Animal agriculture is an essential component of the U.S. and Iowa’s economy. The impact of an animal disease emergency or outbreak in livestock could be devastating. Response to such a situation will require interaction between local, state and often federal agencies and personnel. Preparedness efforts are essential for the prevention and control of such an event in Iowa and are necessary to protect animal health, our economy and even human health. During this presentation we will discuss the importance of agriculture to the U.S. and Iowa’s economy, what animal emergency diseases are, the impact they can have, the steps involved in detection and response, including the State and Federal agencies involved. Additionally, we will discuss the importance of preparing at the local level and how you can prepare.

Preparation and Responding to an Animal Disease Emergency

- **Prepare**
  - Identify stakeholders and resources in community
  - Local plan development
  - Practice table top functional exercises
  - Local, state and Federal plans

- **Prevent**
  - Meticulous animal and biosecurity

- **Detect**
  - Surveillance
  - Contact quarantine, isolation, stop movements, biosecurity
  - Control, depopulation and disposal, vaccination, cleaning and disinfection

- **Respond**
  - Awareness and education
  - Biosecurity
  - Emergency, business continuity

Animal disease emergencies involve any number of disease pathogens that may affect large numbers of livestock, resulting in severe economic consequences, including high death rates, high levels of illness, and loss of production. The occurrence of any of these diseases may have trade implications, including embargos and import restrictions. Human health can also be impacted by animal health emergencies. Some of the diseases are zoonotic (spread from animals to humans) and the loss of animals and livelihood can have severe mental health impacts for those raising or working with the animals. Disease listed as important concerns or emergencies are often referred to as FADs (foreign animal diseases) or high consequence pathogens.

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United States agriculture is very vulnerable to the intentional or accidental introduction of disease agents (foot-and-mouth disease or FMD), as well as emerging (Nipah virus in pigs and people) or re-emerging diseases (such as exotic Newcastle disease in poultry). Today we will talk more about those vulnerabilities and ways to minimize the United States’ risk of a devastating disease entering our country. Introduction of these disease agents can occur in any number of ways from natural spread, emergence of diseases to new areas, accidental introduction or even the intentional use of agents in a terrorist type attack. Natural introduction can occur sporadically in given (endemic) areas like anthrax in cattle in the Dakotas. Emerging diseases are those that are expanding in distribution or found in new locations (e.g., Nipah virus, Exotic Newcastle disease). The accidental introduction of disease pathogens may occur through the transport of animals, animal products or persons coming from countries where the disease occurs, via contaminated clothing, shoes or other objects. These are often referred to as foreign animal diseases, as their presence in the U.S. is limited or non-existent. Disease pathogens of livestock may also be introduced intentionally. Defined as agroterrorism, this involves the use of biological agents or their toxins to adversely impact the agriculture industry, the economy, or the consuming public. Regardless of how a disease pathogen may be introduced, the detection, response and control measures needed are essentially the same, but may vary in scale (local vs. state vs. national), depending on the disease in question.

Next we will discuss the importance of agriculture to the nation and more specifically, Iowa.

When we look at the economics of livestock at the national level, we see it is of major value. From pigs and poultry to cattle and sheep, animal agriculture generates income for producers and the economy while supplying safe food to our tables. The economic importance and estimated numbers of livestock and poultry in our nation and Iowa are listed here. (2005 for U.S. and 2006 for Iowa). In 2006, Iowa led the nation in the production of pork, corn, soybeans and eggs and was second nationally in red meat production (6.5 billion pounds) and agricultural exports ($4.02 billion). Data from www.usda.gov/nass/pubs/stathigh/2005/lvstkindex.htm and www.agriculture.state.ia.us/quickFacts2.htm

Here in Iowa, agriculture and livestock are major components of our economy with 88,600 farms, supporting over 63,000 jobs in the state. In 2006, Iowa led the nation in the production of pork, corn, soybeans and eggs and was second nationally in red meat production (6.5 billion pounds) and agricultural exports ($4.02 billion). Total cash receipts for farm commodities in Iowa in 2006 were almost $15 billion dollars, third in the nation. [Source: State of Iowa, Department of Agriculture and Land Stewardship, Quick Facts about Iowa Agriculture, 2005 Livestock Summary. www.agriculture.state.ia.us/2006AgStats/06_76.pdf, www.agriculture.state.ia.us/quickFacts.htm and www.agriculture.state.ia.us/quickFacts2.htm. Accessed 01/02/08.]
Despite the large numbers of animals in Iowa, each year the Census of Agriculture reports fewer farms. The changes in animal production (e.g., higher densities) and species specialization has allowed livestock farmers to efficiently provide food for America and the world, but presents opportunities and challenges that were not a part of raising animals only a few decades ago. The introduction of a disease into a facility can spread rapidly based on the high concentration of animals. This highlights the need to prevent disease introduction to continue to ensure the animal’s well-being and a safe food source.

The effect of an animal disease emergency can impact animal health, economics and possibly even human health. The impact could be felt, in the case of a foreign animal disease discovery, in as quickly as 24 hrs. Exportation of livestock could be halted. Allied and reliant industries, such as restaurants, grocery retailers, food processors and distributors, and transporters have direct and indirect ties to agriculture and would be impacted significantly. Costs would also be generated due to the needed measures for eradication and control of the disease (e.g., disease surveillance, diagnostic testing, tracing of exposed animals and their movement, implementing and maintaining quarantines, depopulation costs, indemnity paid to the farmer), … the list and impact could be extensive. Some losses due to a foreign animal disease may take years to fully realize.

What makes U.S. and Iowa agriculture vulnerable? Animals are raised in high concentrations (cattle feedlots, swine confinement units, poultry barns) which can lead to the rapid spread of a FAD. Animals are often transported great distances, sometimes over 1,000 miles, and mixed at auction markets. Auction markets allow for mixing of animals from around the state or neighboring states, presenting the opportunity for the exchange of infectious diseases such as FMD or hog cholera, and exposing others in a crowded setting. The U.S. is currently very inefficient in our ability to trace animal movement, making the tracking of disease outbreaks difficult. The USDA National Animal Identification System (NAIS) has progressed to get animal owners to register their location or premises. However, it is voluntary and the second step, animal identification, is not as advanced. Most severe, highly contagious diseases of livestock have been eradicated from the U.S., and vaccines are not used for these diseases, livestock have no immunity to FADs. Another concern is our centralized feed supply and distribution; feed can be an ideal vehicle in which to distribute an agent or compound. One feed manufacturer can supply hundreds or thousands of farms, unknowingly distributing an infectious disease agent throughout the country.
Prepare
State and Federal Agencies

So, how do we prepare for an animal disease emergency? Preparedness involves advance planning. This starts with identification of stakeholders and agencies involved or needed for a response. It is important to know members of your community and understand the roles and responsibilities they may have or may contribute to in the event of an emergency at the local, State and Federal level. Familiarity should be established before the disaster strikes. We will discuss the State and Federal agencies involved in preventing and responding to animal disease emergencies, and the plans and programs that are in place for such an event.

In the event of an animal disease emergency, the lead agency involved is the Iowa Department of Agriculture and Land Stewardship (IDALS). Directed by the State Veterinarian, Dr. David Schmitt, the agency is responsible for animal health and disease control issues as well as determining actions and the scope of the response, overseeing field operations, animal movement and tracking, and more. Working under the State Veterinarians are six District veterinarians. These individuals are all Foreign Animal Disease Diagnosticians, or FADs. This means that they have been specially trained to conduct investigations and collect samples for situations involving high consequence diseases, or foreign animal diseases (FAD). In Iowa, 25-50 suspected FAD are investigated each year. The Center for Agriculture Security is also part of IDALS. The Center trains and coordinates the Iowa Veterinary Rapid Response Team (IVRRT). This cadre of over 330 veterinary and animal health professionals is trained and ready to respond to an animal disease emergency in their community, county or in the state. These individuals are activated and directed by the State Veterinarian and the Iowa Secretary of Agriculture to assist in surveillance, euthanasia, diagnostics, premise cleaning and disinfection operations. They can also assist counties with animal sheltering issues during other types of disasters.

