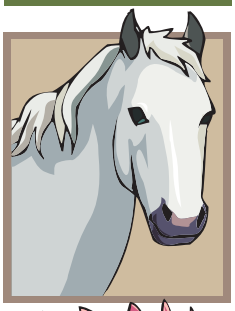
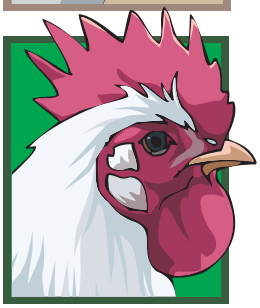




Awareness in Agriculture
Livestock Security

Educator's Guide
A 1 to 1½ Hour Lesson for Small Groups

Desired Outcomes

After this program, participants will:

1. Be aware of biosecurity threats related to livestock production and handling.
2. Understand the meaning of biosecurity and its application to everyday activities.
3. Identify the resources available for biosecurity assistance.
4. Design and implement plans to prevent the introduction and spread of infectious diseases.
5. Recognize disease symptoms.
6. Respond to symptoms safely and effectively.

Before the Lesson

1. Read through this lesson plan and the Livestock Security supplement.
2. Obtain copies of the Livestock Security supplement for all participants from the NDSU Distribution Center, (701) 231-7882 or dctr@ndsu.nodak.edu.
3. Make sure time, space and participant numbers are right for any planned activities involving the class.
4. Setup a sign-in table to obtain information from participants (for follow-up purposes).
5. Ask participants to complete the Livestock Security pre-test.

During the Lesson

1. Use PowerPoint presentations and the notes provided to guide participants through livestock security material.
2. Ask participants to list or mention what their understanding of livestock security is and the concerns they have.
3. Display other resource materials (see Web sites in *Resources* section).

NDSU
Extension Service
North Dakota State University
Fargo, North Dakota 58105
NOVEMBER 2004

After the Lesson

1. Ask participants to fill out the evaluation forms and post-tests provided with this lesson and mail them (with pre-tests) to Becky Koch, Ag Communication, Morrill Hall, NDSU, Fargo, N.D. 58105-5655.
2. Provide copies of the Livestock Security supplement. Ask participants to take them home and discuss them with their families.

Options

1. Offer breaks between each of the PowerPoint presentations.
2. Ask participants to do an Internet search for other livestock security Web sites.
3. Give participants a sheet of graph paper to sketch their ranches/livestock facilities and identify weaknesses in biosecurity (ex. unlocked/unwatched entrances)

Resources

■ Web sites

http://www.cfsph.iastate.edu/

The Center for Food Security and Public Health, Iowa State University

http://www.farmandranchbiosecurity.com/

Great Plains Veterinary Educational Center, University of Nebraska, Lincoln

■ PowerPoint Presentations

Awareness in Agriculture Series

1. Biosecurity and Agroterror in the Livestock Industry
2. Preventing Infectious Diseases
3. Recognizing and Responding to Infectious Diseases

Available on the NDSU Extension Service's Emergency and Disaster Preparedness Web site at www.ag.ndsu.edu/prepare/

■ Supplement

Awareness in Agriculture Livestock Security available from the NDSU Distribution Center (see contact information in *Before the Lesson* section)

■ Other Sources

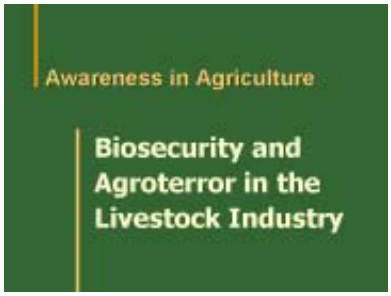
North Dakota State University Extension Service
- Dr. Greg Lardy, Beef Cattle Specialist
- Dr. Charles Stoltenow, State Veterinarian

North Dakota State Veterinarian Office
- Dr. Susan Keller, State Veterinarian

USDA: APHIS: VS
- Dr. Larry Schuler, Area Veterinarian in Charge
- Dr. Jon Van Berkom, Area Epidemiologist

Awareness in Agriculture

Biosecurity and Agroterror in the Livestock Industry



Visual 1

This PowerPoint is the first of a series of three designed to help livestock handlers prevent the introduction and spread of infectious disease in livestock herds through awareness of threats, opportunities for prevention and effective response strategies.

