After Action Report on

The Panhandle Exercise

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Sponsored by
The Texas Animal Health Commission
USDA, Veterinary Services
The Texas Cattle Feeders Association

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Executive Summary

This exercise was the first to specifically engage the cattle feeding industry and to openly discuss the possible ramifications to that industry should a foreign animal disease outbreak occur. The basis for much of the discussion was the NAHERP draft document from USDA, and that document is currently under revision and review. Before this exercise was accomplished, it was considered that more questions would be generated than answered, and those open questions are also included, along with specific recommendations from the groups.

From the first scenario, it was determined that there was a need for a comprehensive strategy to stop cattle and other livestock movements, especially interstate movement. Currently there is no national plan to address the specific problems of animals in transit, especially from state to state. Developing a list of facilities that could be used to hold in-transit cattle in isolation and a financial plan to pay for the use of those facilities and compensation to the owners of those animals and the trucking agents are needed. Legal authority to impose movement restrictions on livestock should be addressed prior to the need to implement such restrictions. Compensation for the financial impact of restrictions of the movement of animals or products should also be addressed beforehand.

From the second scenario, it was demonstrated that more clarification is needed regarding the possible use of vaccine in feedlot animals. If vaccine use for feedlot cattle is part of the national plan and feedlots are considered to be targets, then greater stocks of vaccine are needed. The present stocks of vaccine are inadequate to deal with the numbers of feedlot cattle that could be threatened in even single counties in Texas. It was also discussed that more consumer education is needed regarding the possible use of vaccine in a disease outbreak. More financial questions arose regarding the possibility of sending feedlot cattle to slaughter before they are finished. The feedlots would certainly lose money on those animals. At present, there is no plan in place to address those losses. There are questions regarding the amount of manpower that will be needed to respond to a foreign animal disease in a feedlot. A major question that is not resolved is whether it is in the best economic interest of the industry to depopulate and receive indemnity or whether it is best to vaccinate and salvage cattle on feed but with drastically reduced markets due to restrictions on movement of beef products and possible consumer reluctance to purchase beef. Possible carcass disposal of hundreds of thousands of feedlot cattle also remains an unresolved issue.

From the third scenario, the issue of compensation to owners when there are catastrophic losses remains unresolved. USDA, Veterinary Services will not pay indemnity for losses that occur from the infection. USDA, Farm Service Agency does have authority to pay compensation for losses from drought, flood or other disaster, but, again, there is no system in place to calculate losses on unfinished feedlot cattle nor is compensation to owners due to disease specifically outlined in any state or federal government program. Logistics for carcass disposal and disinfection after the outbreak remained huge issues. More research is needed to address these problems.
The Panhandle Exercise

Introduction
The animal health regulatory agencies in our country are stepping up vigilance to protect domestic livestock from the threat of foreign animal diseases. All types of livestock are under scrutiny but because of the extremely large numbers of animals concentrated in feedlots in areas such as the Texas Panhandle area, an outbreak of a foreign animal disease would present special logistical problems. The most difficult problems include depopulation and carcass disposal. For example, an outbreak of Foot-And-Mouth disease in a feedlot containing 75,000 head would require euthanasia and disposal of the entire population in as short a time as possible. Therefore, special consideration and preparations need to be made for the Panhandle Livestock population. Since these same problems also make feedlots potential targets for bioterrorism, and while this has been acknowledged many times by state and federal veterinary officials, there have not been any previous exercises that have particularly emphasized this industry.

Primary Focus
This exercise was designed particularly for the consideration of the cattle feeding industry representatives. State Animal Health regulators from the 5 states area and the allied group representatives were invited to present their perspectives in the joint discussions. The exercise focused on the Panhandle region of Texas and the adjacent regions of four neighboring states that have an especially high density of feeder cattle at risk. The exercise posed two foreign animal diseases in the scenarios, Foot-and-mouth disease and Rinderpest, and two types of location, one away from the Panhandle area and two within single feedlots. Multiple strains of Foot-and-mouth disease and multiple simultaneous outbreaks were not considered. How each scenario would affect the industry on every level was a primary consideration of the exercise.

Exercise Objectives
• To present 3 different foreign animal disease (FAD) scenarios that could affect “business as usual” and discuss specific actions by government and/or industry that could be expected in these situations.
• To initiate discussion of possible remedies that could reduce the negative impact of an FAD on the cattle feeding industry.