This map shows the areas covered by the six District veterinarians for the state of Iowa. All of these veterinarians are FADs. They run surveillance and prevention programs in the state for diseases such as brucellosis, tuberculosis, pseudorabies, and avian influenza. Several have dual roles as USDA Veterinary Medical Officers (VMOs).

The Iowa Department of Agriculture and Land Stewardship has been working with the U.S. Department of Agriculture on the voluntary implementation of the National Animal Identification System (NAIS). This national program is being developed to identify animals and track them as they move from one location to another. The database created will allow a rapid traceback in the event of a disease of concern. When fully operational, the NAIS will be capable of tracking an animal or group of animals back to the original premises within 48 hours. The first step in the process is to identify and register premises that house animals. Premise Identification Numbers (PINs) are necessary for any location involved in livestock commerce or the movement of animals or poultry. Allied agricultural operations and non-producer participants can also be assigned PINs. The PIN process begins with the completion of a Premises Identification Number Application.
Additional State Agencies Involved

- Iowa Homeland Security and Emergency Management Division (HSEMD)
  - Resource management
- Department of Natural Resources (DNR)
  - Animal disposal issues
  - Livestock burial maps
- Iowa Department of Public Health (IDPH)
  - Human health issues
  - State Public Health Veterinarian
  - Dr. Ann Garvey

Additional Supporting Agencies

- Iowa Department of Public Safety
- Iowa Department of Transportation
- Iowa National Guard
- Iowa State University Extension
- Iowa State University College of Veterinary Medicine

Iowa Emergency Response Plan

- The State plan outlines who is responsible for what and when
  - Each state agency is assigned responsibilities
  - Each agency determines how to meet their responsibilities
- Iowa Comprehensive Plan
  - Iowa Emergency Response Plan
  - Annex W: Infectious Animal Disease
  - Iowa Hazard Mitigation Plan
  - Iowa Disaster Recovery Plan
  - Iowa Critical Asset Protection Plan

Federal Agencies

- U.S. Department of Agriculture
  - Animal and Plant Health Inspection Service (APHIS)
  - Veterinary Services (VS)
  - Emergency Management and Diagnostics
  - National Center for Animal Health Emergency Management
  - National Veterinary Diagnostic Laboratories
  - The National Animal Health Laboratory Network

Other state agencies may be involved in an animal disease emergency response and provide assistance and/or resources to IDALS. The Iowa Homeland Security and Emergency Management Division (HSEMD) would manage the needed resources for the emergency. In the event of depopulation on a farm(s), the Iowa Department of Natural Resources (DNR) would assist in animal disposal and environmental issues. An online livestock burial map database to determine safe and secure locations for burial of carcasses has been developed by the DNR. We will talk about this a bit later in the presentation. Some FADs can affect human health, including personnel on the farm. In these instances, the Iowa Department of Public Health would also be involved in an animal disease emergency. They may also be involved in assisting and addressing the mental health issues that could occur during or after an emergency response.

Additional State agencies may be involved depending on the degree and nature of the animal disease emergency. These include the Iowa Department of Public Safety, Iowa Department of Transportation, Iowa Department of Public Health, Iowa National Guard. Additionally, support may come from Iowa State University Extension Service and Iowa State University College of Veterinary Medicine.

There is a State plan developed for the occurrence of an animal disease emergency. It describes the roles, responsibilities and actions needed for a variety of emergencies or disaster events. The Iowa Emergency Response Plan is part of the Iowa Comprehensive Plan, outlined in the Iowa Code, Section 605, Chapter 9 and Essential Support Function #11: The Agriculture and Natural Resources Plan, and Annex W: Infectious Animal Disease addresses the specifics for an animal disease emergency.

There are a number of federal agencies involved in the surveillance, detection and response of animal disease emergencies at the national level. The lead federal agency for safeguarding American livestock and poultry health and for responding to an animal disease emergency is the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS). There are several divisions of the agency which handle various aspects of surveillance, detection, diagnostics and response. The Veterinary Services division (VS) works to prevent, control and/or eliminating animal diseases, and monitoring and promoting animal health and productivity. The Emergency Management and Diagnostics Division prepares and trains personnel for response to animal health emergencies and oversees the National Center for Animal Health Emergency Management and the National Veterinary Diagnostic Laboratories. The National Animal Health Laboratory Network (NAHLN) is a nationwide strategy to enhance communication and collaboration between all organizations providing animal disease surveillance and testing services, including Federal, State and University veterinary diagnostic laboratories.
Animal Disease Emergencies – Local Preparedness and Response

There are several USDA personnel based in Iowa and responsible for federal activities in the State. All are trained FADDs.

Just as the state has District Veterinarians, on the Federal side, there are 9 regionally located Veterinary Medical Officers, or VMOs. These veterinarians are all FADDs and work to implement and monitor federal animal health surveillance and control programs. Some of these individuals have dual duties as State district veterinarians as well.

The USDA also manages the National Animal Identification System (NAIS), a voluntary national program created to identify and track the movement of livestock. This will aid in determining animals in contact with or commingled with diseased or exposed animals during an outbreak investigation. Although most animal industries use some type of identification system for animal identification, the current systems are not consistent from state-to-state. In the event of a disease outbreak, the process of tracing an animal’s movement using the current forms of identification can be a time consuming event, especially if the animal has moved across state lines. Additionally, the maintenance of this information improves the ability to notify states and producers in the event of an animal health emergency. Once the program is fully implemented, a goal of NAIS is to be able to trace backward or traceforward exposed animals in 48 hours or less. The first component of the program is premises identification, followed by animal identification and lastly, reporting animal movement.

The Department of Homeland Security (DHS), through USDA-APHIS, has the difficult job of protecting our borders and keeping foreign animal and plant pests out of our country. Agriculture border controls were maintained by the USDA-APHIS-Plant Protection and Quarantine, prior to March 1, 2003, when responsibilities were transferred to the Department of Homeland Security (DHS), Customs and Border Protection (CBP). DHS CBP is responsible for monitoring 317 ports of entry into the US and are constantly on the lookout for imported animal and plant material. Under the CBP are the Customs Service, the Border Patrol, Immigration and Naturalization Service, and Agricultural Inspections; more than 40,000 employees working to safeguard our borders and ports. About 3,000 USDA-APHIS agriculture inspectors search baggage at airports and cargo at major ports of entry to ensure compliance with animal and plant import restrictions. In 2004, DHS CBP agriculture specialists inspected nearly 1 million conveyances; 83 million passengers/pedestrians and conducted nearly 3.6 million cargo inspections. An additional part of the CBP is the Beagle Brigade, a team of 141 detector dogs used to sniff out luggage, packages, mail and any other items brought in the U.S. Over 2 million interceptions of prohibited agricultural products made each year, detector dogs make 75,000 of them. This photo depicts a beagle sniffing baggage at an airport; the vest he is wearing says “Protecting American Agriculture”. (Photos by Danelle-Bickett Weddle, ISU)
### Veterinary Response Teams
- National Veterinary Response Teams (NVRT)
- Veterinary Medical Assistance Teams (VMAT)
- National Animal Health Emergency Response Corps (NAHERC)

### National Veterinary Stockpile
- HSPD-9 (Jan 30, 2004)
  - National repository of critical veterinary supplies
  - Vaccine, antiviral, drugs
  - PPE kits
  - Deploy within 24 hours
  - Support response efforts for 40 days

### National Response Framework
- Incidents handled at the lowest jurisdictional level possible
- Emphasis on local response
- Identify personnel responsible for incident management at local level
  - Police, fire, public health, medical or emergency management
  - Veterinary, animal health professionals
  - Private sector is key partner

### Prevent
- Managing Disease Risk

### Biological Risk Management (BRM)
- Overall process of awareness education, evaluation, and management
- Designed to improve disease control
  - Foreign and domestic diseases
- Provide tools to minimize risk

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The National Veterinary Response Teams (NVRT) and Veterinary Medical Assistance Teams (VMAT) are groups of veterinarians and animal health professionals capable of setting up a full field hospital, and can provide medical care for pets, search and rescue dogs, livestock, wildlife and even zoo animals if the need arises. The USDA manages The National Animal Health Emergency Response Corps (NAHERC), a roster of private and state veterinarians and veterinary technicians that can be activated quickly to serve as temporary Federal personnel to help meet emergency staffing needs for the response and control of animal disease outbreaks. (Photo: VMAT members examining a dog. www.fema.gov/storm/charley/photos/h_c_s2_10.jpg)

The National Veterinary Stockpile (NVS) was established following release of Homeland Security Directive #9 (HSPD-9) on January 30, 2004. The NVS, much like the human version – Strategic National Stockpile, contains critical veterinary supplies in the event of an animal disease emergency. Items include vaccines, antiviral medications and other drugs needed for treating ill animals. It also includes PPE kits – Personal Protective Equipment – to ensure those working with animals have the proper gear so they aren’t exposed to disease agents. The shipment must be requested by the State; the State must then be prepared to receive, stage, store, and manage the inventory. It will be sent within 24 hours of request and is designed to support the response efforts for 40 days. A practice deployment and inventory management scenario was performed in Iowa in 2007.