The first segment, titled Biosecurity and Agroterror in the Livestock Industry, is an introductory presentation that offers a glance at the meaning of biosecurity to the welfare of the industry and its people.

Visual 2

Possible audience participation questions:

- If asked to define biosecurity, what would you say? OR
- What is the first thing that comes to mind when you hear the word biosecurity?

(Try to gather a variety of responses.)

The term "biosecurity" is used in a number of contexts. The definitions have become so diverse that practical usage can be unclear. For today, the meaning of the word is limited to its application in the livestock industry. The description we will use is that of Dr. Larry Schuler, Area Veterinarian in Charge for APHIS. He says, **(click)** "Biosecurity is a set of management practices that prevent infectious diseases from being carried into a herd."

Although a portion of this presentation is dedicated to agroterrorism, **(click)** biosecurity is not just about terrorist attacks. More importantly, it is about practices that are beneficial to herd health and producer profit on a day-to-day basis.

Visual 3

Developing a biosecurity plan is not the sole responsibility of the producer, feedlot operator, etc. Several individuals and organizations are available to guide livestock handlers in the use of biosecurity strategies specific to each scenario.

Since September 11, many job descriptions have changed and new positions have been created to deal specifically with biosecurity. This is an unrealized asset to the livestock

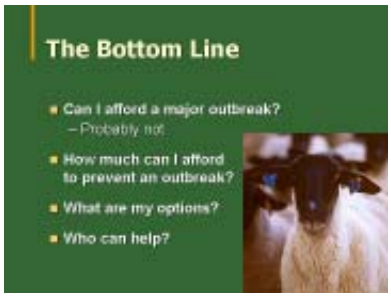
industry. The attention that should have always been given to livestock health, but wasn't, is now an international priority. The resources to implement disease prevention plans are available now, and should be used to their full advantage.

Among these resources are a host of people that livestock handlers can turn to for guidance, including Extension specialists, private veterinarians and state/federal health officers. *(Ask if anyone has been through the Biosecurity in-service.)*

Visual 4

Depending on the size and nature of a particular livestock operation, the introduction of infectious disease could be caused by a number of different agents. The threats for a family operated cow/calf producer in southwest North Dakota are obviously different than those of a large-scale swine facility in Iowa. It is important that we remember the scope of American agriculture when considering the need for biosecurity measures.

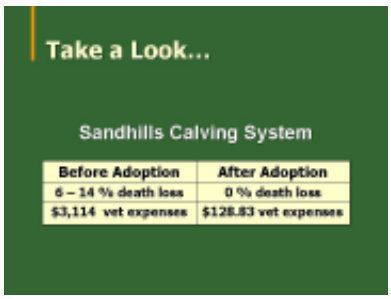
There are universal threats to almost all operations including purchased animals and products, visitors and suppliers. Other operators may have to consider the neighbor's herd, different farm animals and wildlife. Others yet may need to be conscious of potential employee problems or illness spread through the livestock show circuit. Recognizing these threats is the first step in preventing the spread of infectious disease. Awareness is key.



Visual 5

Once elements that could potentially affect herd health are identified, the cost of disease prevention needs to be weighed against the consequences of an outbreak — an extremely difficult thing to do, considering the variables.

However, the bottom line is that the majority of livestock producers could not afford to replace significant numbers of livestock. Thus, a prevention plan needs to be made. Certainly, some disease prevention tactics are more affordable than others. It is unrealistic to expect all operators to put out the money for full-blown biosecurity plans. For many, it simply isn't feasible, in terms of finance or labor. Luckily, an array of options exist. Again, Extension and health officials, as well as veterinarians, can serve as assistants in exploring these options.