Three Scenarios
The following three scenarios were presented for a tabletop discussion.

1. Foot-and-Mouth Disease (FMD) diagnosed near Brownville, Texas.
2. FMD diagnosed in a feedlot near Hereford, Texas
3. Rinderpest diagnosed in a feedlot near Hereford, Texas
The Logistics

The invited industry, regulatory and allied representatives in attendance met jointly at the Ambassador Hotel of Amarillo, Texas on the first afternoon of the meeting. General background provided to every member included a paper copy of the “National Animal Health Emergency Response Plan for an Outbreak of Foot-And-Mouth Disease or Other Highly Contagious Animal Diseases (NAHERP)” document draft of September 19, 2002. Also, each member received a copy of the State of Texas Emergency Management Plan found in Annex H “Foreign Animal Diseases” of Appendix 4 of the Texas Administrative Code. Prior to each discussion session, exercise planners provided background information first on the animal population statistics of the livestock at risk in the area under investigation and then regarding the disease pertinent to the scenarios.

For each scenario, the participants were separated into three discussion groups according to their respective roles. Each group was asked to examine the scenario from their own perspective and prepare comments to share with all the participants in joint session. Those groups were:

1. Industry (Dr. Jim Amend, moderator)
2. Regulatory (Dr. Ken Waldrup, moderator)
3. Allied (Dr. Suzy Burnham, moderator)

As there was concern about an open public discussion about the vulnerability of the cattle feeding industry, all participants were invited representatives only, of agencies or institutions that have direct links to the industry. These agencies and institutions included:

Texas Animal Health Commission           Texas Tech University
Texas Cattle Feeders Association         Texas Department of Agriculture
USDA/ Veterinary Services               Texas Department of Health
Kansas Animal Health Department         Texas Commission on
Oklahoma Department of                  Environmental Quality
Agriculture                             Texas Beef Council
Colorado Department of Agriculture      CNA.
Texas A&M University system

NOTE: For a complete list of participants, see Appendix One.

After the discussion periods for each scenario, each group elected a spokesperson that stood before the entire reassembled group of representatives to describe the major issues identified by the group. A joint open discussion followed.
Livestock Statistics for the Panhandle and Neighboring Regions

Feedlot Industry and Animal Populations

Background Summary
Jim Amend, DVM, TAHC

The Planners of the exercise selected a region that, because of the climate and central location, has lent itself to beef cattle production, primarily as the location of the greatest number of feedlots per capita in the nation. For the purpose of this exercise, the area under consideration includes the Texas Panhandle and the neighboring states of Oklahoma, Kansas, Colorado and New Mexico. This five state region, as you will notice from the numbers indicated below, represents an extremely important segment of the country’s agricultural economy. These are regions of highly concentrated livestock production, especially for cattle. To have some perspective of the magnitude of the population of livestock in the area under consideration, and therefore to understand the economic impact at stake, the following are some statistics from 2002:

- The entire United States feeds 23 million head of cattle per year; sixty-two percent (62%) are fed in the five states represented in this Panhandle exercise.

- The ranking of cattle fed in 2002 for the five states under consideration is:
  1. Texas  
  2. Kansas  
  3. Colorado  
  4. Oklahoma  
  5. New Mexico

- Of the 2,189 feedlots found in the United States, twenty five percent (25%) are located in these five states.

- The estimated Beef Product from the five-state region is 7,100,000,000 (7.1 billion) lbs.¹

Feedlot operators estimate that approximately 23 trucks arrive and leave each day from each feedlot. ¹ These trucks carry feeds, supplies and livestock. In the event of a foreign animal disease emergency, it is expected that movement of all conveyances would be halted. Stopping all of these conveyances would present a major challenge.

¹Information provided by The Texas Cattle Feeders Association.
The Figure 1 demonstrates how many large feedlots are located in the Panhandle region and surrounding states of Texas, Oklahoma, New Mexico, Kansas and Colorado. Not all feedlots are included.

Fig. 1.

![Map of Cattle Feeding in the Panhandle region](image)

The Figure 2 identifies the major slaughter plants in the five states area, including those owned by four of the largest packers.