The National Response Framework provides guiding principles for all response partners in preparing and providing a unified national response to disasters and emergencies. A basic premise of the NRF, is that all incidents are handled at the lowest jurisdictional level possible. The emphasis is on local response. The personnel responsible for incident management at the local level must be identified. This may include police, fire, public health, medical or emergency management professionals; in the event of an animal disease emergency, veterinary and animal health professionals should be included. Additionally, the private sector is a key partner, particularly for critical infrastructure protection and recovery in the community.

Prevention includes measures that prevent the emergency from happening, reduce the chance of the emergency happening, or reduce the damage of unavoidable emergencies. Awareness and management of disease risk is an important component for Iowa livestock operations so that an animal disease emergency can be prevented. Whether it is part of everyday operations or in the event of an outbreak, awareness of common biosecurity, or biological risk management, protocols is essential to those interacting with animal facilities. Specific prevention steps exist for certain diseases, and control practices relate to how the disease is actually spread. Recommended prevention practices for the five routes of transmission will be further explained.

In order for a farm to develop a biosecurity plan, specific disease risks for their operation must be identified. Biological risk management (BRM) is the overall process of awareness education regarding the risk of infectious diseases entering or spreading through an animal facility. It also involves evaluating and managing those risks. BRM is designed to improve disease control, not only for foreign animal disease threats like foot-and-mouth disease, but domestic diseases, like *E. coli* or *Salmonella* as well. Biological risk management provides the tools to identify and minimize the risk (photo courtesy of: DB Weddle).
**Biological Risk Management (BRM)**

- Disease risk cannot be totally eliminated
  - Animal, its environment
  - Decrease exposure to disease agents
- Minimize threat to animals and humans
- No one-size-fits-all answer

BRM recognizes that diseases cannot be totally eliminated, but that the risk can be managed through effective prevention steps. Animal caretakers are knowledgeable about animals and can manage their environment to minimize the risk of disease. For nearly all diseases there is a relationship between exposure dose (number of disease organisms) and severity of disease. By decreasing the animal’s exposure dose through cleanliness, good nutrition, decreased stress and proper vaccinations, there is less risk for the animals getting sick which helps justify the cost of implementing BRM. It is important to remember that many different solutions exist and because all animal facilities are different, there is not a one-size-fits-all answer. (Photo: Cattle in a pasture and the owner walking through them monitoring for illness (courtesy of USDA, taken by Bill Tarpenning).

**Diseases of High Consequence**

*International, U.S. and Iowa*

High consequence animal diseases lists are maintained at the international, national, and state levels. Most of the listed disease agents have been successfully eradicated or controlled in the U.S. but still occur in other countries. While this is good for our livestock industry, it also means that the introduction of any of these agents can have severe consequences since our animals have no natural immunity to the disease. These diseases are listed based on the impact they may have (e.g., highly contagious (spread quickly), severe animal health, economic or public health consequences, great importance in international trade). 

*Note to presenter... There is a complete list of diseases included with your materials. Additionally, audience handouts (Fast Facts) and disease specific PowerPoint presentations on each of these diseases are available for inclusion in this presentation (Short version) or as stand alone presentations (Long version) depending on the interest and need of the audience.*

**World Organization for Animal Health (OIE)**

- Early Warning System
- Disease reported within 24 hours
- Informs countries at risk
- Trade shut down until further notice

The detection of any of the listed high consequence livestock pathogens must be reported to the World Organization for Animal Health (called the OIE – Office International des Epizooties) within 24 hours. This international organization monitors the disease status of animal diseases of severe economic or public health consequences. The OIE immediately informs all other countries at risk, i.e. those countries receiving exports from the affected country. The result is often the swift implementation of a trade embargo by many countries against the affected animal species or their products. This was seen with the discovery of “mad cow” case (BSE, bovine spongiform encephalopathy) in the State of Washington. Once the infected cow was discovered, live cattle exports ceased to many countries. Borders did not reopen until an international investigation team deemed the disease investigation was handled appropriately and the disease had been eradicated. In the case of foot and mouth disease (FMD), trade could not resume until 3-months after the slaughter of the last positive animal, given ongoing testing and surveillance had occurred throughout the disease monitoring process.

**Routes of Transmission**

- Apply to all infectious agents
- Animal must be exposed to develop disease
- Understand different routes of transmission = Gain control
- Risk areas must be identified – Design protocols to minimize exposure

While disease agents and the subsequent illness can vary, one thing is common – the animal or human must be exposed to the pathogen to develop disease. One way to minimize disease risk involves focusing on the pathogen’s routes of transmission (how it spreads and enters the animal or human). This has the advantage of protecting against multiple disease pathogens at once, as well as any new or unanticipated infectious diseases that may arise. Using this classification system is effective and easy to understand without requiring knowledge about a wide range of diseases. From a management standpoint, it is easier to identify specific risk areas, such as oral exposure through drinking contaminated water, and then design protocols to minimize exposure.
### Routes of Transmission

- **Spread of disease agents**
  - Animal → animal
  - Animal → human ("zoonotic")
- **Different modes of transmission**
  - Aerosol
  - Oral
  - Direct contact
  - Vector-borne
  - Fomite
  - Zoonotic

Disease agents can be spread from animal to animal, or animal to human (known as zoonotic disease), through five main routes – aerosol, direct contact, fomite, oral and vector borne. Zoonotic diseases involve the transmission of disease pathogens from animals to humans. The disease agents entry into a person goes through the same five routes of transmission as in animals – aerosol, oral, etc. It should be noted that many infectious agents can be transmitted by more than one route of infection. (Photo courtesy of DB Weddle, DVM, Iowa State University)

**NOTE TO PRESENTER:** This would be the place to distribute the Transmission Routes Handout so participants can learn the definition of each of the routes of transmission. For brevity, here are quick explanations: aerosol – breathing in contaminated particles; direct contact – disease agent entering through blood, breeding, mucous membranes like eyes/gums/open wounds; fomite – contaminated inanimate object carries disease agents and enters animal directly or orally (example – needles, buckets, boots); oral – consumption of contaminated feed, water; vector-borne – insects acquire disease agent from one animal/human and spread to another animal/human.

### General Disease Prevention Practices

- **Next we will look at prevention practices that should be implemented on farm to help minimize the chance of disease entry or spread among animals.**
- **There are many general prevention steps that every farm could implement that would help prevent against a variety of diseases that are transmitted in various ways. Two of the biggest risks for disease entry include animals and traffic (vehicles and people).**

### Daily Practices

- **Post signs limiting animal access to unauthorized visitors**
- **Restrict access to farm**
  - Appointments
  - Known personnel
  - Visitor log
- **Limit contact with animals**
  - Neighbor’s livestock
  - Wildlife, birds
  - Roaming cats, dogs

Posting signs with clear instructions regarding your farm policy for visitors and locking gates will help limit unauthorized access to your animals, feed, and equipment. Restrict access to your farm to only those with appointments or people you know. All visitors should sign in on a visitor log and disclose their last known contact with other livestock species. Also, besides introducing the same species to a facility, it is important to limit contact with other animals – neighboring livestock on common fence lines, wildlife, rodents and birds. Cats and dogs should be prevented from roaming between farms. Photo courtesy of: Bryan Buss, DVM, ISU.