Visual 6

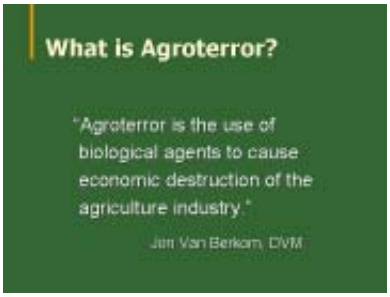
Let's look at one option that has gained popularity for minimizing scours, a common disease problem in cattle operations.

Pathogen levels are low when the season's first calves are born and scouring incidence is low. Once a few calves develop scours, they shed more pathogens, and the cases of scours multiply.

The Sandhills Calving System, developed at the University of Nebraska, interrupts this cycle by separating calves by age and by moving pregnant cows to new calving pastures to minimize exposure to the youngest calves.

A large Nebraska ranch has used this system since 2000. Prior to this time, annual death loss from scours ranged from 6 to 14 percent, with veterinary expenses during the calving season averaging $3,114 per year.

Since adopting the system, not one calf has died from scours. Four calves were treated in 2000, and no calves have been treated since. Vet expenses during the past three calving seasons have averaged $128.83 per year. This is 24 times less than in previous years.



Visual 7

Biosecurity efforts can be instrumental in preventing common problems like scours. They can also be effective in combating what we call agroterror, a concern that has been expressed as terrorist activity increases. Dr. Jon Van Berkom, Area Epidemiologist for APHIS, defines agroterror as "the use of biological agents to cause economic destruction of the agriculture industry."

The devastation caused by infectious disease can be phenomenal, and agroterror is not an unexplored terror tool. As far back as 1915, perpetrators have used biological agents to target livestock herds. *(Does anyone know of specific livestock attacks that have occurred throughout the world?)*

Visual 8

(Discuss chart. Ex. Germany used Glanders and Anthrax to target livestock in the United States, Europe and Argentina.)

Visual 9

There are several different agents that can be used to infect livestock herds, some of which you may not have heard of prior to today.

Visual 10

Yet, agroterrorism agents are readily available on a global basis and easily transportable, further contributing to the ease of biological attack.

Visual 11

Why might terrorists use biological weapons? Any ideas?

First, **(click)** it can be difficult to detect when biological agents are released. **(click)** Dissemination often covers a large geographic area and **(click)** clinical cases may take days to weeks to recognize, **(click)** allowing the perpetrator plenty of time to leave. **(click)** There is also the possibility of secondary spread if the agent is contagious person-to-person or through a carrier, such as an animal or insect.

Visual 12

Regardless of the cause, terrorist induced or not, infectious diseases can cause tremendous economic losses. *(Discuss economic effects of outbreaks that have occurred and ask participants how much money they think is predicted to be lost should an outbreak of African swine fever/foot and mouth disease occur in the United States.)*

Visual 13

Contributing to economic loss are the trade barriers that are forced upon victim nations when outbreaks occur. The Office of International des Epizootics (OIE) is a global organization consisting of 158 member nations, including the United States, dedicated to maintaining transparency in international animal health. The OIE classifies diseases as either List A or List B. List A diseases are transmissible and have the potential for very serious and rapid spread and are of serious socio-economic consequence. These include many of the diseases previously mentioned as agroterror agents. OIE requires that its member nations report any List A disease to the Central Bureau within 24 hours of diagnosis. The significance of this clause lies in the penalty for not reporting — no trade. Livestock handlers have the first opportunity to stop such inhibitions.

Visual 14

To minimize trade barriers and loss of animal and potentially human life, it is important that livestock handlers be aware of infectious disease threats — be it a neighbor or a terrorist posing the danger. Awareness is the first step of prevention. Other steps will be discussed in the next segment, "Preventing Infectious Diseases."

(Ask for questions?)

Awareness in Agriculture

Preventing Infectious Diseases

Visual 1

Preventing infectious diseases in livestock herds is a huge task – a little bit like defensive driving on a busy freeway. The information in this presentation explains the biosecurity measures that can be implemented to prevent a crash.

Visual 3

The diseases we're trying to prevent are both old and new, with old diseases including **(click)** Brucellosis, Tuberculosis, Johne's Disease, Leukosis, etc. Then, there are new or re-emerging diseases like the **(click)** West Nile and Hanta viruses and new strains of infectious agents, including Type II BVD.