Fig. 2.

![Map of Major Fed Cattle Slaughter Plants in Five States Area, 2002](image)
**Dairy Industry**

In addition to the large numbers of beef cattle, this region also includes many dairies. The relatively low humidity, the availability of feed and water, and the relative ease of obtaining environmental permits are key factors in the increased numbers of dairies in the area. The estimated yearly milk production for these areas is presently 1,486,000,000 gallons. In Texas, dairy populations are increasing. Currently there have been 48 permits granted or under consideration in the Panhandle. This could eventually result in more than 500,000 head of dairy cows residing in this area.

The current population of dairy cattle by state is:

1. New Mexico – 290,000+
2. Kansas – 104,000+
3. Colorado – 90,000+
4. Oklahoma – 87,000+
5. Texas Panhandle – 47,000+*

*36 active dairies with 5 new dairies under construction

**Commercial Swine**

Swine numbers are also extremely important as they represent a susceptible population of “amplification hosts” in the area. The five-state region produces an estimated 333,320,000 lbs of pork per year. In Texas alone, additional growth is expected in the industry as approximately 50 building permits have been approved or are in the process of review. If all these permits were granted, this would provide space for up to 5.6 million head of swine.

Current population of commercial swine by state:

1. Colorado – 800,000+
2. Kansas – 700,000+
3. Oklahoma Panhandle – 144,000+
4. Oklahoma East – 120,000+
5. Texas Panhandle – 800,000+

**Feral Swine**

The feral swine population poses added problems in the realm of foreign animal diseases. Currently USDA-Wildlife Services has provided assistance to 27 states to alleviate feral hog damage, and the range of feral swine populations is expanding. A foreign animal disease (FAD) outbreak, such as foot-and-mouth disease, in the feral swine population would compound the problem of controlling and eradicating the disease. Although the High Plains may not have the concentration of feral swine as other areas, one cannot ignore their presence if there are rivers, creeks, or streams in close proximity.
Disease Characterization

Foot-and-Mouth Disease (FMD) is a highly contagious, viral infection that can affect many different ungulate species, including cattle, swine, sheep, goats, deer, antelopes, camelids and elephants. The disease is caused by a picornavirus and is characterized by severe vesicles in the mouth and on the tongue which lead to sloughing of the affected epithelium and along the coronary band of the hoof which appears as lameness. The mortality rate of FMD in ungulates is usually low, except for very young animals, but almost all animals in the population will be infected. Some species, such as cattle, are severely affected and are “indicator” hosts, while other species such as sheep are not as severely affected and may show little apparent disease. The disease can be especially difficult to diagnose in sheep, and, therefore, sheep are “silent” hosts. Swine can be severely affected, but they also are considered to be “amplification” hosts because they shed massive amounts of virus through the respiratory tract. FMD is not considered to be zoonotic, but clinically affected animals would not pass antemortem inspection in the USA.

Disease Symptoms and what this means to producers

Infected cattle and swine are lame, do not eat and lose weight dramatically. Infected animals can recuperate, although the recovery period can be months to years. During recuperation, productivity by weight gain or lactation is severely compromised. Furthermore, recuperating cattle can become long-term carriers of the virus.
Vaccination
There are seven recognized serotypes of FMD worldwide (types O, A, C, Asia 1, SAT1, SAT2 and SAT3). There are effective vaccines available, but the current vaccines are serotype specific, that is, the “A” serotype vaccine should be used to combat the “A” virus infection. Vaccination can prevent clinical disease, but it does not stop the viruses from replicating in the animal. Because vaccinated animals can still carry the virus, there are currently international trade restrictions on countries that vaccinate for FMD, even if they are free of clinical cases.

Transmission
The virus is shed by infected animals in oral or nasal secretions and can be aerosolized, particularly by infected swine. Large numbers of infected swine can produce such a volume of aerosol virus that it can be carried downwind. This phenomenon is called a “plume” (like a plume of smoke). Cattle are very susceptible to aerosol infection, while swine are not. Swine are usually infected by eating contaminated material.
Cleaning and Disinfection

The virus can survive freezing but is inactivated by heat (>56° C) and desiccation and by acid or alkaline solutions outside the range of 6.0-9.0. Common solutions of chlorine bleach, citric acid or acetic acid can be used for disinfection. The virus is also susceptible to some commercial disinfectants, such as Virkon S®. Cleaning and disinfection of contaminated facilities and means of transport are essential to prevent re-infection of newly introduced livestock. The virus can also be carried on contaminated boots, clothes, equipment, stock trailers and even vehicles.