### Daily Practices

- **Limit animal purchases**
- **Quarantine newly introduced animals**
  - New purchases, returning animals
  - Isolate ill animals immediately
  - No shared ventilation, direct contact with other animals
- **Time determined with veterinarian**
- **Test for key diseases before placing with rest of herd/flock**

If animals are purchased, they should come from a known source with a health status similar to the home herd/flock and from a limited number of sources. Newly introduced animals, including animals taken to a show, trail ride or veterinary clinic for treatment, may be carrying diseases that the home herd/flock is not immune to. Quarantine is recommended for a period of time, commonly 2-4 weeks. Ill animals should be removed from the rest of the herd/flock immediately and placed in an isolation area where ventilation, feed/water, and other equipment are not shared and direct contact with other animals does not occur to minimize disease spread. Personnel handling or working with ill animals, should do so the last part of the day, to avoid spreading pathogens to healthy animals on the farm. Time spent in isolation and quarantine varies depending on the risk so this should be determined together with your herd veterinarian. Before taking animals out of isolation or quarantine, they should be tested for key diseases (determined together with your herd veterinarian) to make sure they are not carrying diseases that could be introduced into the home herd.
To monitor health status and effectiveness of treatments and vaccination protocols, it is imperative to keep health records on every animal. There are many computer programs out there that can simplify this for producers. By establishing and educating all employees on what to look for regarding sick animals and having a reporting system so that those in charge can make treatment decisions or the veterinarian can be contacted, serious diseases can be identified early on and minimize the risk of disease spread. It is important to clean any equipment, boots or clothing that is used between groups of animals with differing health status. Producers should work with their veterinarian to investigate those animals that present with unusual symptoms or are unresponsive to treatment, especially neurologic cases, downers and those that die suddenly. Photo courtesy of Dale Moore, UC Davis VMTRC.

Specific prevention steps exist for certain diseases, and control practices relate to how the disease is actually spread. Recommended prevention practices for the five routes of transmission will be further explained.

It is important to remember that disease transmission can occur without animals exhibiting obvious clinical signs of disease. That is why daily disease prevention and awareness of developing how diseases are transmitted are essential when a strategy to minimize the risk of disease for a facility or operation. (Photo source: DB Weddle, DVM, Iowa State University)

Aerosol transmission occurs when infected droplets are passed through the air from one animal (infected) to another animal (susceptible). There are various prevention steps that can help ensure aerosol transmission of disease does not occur. One essential step is to increase the distance between sick and susceptible animals. Another is to maximize ventilation so that fresh air is provided to all animals and humidity and odors do not build up. These basic steps will go a long way in preventing aerosol disease transmission. Graphic designed by Clint May, ISU.

An essential step in aerosol prevention is to isolate all sick animals immediately so that they do not contact other susceptible animals. For aerosol spread diseases, distance is extremely important. Air space should not be shared between sick and healthy animals as is depicted in this photo with the horse isolated by herself in an pen (photo courtesy of DB Weddle, DVM, Iowa State University).
Animal Disease Emergencies – Local Preparedness and Response

There are various prevention steps that can help ensure direct contact and fomite transmission of diseases are minimized. This begins with visitors and vehicles on farm – limit or restrict access, require clean clothing/footwear/vehicles, and restrict access to animals on farm. Another essential step in prevention is to isolate all sick animals immediately so that they do not contact other susceptible animals (discussed previously). Keep the animal housing environment as clean and dry as possible to minimize risk of environmental exposure. Finally, keep equipment clean so that it does not act as a fomite and spread disease to the next animal (discussed previously). These basic steps will go a long way in preventing direct contact and fomite disease transmission. (Photo source: DB Weddle, DVM, Iowa State University)

Minimize vehicle traffic on farm by loading/unloading animals and keeping rendering piles only at the perimeter of the operation. Rendering trucks can visit several farms in one day picking up animals that may have died from contagious diseases. By having the dead pile at the perimeter of the operation, the risk of disease introduction is minimized. Another way to minimize the disease introduction is to designate certain vehicles for use on-farm only and other vehicles for off-farm only. If this is not possible, vehicles used off-farm should be cleaned and disinfected appropriately before coming into contact with animals or their travel paths on farm. Do not share equipment with other farms, such as tractors for cleaning barns or livestock trailers, because the risk for disease introduction increases. If equipment is shared, it should be inspected for cleanliness and cleaned appropriately (washed down, soap washed, rinsed, disinfected and allowed to dry) before use. It is also good to prevent feed and fuel truck drivers from crossing animal paths on on-farm vehicle paths. Photo courtesy of Bryan Buss, DVM, Iowa State University.

Since visitors and sales people have had unknown animal contact prior to visiting your farm, require them to make appointments prior to their visit. Have visitors sign in and disclose their last known animal contact so you can decide what, if any, animal contact they should have on your farm. Collecting this information is also important with regard to disease tracking, should an outbreak occur on your farm or in your area. By limiting access of people who have recently (last 7-10 days) been to a foreign country, the risk of disease introduction is minimized; often times a devastating disease. Clean clothes and footwear should be required of anyone entering your operation and if not, entry should be denied as the risk of disease introduction increases. By having the dead pile at the perimeter of the operation, the risk of several farms in one day picking up animals that may have died from contagious diseases. By having the dead pile at the perimeter of the operation, the risk of disease introduction is minimized. Another way to minimize the disease introduction is to designate certain vehicles for use on-farm only and other vehicles for off-farm only. If this is not possible, vehicles used off-farm should be cleaned and disinfected appropriately before coming into contact with animals or their travel paths on farm. Do not share equipment with other farms, such as tractors for cleaning barns or livestock trailers, because the risk for disease introduction increases. If equipment is shared, it should be inspected for cleanliness and cleaned appropriately (washed down, soap washed, rinsed, disinfected and allowed to dry) before use. It is also good to prevent feed and fuel truck drivers from crossing animal paths on on-farm vehicle paths. Photo courtesy of Bryan Buss, DVM, Iowa State University.

There are various prevention steps that can help ensure oral and fomite transmission of diseases are minimized. One essential step in prevention is to isolate all sick animals immediately so that they do not contact other susceptible animals (discussed previously). Keeping feed and water clean by minimizing fecal and urine contamination is extremely important. Another is to manage animal manure so that it does not contaminate young stock areas or contaminate grazing areas. Manure can contain high doses of pathogens; disinfectants cannot kill pathogens “protected” by manure. Finally, keep your equipment clean- feeding, treatment equipment and delivery trucks especially (discussed previously). These basic steps will go a long way in preventing oral and fomite disease transmission. Photo depicts an esophageal feeder that can administer electrolytes to a sick animal – if not cleaned appropriately, this fomite could introduce disease to another animal orally. (Photo source: DB Weddle, DVM, Iowa State University)
Prevent: Oral, Fomites

- Elevate feed, prevent stepping into feed bunk with contaminated boots
- Examine feed for contaminants, quality: manure, mold, carcasses
- Monitor feed tags, deliveries
- Test, control access to water sources: fencing to prevent animal entry and contamination

Feed and water can become contaminated with feces and urine if not properly handled both before and after feeding. Elevate feed and prevent people from stepping into feed bunks with manure on their boots. Feed stuffs should be examined routinely for contaminants such as manure, mold, or foreign material (carcasses during ensiling), and overall quality. Monitor feed tags and delivery of commodities to ensure quality products are being fed to animals. If a natural water source, such as a pond or stream, is the main drinking water for the herd, test it periodically for quality purposes and control access so that animals can drink from it but not enter and potentially contaminate it. This can be done with strategic fencing and a concrete or gravel rock pad leading into the water source. (Photo source: USDA ARS)

Vector Control

- Basic prevention steps include:
  - Source reduction
  - Prevent egg laying
  - Control adults
  - Insecticides
  - Minimize animal interaction
  - Screens on buildings
  - Animal treatment
  - Mowing long grasses