Visual 2

Again, the definition of biosecurity for today is "a set of management practices that prevent infectious diseases from being carried into a herd."

Visual 4

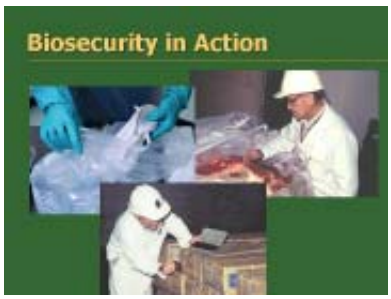
And, with global trade and terrorist activity, a whole new set of diseases become visible — foreign animal diseases including Foot and Mouth, Hog Cholera, BSE, and African Horse Sickness. Specific bioterrorist diseases that are also of concern include Anthrax, Botulism and Plague. These are just are few of the many global threats.

Visual 5

So, to prevent death loss, decreased weight gains, reduced milk production, premature culling of animals and soaring production costs that are typical effects of disease, **(click)** we must prevent infection in our herds.

Visual 6

Disease prevention is not an easy task, considering the multiple routes of infection. Take a look at Salmonella and Johne's disease. They can spread via all four routes.



Visual 7

Fortunately, simple biosecurity practices work against multiple problems.

Visual 8

Biosecurity programs vary greatly from operation to operation. However, four basic strategies can be used in almost all scenarios to help prevent the introduction and spread of infectious disease. *(Encourage participants to guess strategies.)* **(click)** Quarantine, **(click)** Disease Testing, **(click)** Vaccination and **(click)** Sanitation

Visual 9

On previous occasions, Dr. Schuler has pointed out that most diseases are bought and paid for; by this, he means that purchased livestock are probably the greatest threat to established herd health.

One tactic for minimizing the price you pay for disease is to quarantine incoming livestock, keeping them away from the rest of the herd. Away means that the two groups are not sharing food, water or even air space.

The Sandhills Calving System, mentioned in the first segment of this presentation, is a good example of how physical separation can be used to prevent disease even within the established herd. Segregation by age in this example, isolation of sick individuals and dilution of the number of animals over a large area are all methods of stopping the spread of disease.

The biggest question.... **(click)** how long do animals have to be quarantined? *(Any guesses?)*

Visual 10

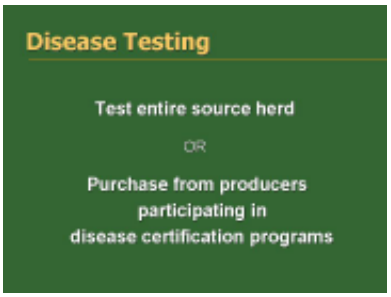
Quarantine is effective only in preventing diseases with short incubation periods, such as IBR, BVD and BRSV. For these diseases, three weeks is generally adequate.

Visual 11

However, quarantine is obviously not effective for diseases with long incubation periods or diseases with unapparent carriers. Tuberculosis, Brucellosis, Johne's Disease and Leptospirosis are among the group that do not apply to the three week quarantine rule. **(click)** Additional biosecurity strategies must be used to ensure safe herd entry.

Visual 12

Disease testing is one option for decreasing the chance of infection. Buyers should ask sellers to test animals prior to the exchange. But, the buyer needs to be aware that not all tests are 100 percent accurate. The animal's infection status has to be determinable. Often times the infection status of a herd can be determined more accurately than a single animal.

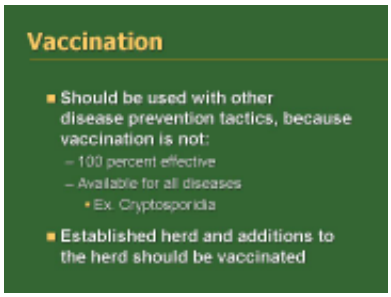


Visual 13

So, there are a couple options. You could ask for the entire source herd to be tested or **(click)** simply purchase from producers participating in disease certification programs.