Photo by Dr Ken Waldrup
Scenario 1

The opening scenario is a diagnosis of FMD in a backyard swine operation in Brownsville, Texas, a site far remote from the Panhandle. This scenario was designed to emphasize that FMD diagnosed in any susceptible species anywhere in the state will directly affect all livestock industries. The current draft of the NAHERP document was used as a reference. The moderators directed the discussion to the expected impact that this situation would have on cattle feeders in the Panhandle and adjacent regions through state and federal livestock movement controls. Each group discussed the impact of these expected movement controls on the marketing and supply of beef and animal products. *Methods or contingency plans to mediate any negative impact of movement controls and quarantines were identified but not completely resolved.*

Based on the draft NAHERP document, the questions that were posed in the introduction of Scenario 1 included:

1. What would be the extent of movement controls within the state and country?
2. What would be the extent of the federal quarantine?
3. Would fat cattle ready for slaughter be restricted?
4. Would beef products from animals slaughtered within the past few days be restricted?
5. How long would movement controls stay in effect?

The following is an outline of the major issues listed by each group regarding Scenario 1:

**Industry Group**

(Dr. Jim Amend, moderator)

It is assumed that there would be statewide movement control of *all* livestock, including trucks moving to and from the fat-kill slaughter facilities. Movement of animals and product is the main focus of this scenario.

Recommendations for Cattle in Transit when the declaration to stop livestock movement is made:

- Animals going to slaughter should proceed to slaughter, even across state lines (See Fig. 3).
- Animals leaving a facility for grazing should return to the facility.
• Animals destined for a feedlot should be stopped in transit (See Fig. 3).
  1. At this point, the feedlots do not want these cattle.
  2. At this point who owns these animals?
  3. Facilities would be needed to hold these animals.
  4. These animals could not be returned across state lines.
  5. Is there alternative destination/return of these animals?

• Animals at a livestock market
  1. These could be held at the market, but at whose expense?
  2. These could be permitted back to the farm of origin, but would need extra manpower to issue and verify permits.

• Fresh or frozen product
  1. Product from unaffected areas could be permitted to other markets
  2. Product that could be infected should be destroyed

Fig. 3

For all cattle currently in transit at time hold or quarantine is initiated

[ graphic by Dr. Rosemary Speers]
Regulatory Group  
(Dr. Ken Waldrup, moderator)

- Who is the Authority for stopping all livestock movement?
  1. Both federal and state animal health agencies have authority to impose movement restrictions.
  2. States can impose this restriction quicker than USDA.

- What is the length of time for movement restrictions?
  1. At least 72 hours based on NAHERP document
  2. This would likely be much longer.
  3. Horses would be included in the movement ban because of contact with other susceptible species.

- Holding facilities for animals stopped in transit would be needed.

- These facilities should be isolated since it may not be clear whether the animals are exposed.

- There is no current list of available facilities.

- Restrictions on products
  1. Options are to retain product within the affected state or region.
  2. Product could be treated to remove the virus by irradiation.
  3. NAHERP includes vaccination options.

- The primary objective for the livestock industry and regulatory agencies should be returning the state and region to normal business conditions as soon as possible.

- Regionalization within a region or state
  1. May need agreements with neighboring states.
  2. May need federal agreement
  3. Are plans in place to allow movement within a state under federal quarantine?
Allied Group
(Dr. Suzanne Burnham, moderator)

- Enforcement of Movement Controls
  1. The primary objective was the total eradication of the disease.
  2. Whose responsibility is it ultimately?
  3. What are the “Rules of Engagement”?

- Communications
  1. First priority is to educate the public.
  2. Second priority is to inform stakeholders.

- Manpower
  1. What are the enforcement personnel sources?
  2. Responding field personnel will come from which agencies?
  3. Is there adequate personnel in the diagnostic laboratories?

- Statutory Authority
  1. A Governor’s declaration will be necessary.
  2. May need multiple sources of manpower designated by Governor.