Vector control is important as a number of insects can be carriers of FADs. Control begins with an understanding of the insect’s life cycle. Insect life stages vary and do so effective control measures. For instance, the egg laying grounds for flies are different than that of mosquitoes and midges and one approach does not work for all. Controlling adult insects, be it flies or mosquitoes, often involves the use of insecticides. This is often less effective, so more effort should be focused on reducing the source. Finally, minimize the opportunities for insects to interact with animals through the use of screens on barns, animal treatment with approved chemicals, and mowing long grasses. Photo depicts insecticide spray and screens on the animal building. (Photo source: DB Weddle, DVM, Iowa State University)

Environmental Contamination

- Disease organism in environment
  - Survive in soil, organic material
- Animals and humans can acquire agent(s) through:
  - Inhalation (aerosol)
  - Direct contact
  - Fomites
  - Oral consumption
  - Vectors

Many disease agents can survive for extended periods of time in soil or other organic material like bedding, manure, old feed, etc. Animals or humans can then acquire the disease agent from the environment through inhalation or aerosolization, oral consumption, direct contact, or via fomites as discussed in previous slides. Therefore, environmental contamination should not be ignored but recognize the routes it uses to get into the animal can be controlled. This photo demonstrates the wide realm of environmental contamination possibilities (photo source DB Weddle). Next we will discuss ways to prevent entry of disease onto a farm – carrying organic matter from the environment is one area that must be controlled.

Response to an Animal Disease Emergency

The response needed for an animal disease emergency will be dependant on a number of factors. However, almost all disease outbreaks involving livestock or poultry will involve the State Veterinarian and usually the Federal Government (USDA-APHIS) to some extent. Those outbreaks that involve a foreign animal disease (one that is not found in the U.S.) will have international trade issues.

Response

- Preparedness plan in action: expedient, safe, effective
- Level of response depends on:
  - Particular disease
  - Ability of disease to spread
  - Degree of spread
  - Resources available

Response is crucial for an emergency incident, including an animal health emergency. The goal is to put your preparedness plan into action expediently, safely and effectively. The level of response needed will vary on a number of factors. The disease suspected or confirmed, the number of animals or premises affected, the animal health and public health impact from the disease, the economic or trade implications of the disease. Actions taken will be made by the State Veterinarian (or in the case of a national emergency – in conjunction with the Federal AVIC). Some diseases may potentially bring a Presidential or a USDA declaration of emergency. Should the disease be one that spreads quickly, or can be transmitted to humans, other USDA or Federal teams, even FEMA teams, may be sent for assistance.
Animal Disease Emergencies – Local Preparedness and Response

Diseases are detected at the local level, either by the producer or the local veterinarian. In some cases, the diagnostic laboratory or slaughter facility may make initial detection. Veterinarians are required to report animal disease of high consequence (listed in the Iowa Code, USDA or OIE lists) to the State Veterinarian or Federal AVIC. Once detected, the incident is typically handled at the State/Federal level first working with the local level. State Veterinarian has authority for and directs all response and treatment actions (in partnership with their Federal counterpart-AVIC). Once the animals are euthanized and disposed of, then the site or sites must be cleaned and disinfected. Likewise, some compensation (indemnity) may be provided to the owners of the animals. The state or federal indemnity funds will need to be made available. During and after an animal disease emergency, businesses must attempt to continue function. Recovery takes time.

The report of an ill or suspicious animal usually occurs at the producer level. The producer should call their local veterinarian upon seeing any unusual or unexplained illness. Although many high consequence diseases can have signs similar to commonly seen diseases, some indicators to be alert for include any increases in illness, deaths or abortion, any significant drops in production, ulcers or blisters on or around the mouth or feet, sudden lameness, any neurological signs, any pox or lumpy skin condition, and any severe respiratory conditions.

Upon suspecting a disease of high consequence, the local veterinarian is required to contact the State veterinarian or the Federal AVIC. At this point a FADD (foreign animal disease diagnostician) is sent out to investigate. A FADD, is a state or federal veterinarian who is specially trained to conduct investigations of high consequence animal diseases. Each year in the U.S. over 500 FADD investigations are conducted; most of which turn out to be negative for high consequence animal diseases. Here in Iowa, about 25-50 investigations are conducted each year. The FADD will investigate within 24 hours of the local veterinarians initial call. The FADD will assess the situation and examine the animal(s). Working in close collaboration with the State Veterinarian and the Federal AVIC, the FADD will obtain the appropriate samples and forward them to the appropriate National laboratory for testing. Depending on the level of suspicion of an FAD, the sample may be shipped overnight or hand carried to the laboratory. While the sample is being processed, the affected farm may be placed under a hold order to prevent the movement of animals off of or onto the premises. The level of response needed will vary on a number of factors. The disease suspected or confirmed, the number of animals or premises affected, the animal health and public health impact from the disease, the economic or trade implications of the disease. Actions taken will be made by the State Veterinarian (or in the case of a national emergency – in conjunction with the Federal AVIC). Some diseases may potentially bring a Presidential or a USDA declaration of emergency.

These are the various case priorities the FADD can assign a situation based on their investigation.

### Animal Disease Emergency Indicators
- Increased illness, death rates, abortions
- Significant drop in production
- Ulcers or blisters on or around the animal’s mouth or feet
- Sudden lameness
- Any nervous system signs
- Pox or lumpy skin conditions
- Severe respiratory conditions
- Any unusual or unexplained illness

### FADD Investigation
- **Foreign Animal Disease Diagnostician**
  - Specially trained veterinarian
  - Over 500 investigations in U.S. each year: 25-50 in Iowa
  - Visits premises within 24 hours
  - Inspects animals and makes field assessment
  - Consults with State Veterinarian and AVIC on case priority and necessary actions
  - Sample collection (priority level)
  - Control measures: movement restrictions, quarantine

### Case Priorities
- **Highly likely**
  - Virology and clinical signs are consistent with FAD
  - Samples shipped by carrier and tested overnight or hand carried to the laboratory

- **Likely**
  - History and clinical signs suggest FAD
  - Samples shipped by carrier and tested when over 24 hours

- **Possible**
  - History or clinical signs not consistent
  - Samples shipped high priority and tested on next duty day

- **Unlikely**
  - History and clinical signs do NOT indicate FAD
  - Samples shipped by carrier and tested when over 24 hours

HSEMD, IDALS, CFSPH 2008
Animal Health Laboratory Submissions

- Routine (daily) testing
  - ISU CVM Diagnostic Laboratory
  - Private laboratory facilities
  - National Veterinary Laboratory Network
- Suspected foreign animal disease
  - Foreign Animal Disease Diagnostic Laboratory, Plum Island, NY (cloven hoofed)
  - National Veterinary Services Laboratories – Ames (poultry, equine, fish)

Animal disease diagnostic testing in Iowa is done routinely by the Iowa State University College of Veterinary Medicine Diagnostic Laboratory as well as other private laboratory facilities or those in the National Veterinary Laboratory Network. In the event of suspicion of a high consequence disease pathogen, samples would be sent to one of two National Animal Disease Diagnostic Laboratories. The FADDL (Foreign Animal Disease Diagnostic Laboratory) in Plum Island, NY, conducts testing of sample from cattle, sheep, goats and swine. The National Veterinary Services Laboratories in Ames, Iowa, conducts testing on poultry, equine and fish disease agents.

There are various disease prevention and control methods that must be applied during and after an animal health event and these will be discussed next.

Prevention: State Level

- State Veterinarian
  - Under authority of Iowa Secretary of Ag
  - Embargo
    - Prohibits animal and/or product movement into Iowa
    - Voluntary hold order
      - Request that owners voluntarily cease all movement of animals and/or product
      - Quarantine
        - Mandatory order to cease animal and/or product movement

If a major animal disease is reported in Iowa, movement restrictions could be put in place to minimize spread until more information is known. The State Veterinarian, under the authority of the Iowa Secretary of Agriculture, may implement embargos, voluntary hold orders, or quarantines, depending on the needed response. Animals or their products may not be allowed to go to market or for further processing. The only ones allowed on/off operations could be essential personnel or state authorities. Deliveries may be halted as well depending on the disease concern and how rapidly it can spread. People movement may also be limited initially until more is known about the disease and how it is spread.