Visual 14

Sounds pretty complicated, doesn't it? Here's where a veterinarian becomes very useful. He or she can suggest **(click)** which tests to request, **(click)** which animals to test and **(click)** how many to test based on regional concerns and herd history. You wouldn't want to spend your life's savings on testing to find out one simple, inexpensive test would have been adequate! Your local veterinarian should be able to shed some light on the situation.



Visual 15

The third strategy is vaccination. Unfortunately, vaccination is sometimes the only method used for disease prevention. This is a problem since vaccines are not 100 percent effective, nor are they available for all diseases, such as Cryptosporidia. Vaccination needs to be used in combination with other management practices for maximum protection.

(click) Both the established herd and additions to the herd should be vaccinated.

Visual 16

Vaccinations are available for a variety of diseases including sudden death, respiratory, abortion and diarrhea diseases.

Visual 17

Many different brands and combinations of vaccines are available, making it difficult to choose which are most effective. *(Ask participants what factors should be considered when selecting a vaccination.)* Vaccination decisions should be based on **(click)** herd history and management practices, along with **(click)** regional problems, costs and benefits and risk factors. Again, **(click)** the veterinarian is a good consul.

Visual 18

Sanitation is the fourth strategy and one of the best defenses against a lot of things. We learned this early when our moms made us wash our hands and clean our rooms. Moms' lessons will pay off if incorporated in the livestock business, but the rules are changed a bit.

(click) Dogs, cats, birds, rodents and wildlife should be kept away from feed supplies. They can carry diseases such as Neospora, Salmonella and Cryptosporidia. Also, **(click)** manure handling equipment should not be used to feed cattle. Johne's Disease, E. coli, Salmonella and Coccidiosis can be spread via the fecal to oral route.

Visual 19

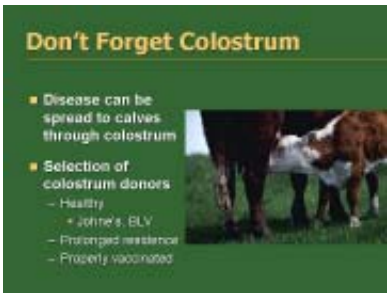
Moreover, the herd should be protected from exposure to infectious agents as best as possible. Visitors should be required to wear clean boots and coveralls. A footbath and brush for boot disinfection is also a good idea, **IF KEPT CLEAN.** A dirty footbath can multiply your chances of spreading disease.

Finally, common "Mom" sense is required. **(click)** Practice cleanliness and be aware of environmental changes on a daily basis.

Visual 20

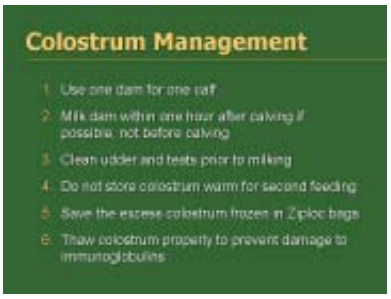
Beyond the four basic strategies for disease prevention, special considerations need to be made for newborn calves. Traffic through areas with newborn calves should be minimized. Visitors should be discouraged and other animals should also be restricted from these areas.

(click) Working with younger calves before working with older calves helps prevent the newborn, highly disease-susceptible calves from being exposed to multiple infectious agents that older calves with stronger immune systems spread.



Visual 21

When thinking about newborn calf health, one must also remember that colostrum, although it generally provides the antibodies calves need for immunity, can ironically spread disease. Producers must be especially careful to **(click)** select healthy donors that are known to be free of diseases such as Johne's and BLV. The dams should have **(click)** prolonged residence on the operation and be **(click)** properly vaccinated.