- Restrictions
  1. This will include all meat, milk and animal-origin products.
  2. Establish a product identification system to allow movement of product.
  3. There will need to be appropriate surveillance to end restrictions.

Additional questions to be resolved:
1. What animals and animal products could return to business as usual? When?
2. Could non-susceptible species (i.e. horses) be permitted to veterinary facilities for emergency treatments?
3. Could the meat products move after (what?) an interval of time?
4. Would persons working on ranches and in feedlots be allowed to move freely? (Fomites? Exposed or not?)
5. Would children living on cattle ranches be allowed to attend school? Special precautions?
6. With the cessation of all market activity in Texas, no one will starve. There are sufficient protein sources available, but how can public perception be mediated?
7. What would be the impact on commodities futures markets?
Discussion

There were a number of common concerns among the groups. All groups identified the problem of what to do with animals in transit, which on any given day might represent 10,000 cattle trucks. Industry made a list of recommendations that could serve as a starting point for a resolution of the problem. The need for facilities to hold these animals “in quarantine”, preferably in some degree of isolation, could be very important to stopping spread of the disease from state to state. Constructing a list of available facilities with pre-existing permission to use those facilities would be advisable. The issue of appropriate manpower to handle all of the tasks that will be necessary in any outbreak of a foreign animal disease is crucial. A governor’s declaration of emergency will be necessary to engage other resources such as police and other state workers. Cessation of all livestock movement, including horses, may be a surprise to some as it is well understood that horses are not susceptible to FMD. However, many horses are used in events that also utilize cattle, and the equipment used around both species could act as a fomite for spread of the infection. Therefore it was accepted that horses should be included in the movement ban. Cessation of movement of animal products presents other problems. It is important that beef continue to move to market, but care must be exercised to not spread the disease. Returning to “business as usual” was identified as the primary goal of the Industry group, but the Allied group listed the primary goal as eradication of the disease. The Allied group also stressed that return to business as usual would be contingent on a system of identification of product source, and immediate surveillance in order to lift restrictions as quickly as possible.
Scenario 2

The second scenario is a diagnosis of FMD in a large feedlot (concentrated animal feeding operation) near Hereford, Texas. This scenario puts the disease in the midst of a very large concentrated population of cattle, posing additional negative impacts to the industry. The focus of the discussion will again include statewide movement control of all livestock including trucks to and from the fat-kill slaughter plants, actions of neighboring states, and whether or not to consider vaccination.

The following is an outline of the major points listed by each group regarding Scenario 2:

**Industry Group**
(Dr Jim Amend, moderator)

- Would feedlot cattle be vaccinated? This would not be decided at the state or local level but rather on the national or international level. If vaccination is a possibility, the Industry group brought up the following points.
  1. Depopulation would occur in the local infected zone.
  2. We would vaccinate within the surveillance zone.
  3. We would send all feedlot cattle through the “regular” processing and work down to zero population.
  4. Wouldn’t bring in any new animals.
  5. Clean and disinfect premises, rest, and repopulate.
  6. Provide indemnity for lesser value of vaccinated animals.

- If vaccination is not possible:
  1. Industry would cast a wider net for depopulation.
  2. Continue humane support for animals (hay, water).
  3. Run down silage to zero level.
  4. Decrease need to bring in supplies.
  5. Industry would need help with depopulation:
     - Arrangements for space.
     - Equipment through state EMA
     - Simultaneous on-site and packing house personnel
  6. Clean and disinfect premises, rest and repopulate.

- Would feedlot cattle be sent to slaughter early (before finishing)?
- If sent to slaughter early, would federal indemnity cover the loss? Based on projected final weight or actual weight at the time?
- Would the Federal quarantine include Texas only or the neighboring states as well?
• Would the Federal quarantine include beef product already processed?
• What would be the impact on futures commodities markets?
• How would depopulation, and carcass disposal be handled for such large number of animals?
• Who will determine who has the legal authority to stop other modes of transportation, (trains run near feedlots, and air travel) and for how long?