IDALS Authority:

Iowa Code 163.1(1)

- Grants IDALS power to “control an infectious disease affecting animals within this state” which may involve
  - Control and eradication of animal disease
  - Quarantine of animals or premises
  - Regulate or restrict animal movement
  - Enter any premises where animals/carcasses are or have been in the past
  - Condemn and depopulate animals
  - Disinfect farm operations

The Iowa Code, Section 163, grants IDALS broad powers to “control an infectious disease affecting animals within the state”. Actions needed may include control and eradication of animal disease, quarantine of diseased animals or premises, regulation or prohibition of animal movement in, out and within the state, entry to any premises where animals/carcasses are or have been in the past, condemnation and depopulation of animals and/or disinfection of farm operations. Iowa Code Chapter 163: Infectious and Contagious Diseases Among Animals at http://www.legis.state.ia.us/IACODE/2001/V.html.

Once an Infected Premise with a high consequence animal disease is identified, the area surrounding that farm will be quarantined (Infected zone ~ approximately 6.2 miles in diameter). Neighboring farms, Contiguous Premises, may also be quarantined as would any farms that had received animals from the IP or were sources of animals to the IP (until surveillance is conducted). For some severely contagious diseases, such as foot-and-mouth disease, movement of animals and possibly traffic will be stopped. This will involve the implementation of various road block and entry and exit points in the Infected Zone. Depending on the location and number of roadways feeding into the area, this may be a high resource (personnel) demanding function. (Graphic by Andrew Kingsbury, CFSPH, ISU)
Single Premises Response

- One location
- FADD investigates
- Diagnosis
- Quarantine premises
- Most coordination at State level
- Treat or depopulate
- Federal authorities manage international issues

Single premises responses consist of one location where the FADD is called out to investigate the clinical signs or cause of death in animals. If the history and clinical signs are cause of concern, the FADD can discuss their findings with the State Veterinarian first and the quarantine can actually be put in place prior to definitive diagnosis as a safety measure. Once a diagnosis of a foreign animal disease is received, the State Veterinarian will put a quarantine on that premises. A single premises FAD will most likely be handled by State. They will decide to treat the animals or depopulate (euthanize and dispose of carcasses) depending on the disease diagnosis. The Federal authorities will handle the issues related to international concerns as a result of the disease diagnosis (OIE communication, embargos from other countries).

Multiple Premises, Confined Area Response

- All steps listed for single premises plus
- Increased quarantine area
- REGIONAL Involvement
  - State, Federal and industry agricultural authorities handle situation with or without State Declared Emergency
- USDA Secretary of Agriculture may issue Declaration of Emergency

Once you have considered the incident management of one location and some of the logistics and personnel issues, consider a multiple premises response. Although limited in geographic area, the control area needed would still be large and require increased resources. At this level, the Region gets very involved and there may or may not be a State Declaration of Emergency.

Multiple Premises, Multi-State Response

- Everything previous plus
- National movement controls
- State level emergency declared
- U.S. Secretary of Agriculture requests assistance from DHS
- National Response Framework and ESF 11 activated
- APHIS is lead agency

This is the worst case scenario. All of the previous response type actions are in place and now a State level emergency is declared. The U.S. Secretary of Agriculture will request assistance from Department of Homeland Security (DHS), thus turning on the National Response Framework, specifically Emergency Support Function (ESF) 11. APHIS will be the lead Agency and will support the States in their response efforts.

World Organization for Animal Health (OIE)

- Early Warning System
- Disease reported within 24 hours
- Informs countries at risk
- Trade shut down until further notice

The detection of the most high consequence livestock pathogens needs to be reported to the World Organization for Animal Health (the OIE) within 24 hours. The OIE immediately informs all other countries at risk, i.e. those countries receiving our exports. Our borders could, and would, be shut down, and preventative action would be taken by all countries at risk. As was the case with bovine spongiform encephalopathy (BSE) or “mad cow disease” in the state of Washington, once the infected cow was discovered, live cattle exports ceased to many countries. Borders will not reopen until an international investigation team deems the disease investigation was handled appropriately. If FMD were to occur in the U.S., trade could not resume until 3-months after the slaughter of the last positive animal, given ongoing surveillance through serological testing has occurred throughout the disease monitoring process.

Depopulation

- Control of FAD
- Determined by State or Federal Veterinarian
- Humane method
  - Cervical dislocation
  - Carbon dioxide
  - Captive bolt
  - Anesthetic overdose

Control of a diagnosed foreign animal disease on a livestock operation usually involves depopulation of all animals on the farm. This decision will be made by the State or Federal Veterinarian. Many different humane options exist for euthanizing animals and the method is determined by species. If animals are euthanized, then a disposal plan should be in place. (The photo shows carbon dioxide foam used to humanely euthanize floor reared poultry.)
Disposal

- Burial on-site
- Composting
- Incineration
- Rendering
- Alkaline hydrolysis
- Landfill
  - Biosecurity concerns
  - Disease characteristics
  - Quarantine zones
- Open burning (not allowed in Iowa)

Disposal Options

- Disposal restricted by:
  - Disease characteristics
  - Ease of transmission
  - Method of transmission
  - Zoonotic potential
  - Quarantine zones
  - Other restrictions per the state veterinarian

IDNR: Carcass Disposal Maps

- www.iowadnr.gov
  - Site considerations of burial locations
  - Environmental: Water tables
  - Proximity to habitation
  - Disease transmission
  - GIS Mapping - Interactive
    - 3 tiered approach
      - Red – restricted zones
      - Multiple colors – cautionary zones
      - Green – no known restrictions

Disease Prevention During Animal Health Event

Burial on-site and composting are the current options the Iowa Department of Natural Resources (IDNR) has in their plan for livestock disposal. Protocols have been developed to ensure proper composting or burial. One big advantage of these methods is that animal carcasses are not moved off the premises thereby decreasing the risk of disease spread. Rendering may be a consideration depending on proximity to one of five rendering businesses in Iowa. Landfill of dead animals raises biosecurity concerns depending on the disease and where the quarantine zone is located. Open burning of carcasses is not allowed in Iowa; incineration methods may be allowed. In some cases alkaline hydrolysis may also be used.

Some of the considerations that go into determining a disposal option include the characteristics of the disease pathogen (e.g. ability to spread or infect people), the establishment and breech of quarantine zone designations.

The Iowa Department of Natural Resources (IDNR) has developed Carcass Disposal Maps using GIS technology. These maps are online and interactive. Site considerations for livestock burial include proximity to water tables, habitation and the possibility of disease transmission. A 3-tiered approach is used for the maps with red indicating burial restricted zones, multiple colors are cautionary and green are no known restrictions.

This is a sample livestock burial map from the Iowa DNR website. Red – restricted zones, Multiple colors – cautionary zones, Green – No known restrictions.

There are various disease prevention and control methods that must be applied during and after an animal health event and those will be discussed next.
Animal Disease Emergencies – Local Preparedness and Response

Prevention: On the Farm

- Cleaning
  - Manure, feed, dirt
- Disinfection
  - Use proper concentration
- Personal protective equipment
  - Gloves, coveralls, boots
- Vehicles, equipment, footwear
- Wear clean gloves, coveralls, and boots at all times
- Disinfect properly dispose
- Wash hands

Zoonotic Diseases
- Newcastle disease: "pink eye"
- Swine vesicular disease: skin blisters
- Avian influenza: respiratory, pneumonia
- Anthrax: skin lesions, respiratory, death

When on the farm during an animal disease event, personal protective equipment such as gloves, coveralls, and boots should be worn at all times. These materials should be disinfected or removed and properly disposed of following the procedure to prevent cross contamination between different areas of the farm and the farm-to-farm. Additionally, hands should be washed with soap and water after contacting animals to prevent spread of disease to animals or humans if the disease is zoonotic. Depending on the specific disease, protective eyewear and a mask or respirator may also be necessary. State and Public Health Officials will provide guidance regarding proper protection to those working with animals. Vaccination or treatment of animals is very disease specific, and dependent upon the availability of a safe, effective product. Again, State Animal Health Officials will provide guidance to those working with livestock producers and veterinarians as to the best approach in an animal health event.