Visual 22

In addition, you should follow these general guidelines to ensure that calves are getting what they should be getting from colostrum and nothing else:

- Use one dam for one calf.
- Milk the dam within one hour after calving if possible, not before calving.
- Clean the udder and teats prior to milking. Use Soap and Water or volvasan.
- Do not store the colostrum warm for second feeding.
- Save the excess colostrum frozen in Ziploc bags. *(Ask participants how they store colostrum.)*
- Thaw colostrum properly to prevent damage to immunoglobulins. *(Talk with participants about how to thaw colostrum.)*

Visual 23

To wrap things up, a few general reminders to take home with you today: Utilize quarantine, disease testing, vaccination and sanitation strategies to prevent the introduction and spread of livestock disease. Remember that most diseases are bought and paid for — carefully monitor replacements, other herd additions and leased bulls. Don't forget outside vehicles, equipment and visitors wanting to play with newborn calves. And, while outside sources are the cause of many problems, inner-herd disease circulation can also be devastating. Consider separation of animals and order of chores based on age and health factors, and be careful to spread immunity, not disease, through colostrum.

Should a disease slip past you, the following segment will help you recognize certain diseases and respond safely and effectively.

Are there any questions before we move on?





Awareness in Agriculture

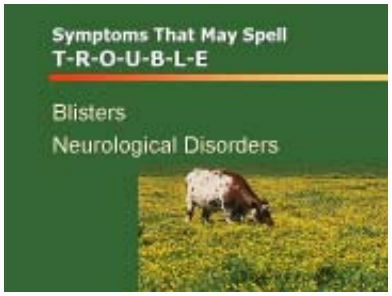
Recognizing and Responding to Infectious Diseases

Visual 1

Even when biosecurity is at its best, livestock are never guaranteed a clean bill of health. It is beneficial for livestock handlers to have a basic understanding of disease symptoms. Different symptoms call for different actions. With a host of diseases that are contagious from animal to animal and/or animal to human, the proper response can be critical.

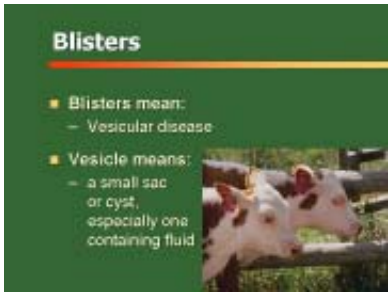
Visual 2

It is not necessary for livestock handlers to memorize detailed information about every disease in the book. However, being aware of a few key symptoms can dramatically lessen the impact of infectious diseases.



Visual 3

With this in mind, we are going to talk about three symptoms that are indicative of trouble. The first is blisters, the second is neurological disorders, and can anyone guess the third? (Sudden death.) We may be tempted to say that death really isn't a symptom, but instead an end result. Nonetheless, it is the ultimate sign of trouble, and the diagnosis of its cause may prevent this "symptom" in the rest of your herd. So for today, we'll treat it as a symptom.

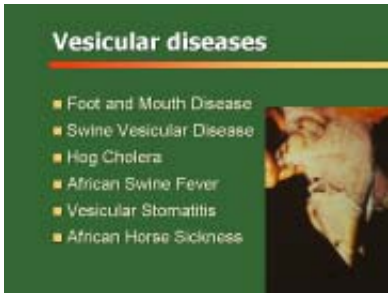


Visual 4

Blisters signify vesicular disease. **(click)** A vesicle is a small sac or cyst, generally containing fluid — a blister, as the symptom suggests. In animals with vesicular diseases, the blisters are commonly found around the muzzle or on the tongue. In horses, blisters

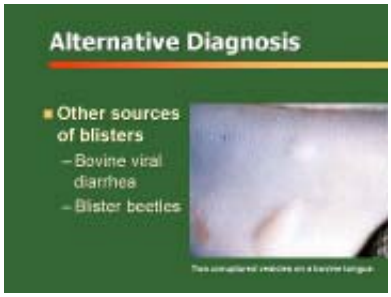
may also appear on the coronary band at the upper border of the wall of the hoof.

The vesicular group contains many diseases. Can anyone name a vesicular disease that we have heard a lot about in recent years?