• Plans need to be made for the labor force that is displaced. Should they remain on the feedlot property? Need to be sure no personnel also work at the packing houses.
• Recommendations by the Industry group:
  1. Develop a poly-valent vaccine
  2. Used markered vaccine
  3. Improve on-site testing capabilities
  4. Provide modeling to support the zoning guidelines (Is 6 miles a magic number?), taking into consideration:
     - Population density, different species
     - Climate, wind
     - Transport and depopulation capabilities
     - Decisions for handling the outbreak
  5. Data needs to be collected on the response to the outbreak and published to serve as guidelines.

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**Regulatory**

(Dr. Ken Waldrup, moderator)

Consider two possible types of outbreak:

• Limited outbreak (single, relatively small focus of infection)
  1. It might be possible to “stamp out” the disease—(depopulate, dispose of the carcasses, C&D, and repopulate)
  2. Possibly only ring vaccinate in this case.
• Very large outbreak
  1. May have to reconsider “stamping out.”
  2. Vaccination may be necessary and not optional.

**Vaccination considerations**

• There exist limitations on number of doses immediately available.
• There might be limitations on manpower to administer the vaccine.
• Other applications under consideration are:
  1. Other heterologous vaccines (i.e. canine morbiliviruses)
  2. Gamma interferon
**Carcass disposal**

- What are the legal aspects of large-scale burial?
- Whose land could be used? Can this be predetermined?
- Will there be a change in property value due to burial site?
- What happens to burial site in the long term?
- Consider other options (rendering, composting, incineration, combination).
- Cleaning and disinfection (C&D) probably will be manageable.

**Allied**  
(Dr. Suzanne Burnham, moderator)

- Will feedlot cattle be a priority for vaccination?
  1. Probably NOT, with limited numbers of doses available. Yes, if there is enough vaccine available.
  2. Even if vaccinated, would be destined for near term slaughter.
- Do we have movement controls in place for:
  1. animals?
  2. animal-origin products?
  3. Should neighboring states be included?
- **RECOMMENDATION** – Increase the numbers of available doses in the vaccine bank.
- **MARKETABILITY** of product from vaccinated animals
  1. By definition, the product can be consumed with no risk of human infection.
- Would consumers buy beef that they knew had been vaccinated for FMD? – **NO!** (Not even for pet food)
- Consumer wants to get it over with as soon as possible!!

- Euthanasia and disposal of large numbers of carcasses would consume lots of resources for:
  1. incineration
  2. burial
  3. rendering
  4. decomposition (composting)
  5. euthanasia would have to be humane (under the watchful eye of the news media)
Would feedlot cattle to be sent to slaughter before term? - YES

1. If yes, the feeders would incur monetary losses from vaccination even though the animals were clinically disease-free.
2. Who would cover those losses?
3. Who would calculate the losses?
4. Credibility remains with the stakeholders.
5. Portable abattoirs could be used to slaughter animals, but with concerns about security of carcasses, offal.
   a. Should the trucks be sealed?
   b. What logistics are in place for C&D of trucks?
   c. Should the trucks be escorted by enforcement?
6. These issues did not receive wide support within the group.

Environmental impact of carcass disposal need to be investigated.

Scenario 2 Discussion Topics

Will there be an action plan implemented on Presumptive or Definitive Diagnosis?

There were a number of sharp points that arose from this scenario. Industry representatives stated that they did not intend to start any control measures until there was a “definitive” diagnosis. By international definition, a definitive diagnosis is not reached until the offending virus is isolated and typed. A “presumptive” diagnosis is reached when a number of other laboratory tests, including polymerase chain reaction (PCR), tissue enzyme linked immunosorbent assay (ELISA) or fluorescent antibody (FA), show the presence of specific virus antigenic markers or nucleic acid (RNA or DNA). Whenever a Foreign Animal Disease Diagnostician (FADD) conducts a field investigation, that FADD makes a decision of whether the animals are exhibiting compatible clinical signs. If compatible clinical signs are present, the situation is termed “highly likely”. The industry was concerned about taking drastic action on the basis of a “highly likely” or possible “false positive” test. This is a valid concern as billions of dollars could be at stake. As a general rule, no animals would be depopulated without the authorization to pay for those animals, and it is very unlikely that authorization for depopulation would be approved on the basis of clinical signs only. However, it was pointed out that waiting for a definitive diagnosis when the presumptive tests are positive may require an additional 2-3 days, and this could have a very negative effect on the disease eradication (See Fig. 4). Further discussion between regulatory agencies and the industry may be necessary to reach further agreement on the initial course of action.
How will the consumer react to Beef Product during an outbreak?