Safety: On the Farm

- Injuries
- Slips, trips and falls
- Mental health
  - Producers loss of herd/flocks, livelihood
  - Responders stress
- Environmental stress
  - Heat, cold, rain
- Physical stress

Safety is also a concern when assisting with a response to an animal disease emergency. Physical stress and injuries may occur from interactions with animals or heavy equipment used on the site. Inclement weather conditions as well as wet disinfection and decontamination areas can lead to slips, trips or falls. Mental health issues are also a concern. Not only for the producer, who may lose the entire herd/flock and possibly their livelihood, but also the responders working with or euthanizing the animals. Depending on weather conditions, environmental stress such as heat, cold, rain, snow, etc. can contribute to the physical and psychological stress.

Animal Industry Audiences

In order to control disease, proper cleaning and disinfection of all vehicles on and off the farm, plus animal housing areas may be necessary. An essential step is cleaning - removing all organic matter (manure, feed, dirt, etc.) prior to application of any disinfectants. Most disinfectants are inactivated by organic material. Additionally, this debris can allow microorganisms "hiding" from the action of disinfectants. Always read the label instructions to determine to concentration needed. More is not always better. Another often overlooked step is to allow for proper contact time after application of the disinfection solution. The chemicals need time to do their job. In the event of a disease outbreak, the best disinfectant of choice will likely be determined by animal health officials. Photo courtesy of: Danelle Bickett-Weddle, DVM, ISU

In the event of an animal disease emergency, strict biosecurity measures should be implemented and will serve as a means of preventing the further spread of the disease. Access to the farm should be restricted to only those personnel necessary for the function of the farm. Signs (like the one shown) should be posted at the farm entrance restricting access (Graphic design by Clint May, CFSPH). Any traffic (vehicle, people) allowed should be CLEAN, closely monitored and recorded in a log book. Animals should be closely and frequently monitored for signs of illness or unusual behavior. If identified, the herd veterinarian should be contacted immediately. Note to presenter: Do Not Enter Sign is available in your resources.

Several of the high consequence diseases are zoonotic (diseases of animals transmissible to humans). For example, Newcastle disease virus in chickens has lead to conjunctivitis ("pink eye") in poultry workers and responders. Swine vesicular disease virus can cause mild blister formation on the hands or other exposed areas of the skin. Avian influenza, as we are all aware, can lead to severe respiratory disease or pneumonia. Anthrax, which does occur in parts of the United States, can cause skin lesions, respiratory disease and if untreated, death. Therefore, response workers should take personal protective precautions if called to assist at sites of a zoonotic disease.
Next we will overview the coordination mechanisms of any animal disease emergencies. These include NIMS, the National Incident Management System and ICS, the Incident Command Structure.

NIMS consists of a core set of principles, terminology and organizational processes that establish standardization of the management of an incident. The system is flexible and adaptable and can be used regardless of the cause, size, location or complexity of the hazard. This allows government and private entities to work together.

NIMS aligns command and control, organizational structure, terminology, communication protocols, resources and resource typing to enable synchronization of efforts in response to an incident at all levels of government. Resources, knowledge, and abilities from the various Federal Departments and Agencies are outlined in the National Response Framework.

The Incident Command System (ICS) is mandated by NIMS. It is a standardized on-scene emergency management tool that allows responders to coordinate their efforts. ICS has an integrated organizational structure with which incorporates the needed officials and responders from Federal, State, local and tribal agencies as well as the private sector and non-governmental organizations. The system allows function without hindering jurisdictional boundaries.

ICS is adjustable depending on the complexity or demands of the incident. The organization structure can be adapted for a variety of situations, including single jurisdiction/single agency events, single jurisdiction with multi-agency involvement, and multi-jurisdictional or multi-agency operations. The structure of the ICS is a modular format. It is a top down structure with five key functional areas. The Command Post, the Operations, Planning, Logistics and Finance/Administration functions.
This slide shows the organization of a larger scale incident. Area command is established to oversee the management of the various Incident Command Posts (ICP). The ICPs are the field locations at which the primary tactical-level, on-scene incident command functions are performed. The EOC (local, state, national) is a physical location at which the coordination of information and resources to support local incident management activities normally takes place.

This is a more detailed view of the various sections in an Animal Health Incident Command. Operations (field) organization is grouped by task (e.g., diagnostics, epidemiology, surveillance, euthanasia, cleaning and disinfection).

It is important to remember that each incident will be LOCAL. Therefore local planning is needed to best prepare for an event. Although State and Federal agencies will respond, once the situation is controlled, the long term recovery process is locally based.

The final step in an animal disease emergency is recovery – what can be done to restore livestock production, continue with business, and ensure Iowa’s agriculture industry rebuilds.

Recovery involves restoring confidence that the situation is contained and the danger is over. A great deal of time, money, and effort is required to recover from an agricultural incident. Once the animals are disposed of, then the site(s) must be cleaned and disinfected. Following an animal disease emergency, Federal and State governments would work together on a possible compensation plan (indemnity) for producers for some or all of the loss of value of animals destroyed, dependent upon availability of State or Federal indemnity funds. Typically a farm will not be allowed to restock for a set period of time, dependant on the disease (e.g., for avian influenza the wait time is a minimum of 30 days). Finally, business continuity is an important consideration in recovery efforts. Recovery is smoother if a business or county has a continuity plan to implement. These plans are developed to keep people safe and employed during a disaster and to keep the business running during and after a disaster, which history tells us requires planning. More details related to business continuity are discussed next.
Prior to an animal disease emergency, some of the thoughts business owners may have had include “It will never happen to me,” “If disaster strikes, it won’t be that bad,” “I have insurance in case anything bad occurs” and “The government will take care of me if a disaster occurs.” As we know, disasters can and do happen and the only thing we can predict is that disasters are unpredictable. The definition of disaster contains words like catastrophe, calamity, great loss and destruction, an uncontrolled crisis. That alone means it will be bad and preparation and planning is imperative for businesses to survive. Insurance and the government are not always going to be able to assist in the capacity that is needed. Take responsibility for the success of your business by establishing a business continuity plan. (Photo source: http://www.cherokeeia.com/images/photos/larrabee_feed_mill.jpg)

Local resources will be needed at all levels of response. Depending on the severity or scale of the incident, State and Federal resources will be available. As the severity and scale escalates, these resources will be strained and a greater demand for local resources will occur. This is often referred to as the YOYO (Your On Your Own) philosophy. The list on the right indicates local resources that may be requested throughout a response to an animal health emergency.

In order to get through the YOYO phase, planning is imperative. Planning is a way to protect your family and/or employees, your pets and/or livestock, your property/business, and allow critical community resources to more readily help those who have special needs or are most severely impacted. This allows you to be part of the solution rather than part of the problem.

FEMA has outlined the important components of a business continuity plan. The planning team should go through each component and address the issues. Source: Emergency Management Guide for Business and Industry: A step-by-step approach to emergency planning.

**Direction and control** – this part of the plan outlines who is in charge and what system they will use to help manage the resources and make decisions. Depending on the size of the business, this can be simple or more sophisticated. This should include the plan to be followed, the duties of personnel, and what information needs to be gathered to make decisions.

**Communications** – this part of the plan outlines how employees and others will be educated and trained about the plan, how each employee will know what their role is in the plan, and how employees will be notified of a disaster. Communications should also be prepared to discuss expectations.

**Life safety** – this is directly related to communication and identifies someone in charge of safety. This person must be prepared to communicate about the safety of employees regarding the disease outbreak. Employees and their families will need to know what the risks are to them and their pets. Protecting the health and safety of all people and animals is a first priority. Photo depicts training people about avian influenza – what it is, how birds are affected, how people can protect themselves. (Source: DB Weddle, DVM, Iowa State University)

**Property protection** – this part should address biosecurity, specifically, what will be the process for restricting movement on and off a property?