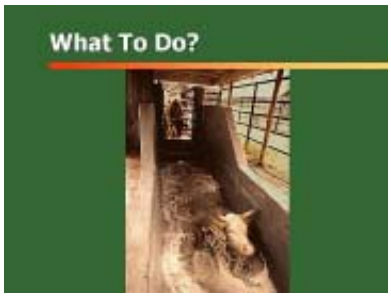
Visual 5

(click) Foot and Mouth Disease. Other very serious vesicular diseases include **(click)** Swine Vesicular Disease, **(click)** Hog Cholera and **(click)** African Swine Fever. Swine, however, are not the only species to watch for blisters. **(click)** Vesicular Stomatitis is a disease of cattle and horses. **(click)** African Horse Sickness is yet another vesicular disease.



Visual 6

While blisters signify vesicular diseases and should be distinctly remembered as a sign of the previously mentioned diseases, they also can be signs of other problems. For example, **(click)** BVD causes blister-like lesions in cattle, and **(click)** blister beetles in alfalfa also give livestock blisters, hence the name.



Visual 7

So, livestock on your operation have blisters. It probably is blister beetle you think, but what if it's not? Dr. Charlie Stoltenow, NDSU Extension state veterinarian, instructs livestock handlers not to fool around; just call the State Vet's Office. After all, it's better safe than sorry. Vesicular diseases are known to be extremely contagious and sometimes deadly. Economic impacts can be huge. Just think of the devastation caused in Europe by Foot and Mouth!

Visual 8

The second symptom to remember is again, neurological disorders. Neurological disorders are generally indicative of inflammation of the brain, which is known as Encephalitis. Producers should watch livestock for **(click)** staggering, **(click)** personality changes, **(click)** disorientation and **(click)** vocalization (distressed sounds).

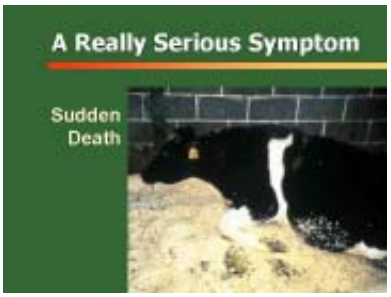
Visual 9

There are many diseases that cause inflammation of the brain. Horses are the target of **(click)** Eastern, Western and Venezuelan Encephalitis. Horses affected by these diseases, if they survive, usually never totally recover and with Venezuelan Encephalitis, can serve as an incubator. This means that a mosquito could bite an infected horse and carry the disease to a another horse, bird or worse yet, a human. In humans, fatality or permanent brain damage are possible.

(click) Since West Nile is endemic to North Dakota, vaccination is highly recommended for preventing loss and further transmission of the disease. Most affected horses do recover. Those who do not and people who do not can suffer similar problems as those affected with Eastern, Western and Venezuelan Encephalitis.

And finally, rabies. Any mammal can become infected with rabies, and the result without immediate treatment is death.

Clearly, neurological disorders cannot be taken lightly. Again, any suspicions should be reported to the State Vet's Office.



Visual 10

The third symptom that I want to discuss is sudden death. From time to time, producers find an animal dead with little or no warning. Often, the animal is disposed of and the cause of death never revealed. At least one disease that causes sudden death is worth further investigation. Does anyone know what the disease is? *(Anthrax)*

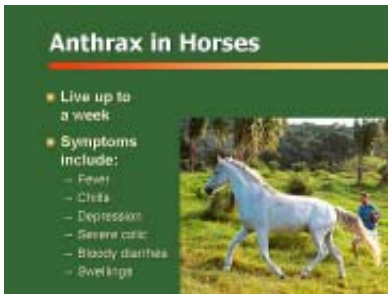
Visual 11

Anthrax results from infection by Bacillus anthracis. In animals, transmission is usually by ingestion. Herbivores become infected when they ingest spores on plants in pastures. Outbreaks are often associated with heavy rainfall, flood or drought. Contaminated bone meal and other feed can also spread the disease. Carnivores usually become affected after eating contaminated meat.

Sheep, cattle and horses are particularly susceptible to Anthrax. The disease has also been seen in pigs, mink, cats and dogs fed contaminated meat.