Perhaps the sharpest point to come from this scenario was from the marketing sector. That consumers possibly would not purchase beef in the face of a disease outbreak in cattle, even though the disease was not a human health risk, is not new. This was also experienced in the FMD outbreak in the UK in 2000. North Carolina Animal Health officials* also cite that meat consumption would fall an estimated 59% in that state should there be an outbreak of a foreign animal disease. In this exercise, representatives from The Texas Beef Council stated that consumers would not buy beef that had been specifically vaccinated or irradiated. This begs the question – why try to salvage beef when it will not be purchased anyway? Flooding the market with beef that will not be purchased will not help the industry. A suggestion was made that this beef could be used for hunger relief overseas. The industry was genuinely interested in procedures and policies that would allow the salvage of meat protein and the safe consumption of beef and beef products, even in the face of a disease outbreak, but it appears that more consumer education is needed with regard to the prospect of vaccination. Depopulation with indemnity based on prior value may be the best way to support the industry through an outbreak. The consumer wants to be reassured that the disease has been completely eradicated.

*Dr Tom McGuin, Assistant State Veterinarian for South Carolina (pers. comm.)
**How can we logistically handle euthanasia of 75,000 head of feedlot cattle?**

There were also discussions on the logistics of euthanizing large numbers of cattle. Working cattle through a squeeze chute usually relies on the mobility of the animals to keep the process in continuation. For a routine procedure such as vaccination or deworming, the animals move individually into the chute, are held, processed, released and walk away down a fenced alley. When the animals are euthanized in the chute, additional machinery is necessary to remove the carcass before the next animal can be brought forward, and this will take extra minutes and personnel. If the euthanasia process required a crew of 5 (two to move the animals forward, one to operate the chute, one to euthanize the animal and one to apply chains to pull the animal out of the chute) and each animal required an average of 4 minutes to euthanize and remove, then each chute could average 15 animals per hour. Using 10 crews (50 personnel) working two 10 hours shifts on 5 chutes, it would conceivably require 50 consecutive days to euthanize 75,000 cattle. This estimate also does not account for breakdown and repair of the equipment. Therefore, to reduce this time to 5 consecutive days, it would require 100 crews (500 personnel) working two 10 hour shifts on 50 chutes. In those counties with cattle populations of over 1 million, depopulation will easily require several thousand personnel in just the one county.

**What are the options for carcass disposal?**

Problems with carcass disposal were also discussed. Incineration is an option, but, given the number of carcasses that would be involved, procurement of sufficient combustible fuel would be difficult in this area. There are currently four rendering facilities in the Texas Panhandle, but these are working at near capacity for regular business. Rendering cannot be relied upon to dispose of thousands of additional carcasses at short notice. Burial at the feedlot if land was available was one other option. *If no land is available, the feedlots should consider exploring other possibilities before a real crisis occurs.* One process that received attention was composting. For additional information, see Appendix 2.

**What are the issues if the Industry accepts vaccination?**

The main issue would be marketability of vaccinated beef. Some international markets would instantly be lost to US beef producers. If the disease spreads to include vast areas of the country, the US would be considered endemic for FMD and may never recover economically from this. All cattle would have to be vaccinated indefinitely. If only a small area of the country is regionalized and the disease is contained, the long-term damage will be much reduced. It was suggested that the federal government could purchase the beef and export it for use in third world countries under special conditions.
How will cattle in feedlots be indemnified?

If feedlot cattle must be slaughtered before they have reached finishing weight, how will the feedlot owners be compensated? The groups recognized that there is a need to develop a formula for determining the value of these cattle that have not reached final fed weight. Will the owner be compensated on the actual weight value at the time of depopulation or will there be a graduated scale based on expected finished weights?
Scenario 3

Rinderpest

Background Summary
Suzanne Burnham, DVM, TAHC

Disease Characterization

Rinderpest (RP) is an acute or subacute, contagious viral disease of ruminants and swine, manifested by high fever, lachrymal discharge, profuse bloody diarrhea and dehydration, inflammation, necrosis and erosions of the epithelium of the mouth and of the digestive tract, wasting and high mortality. The host range includes the following livestock:

- All cloven-hoofed animals are susceptible (not all clinical).
- Most clinical cases occur in cattle and water buffalo.
- European pigs are quite resistant (subclinical); American javelina (Tayassu tajacu) are very susceptible
- Sheep, goats, camels, yak are mostly subclinical.

photo by Dr Linda Logan
Feedlot clinicians will suspect BVD, IBR, MCF, Bluetongue/EHD or vesicular diseases (FMD, VS) first in their differential diagnosis. Rinderpest could go undiagnosed until high mortality occurs. Morbidity is very high and can be greater than 90% in cattle.