**Community involvement** – it is important to be involved with the planning for response in the community. If your business is going to be impacted by an outbreak, participating as a responder to aid in the response and recovery helps
get business back together as quickly as possible. Plan ahead and have employees participate in the responder training. How could your business make adjustments to help in the response since you are not functioning in a normal manner? For example, if you run a warehouse with agricultural products and there is a stop movement order placed on trucks, you could offer to serve as a location for supplies or stockpiled goods. Get to know local and state officials that will be making decisions about movement and restoration of business. Discuss your business capabilities with them so they understand what role or risk you pose to the disaster.

Administration and logistics – ensure you have complete and accurate records for review by officials or the insurance company if needed. Other things to think about before an event include the overall plan, training and exercising, pre-approved purchase requisitions for emergencies, stockpiling key supplies, and how you will access back-up power and maintain communications. During and after an event make sure you keep telephone logs, detailed record of events, record any injuries, be able to account for personnel, notify family, prepare press releases, and pre-approved purchase requisitions are still needed. The final part of the plan relates to recovery and restoration and will be discussed next.

Some things to consider in planning for recovery and restoration includes how your business be impacted in the long run. Are there important contacts and plans that should be made with customers, suppliers, etc. prior to an event that will help in the recovery period? Are there contractual arrangements with vendors, equipment needs or facility needs that should be made before a disaster? What will the management flow be in a disaster are there options for people to work from other locations Is your insurance adequate and appropriate? What services do you have for your employees to support them through a disaster and following a disaster? Employees are the most important asset. Planning for support of mental and emotional health before, during and after an animal disaster is important. FEMA has a list of important operations for resuming business – some of which apply to an animal disease outbreak and others apply to a disaster like a flood, hurricane, earthquake, etc. Source: Emergency Management Guide for Business and Industry: A step-by-step approach to emergency planning. (Photo source: DB Weddle, DVM, Iowa State University)

In summary, it is your choice whether or not to invest the time and energy into creating a business continuity plan. If you choose not to make a plan or make a poor plan, you risk tremendous loss. According to Small Business Administration and FEMA study of small business impacted by federally declared disasters, 43% of businesses never reopen and of the 57% that reopen, 29% of these go out of business in two years (for a total of 16.5%). In all, that is an attrition of 59.5% of all business that existed prior to a disaster. Take time to establish a plan so your business can recover – the investment is worth it. FEMA’s estimate is for every dollar spent on planning, $7 are saved from disaster loss. Make a good plan and practice it. It greatly increases your chances of recovery with a functioning business. Well established plans may even grow your business post-disaster.

Resources for business continuity planning

- Emergency Management Guide for Business & Industry
  - www.fema.gov/business/guide/index.shtm
- Small Business Administration
  - Disaster preparedness and recovery information for businesses
  - www.sba.gov/services/disasterassistance/index.html
- Association of Contingency Planners
  - 1-800-445-4ACP
  - www.ACP-International.com

Resources

- Emergency Management Guide for Business & Industry
- Small Business Administration
- Association of Contingency Planners
- HSEMD, IDALS, CFSPH 2008
To demonstrate the impact an animal disease can have, and highlight the need for a prompt response to control the spread, we will discuss Foot and Mouth Disease and its implications should it be accidentally or intentionally introduced into the U.S.

**Foot and Mouth Disease (FMD)**
- Highly contagious virus
- Considered to be the most important livestock disease in the world
- Not in U.S. since 1929
- Affects cloven-hoofed animals
- Spread between animals, by contaminated objects or aerosol

Foot and mouth disease is a highly contagious viral disease that affects cloven-hoofed (two-toed) animals. [This includes cattle, pigs, sheep, goats, deer but NOT horses]. Foot and mouth disease is considered one of the most important livestock disease in the world. the world today. It is highly contagious, causing fever and blister formation in the mouth, on the tongue or muzzle, the feet or teats of affected animals. These result in great production losses, as animals have excessive salivation, difficulty walking and eating; death may occur in young animals. Sheep and goats that have the virus often have very mild signs of disease and cases may be missed if not examined closely. The FMD virus is found in the saliva and lesions of affected animals. It is spread rapidly between animals by contact, respiratory aerosol, or by objects (feed, coveralls, shoes, instruments, etc) contaminated with saliva or lesion fluids. Any case of FMD discovered in the U.S. (or in any country) must be reported to the World Organization for Animal Health (formerly the Office International des Épizooties (OIE) created in 1924) within 24 hours. The OIE then reports the outbreak to other nations, often this results in embargos or bans on animals or animal products from the affected country. The photos depicts excessive salivation (cow-top) and ruptured vesicles on leg and coronary band (pig-bottom) due to FMD.

**Foot and Mouth Disease Outbreaks – Jan to Mar 2008**

Foot and Mouth Disease (FMD) once occurred in the U.S., but was eradicated in 1929. No new cases have occurred since that time. However, the disease does still occur in other areas of the world, including parts of Asia, Africa and South America. With the ease of world trade in animals and animal products, the threat of the introduction of FMD into the U.S. is a real one. Photo: The map show outbreaks of FMD worldwide from January-March 2008. Map from the World Organization for Animal Health (called the OIE- Office of International Epizootics), accessed 27 March 2008.

**U.K. FMD Outbreak, 2001**
- Total costs over £10 billion
  - Ag industry, compensation, sports
- 6 million animals slaughtered
  - FMD free in less than 1 year
- Public perception
  - Animal welfare
  - Smoke pollution

FMD is an economical devastating disease, as seen by the effects during and following an FMD outbreak in the U.K. in 2001. Estimates. put overall economic losses over £10 billion due to the total economic strain placed on the agriculture and food industry (£3.1 billion), compensation to farmers (£1.1 billion), tourism (£4.5 to £5.3 billion by 2005) and sports (£750 million). While it is known that 6 million animals were slaughtered in the U.K. to control this disease, resulting in them reaching FMD free status in less than one year, the true costs will likely never be known. The public witnessed something few had ever seen. Mass slaughter was called into question, as were animal welfare and animal rights. Pollution from pyres of burning carcasses was intense in some areas and also impacted public health.
Conclusion

Throughout this presentation, we hope you have learned that threats to agriculture and livestock need to be taken very seriously. A local plan needs to be established for proper response and coordination in large events. Adequate resources and expertise will be needed to determine the extent of the attack, prevent disease spread and the losses that accompany it, prevent any public health implications.

What Have We Learned?
- Threats need to be taken seriously
- Framework for response and coordination
- Adequate resources and expertise
  - Determine extent of attack
  - Prevent disease spread and associated losses
  - Prevent any public health implications

Why is Local Planning needed?
- Early detection and response are critical to limit impact
  - Know what to look for and who to call for assistance
- Cooperation with local, state, and federal authorities is essential
- Everyone plays an important role in protecting U.S. agriculture

What can you do?
- Monitor animals for signs of disease
  - Report them immediately
- Be aware of steps and actions needed to control an outbreak
- Get involved in local response plan development process
- Work with State officials to improve your communities preparedness
- Encourage prevention and vigilance among members of your community

Contacts
- Phone numbers to know
  - State Veterinarian
    - 515-281-8601
  - APHIS Area-Veterinarian-in-Charge (AVIC)
    - 515-284-4140
  - State Public Health Veterinarian
    - 515-281-4933

As an animal industry individual, be aware of the steps and actions needed to contain and control an animal disease emergency. If you own or work with livestock, pay close attention for any unusual signs of illness; if noted, contact your local veterinarian or the State Veterinarians immediately. Early detection and control are the key to minimizing a national outbreak and international trade implications. Get involved in preparedness planning in your community, and encourage other members of your community to be involved with local response plan development. Work with State officials to improve your communities level of preparedness. Encourage members of your community to maintain vigilance and prevention practices for animal diseases.

A handout with phone numbers of state veterinarians, state public health veterinarians, and APHIS Area Veterinarian in Charge is provided. It is important to keep this list close at hand. If in doubt it is better to call and let the officials decide if your situation needs further investigation. The faster an outbreak can be identified, the faster it can be contained and controlled. Note to presenter: For your convenience, there is a handout on your CD ROM that lists the state veterinarian, state public health veterinarian, and the AVICs and their contact phone numbers. If you are presenting this to colleagues in your area, you may want to include the specific name and phone number on this slide for better reference.
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