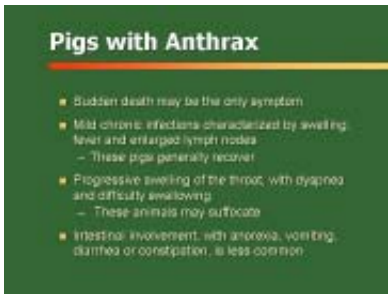
Visual 12

Sudden death may be the only indicator of Anthrax in ruminants, or a host of symptoms may appear for a short period of time. *(Refer to second bullet.)*



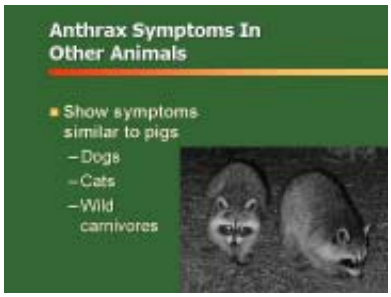
Visual 13

Horses with Anthrax may live up to a week. Common symptoms include fever, chills, anorexia, depression and severe colic with bloody diarrhea. Again, swellings may also be a sign.



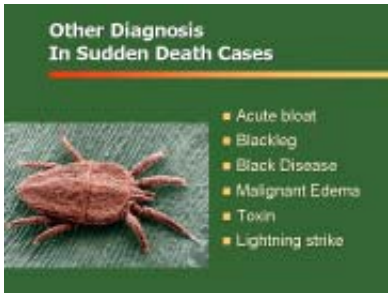
Visual 14

With pigs, sudden death may also be the only sign of Anthrax. Other times, pigs may show a variety of symptoms as do some ruminants and most horses. *(Refer to bullets 2,3,4.)*



Visual 15

Dogs, cats and wild carnivores show Anthrax symptoms similar to pigs.



Visual 16

While I can't expect you to remember all of the symptoms that could mean Anthrax in each species, I do think it is helpful to look back at the days prior to finding an animal dead, and to try to remember any of the signs I have mentioned. Maybe none were seen, but if signs were shown, they could help in the process of elimination. Other problems that could lead to sudden death include acute bloat, Blackleg, Black Disease, Malignant Edema, toxins, or a lightening strike. While you may think Anthrax would be the last possibility on your operation, you may want to reconsider.

Visual 17

Anthrax is common in North Dakota and more common in certain areas than others as you can see on the map. In Grand Forks County alone, there were 12 reported cases of Anthrax in 2000. All the way on the other side of the state in southwestern North Dakota, cases are also frequently reported.

Visual 18

Dr. Stoltenow says that Anthrax should be considered even on non-historical anthrax premises. **(click)** Down animals should be considered suspect and not slaughtered for human consumption unless cause of illness can be clearly identified and does not pose a public health hazard. *(ex. a leg fracture)*

Visual 19

Humans can get anthrax and not just from spores sent by terrorists. Cutaneous anthrax develops after skin infections, usually from handling hides, hair, wool and bone products. A depressed black scab is characteristic of this form. The intestinal form is rare, but is caused by eating contaminated meat. Pulmonary anthrax occurs from inhaling spores in contaminated dust. Depending on the form, anthrax varies in seriousness. Yet, I wouldn't mess with any Anthrax; cutaneous is the least intrusive, and just look at what it does.

Visual 20

Don't take the risk! Call the State Vets Office. Animals with Anthrax must be disposed of carefully.

Visual 21

If I was to tell you there is one reoccurring theme throughout this whole presentation, what would you say it is? *(Call the State Vet's Office.)* **(click)** The State Veterinarian and assistants are trained to diagnose and control the spread of infectious diseases. **(click)** Dr. Susan Keller is the State Vet. Write her number next to the telephone. A quick, proper response can make all the difference in the world.

Visual 22

Although we only touched on a sample of the diseases that are out there, I hope that you will walk away with an increased awareness of animal disease. Please, don't overrule the possibility of any disease. Just look at West Nile, it's not foreign anymore. Awareness is the key is to preventing the spread of such diseases.

Recognizing symptoms, rather than memorizing diseases may be the easiest way to detect mole hills before they become mountains.

Good luck and remember, you don't have to fight the fight alone. Extension agents, veterinarians and public health officials are eager to help! If you suspect a problem, call Dr. Keller!