Transmission

Etiology of Rinderpest is the relatively fragile paramyxoviridae of the genus Morbilivirus which is antigenically related to those causing canine distemper, measles, and “peste des petits ruminants,” a disease of sheep and goats. Rinderpest is transmitted by direct contact with respiratory droplets, lachrymal secretions, feces or other body fluids. Carriers are unknown in wildlife. After an incubation period of 3 to 15 days (avg. 40 hrs), the disease duration may last 2 or more weeks. However, death in 7-12 days is more likely in susceptible populations. In the very young of susceptible populations, death may occur in 2-3 days during the febrile stage, even before the membranes are congested. Death before clinical signs presents a serious problem in attempting to diagnose the disease. Virus is present in blood and secretions BEFORE symptoms

Diagnosis

Diagnosis may be confused with bovine virus diarrhea, mucosal disease (BVD-MD), infectious bovine rhinotracheaitis (IBR), or other mucosal diseases such as malignant catarrhal fever, vesicular stomatitis, foot-and-mouth disease, salmonellosis, necrobacillosis, and paratuberculosis. In a feedlot situation, ration problems may also present in a similar manner. Arsenic poisoning must also be included in the differential field diagnosis. A definitive diagnosis requires laboratory confirmation based on detecting viral antigens, the presence of microscopic lesions, and by isolating and identifying the virus. Laboratory confirmation depends on the collection of suitable samples form a group of animals, preferably in the febrile stage with oral lesions rather than from animals already dying, with profuse diarrhea. Blood should be collected in both serum and EDTA tubes. Swabs of clear tears, necrotic debris from gums and aspiration biopsies from superficial lymph nodes are also recommended. Virus isolation requires samples of spleen, lymph node and/or tonsils from a freshly euthanized animal.

NOTE: Animals that die of disease such as Rinderpest do not fall into the Federal indemnity categories for animals euthanized to prevent spread of disease.
Prevention and Control

A massive vaccination campaign would be necessary after slaughter of all clinically ill animals. Vaccine is available in other countries; however, those countries are also FMD endemic areas. Acquiring the vaccine for use in this country would be a slow and difficult process.⁴

Cleaning and disinfection can be effectively accomplished with strong acids or alkalies or common disinfectants.

…“The secret weapons of the invaders were Grey Steppe oxen. Their value was a strong innate resistance manifested by slow spread of virus and by the absence of clinical signs. A troop of Grey Steppe cattle could shed rinderpest virus for months provoking epidemics that devastated buffalo and cattle populations of the invaded countries. The sequelae were no transport, untilled fields, starving peasants, and overthrown governments.”⁵
Scenario 3
The third scenario is a diagnosis of Rinderpest in a large feedlot (concentrated animal feeding operation) near Hereford, Texas. This scenario puts a disease with all new sequelae in the midst of a very large concentrated population of cattle, posing additional negative impacts to the industry. The focus of the discussion will emphasize the higher mortality of Rinderpest and therefore carcass disposal of affected livestock; those that are dead of the disease and those that must be euthanized. How compensation will be handled for animals that die of the disease is a further consideration.

Industry Group
(Dr Jim Amend, Moderator)
- The bottom line for the Industry Group is that there is a decided lack of communication and knowledge between government agencies and industry groups.
- There is a need to understand the shared expectations to handle an outbreak; what is the role of the feedyard manager, the regulatory agencies and what is done the first 24 hours, by whom? The next 24 hours, etc.?
- There is a need to specifically identify what plans are needed and what each participant in the process should do. Standard operating procedures (SOP’s) must be developed and published for everyone to have in advance.
- What if there is a multi-state outbreak? Are statements of disaster needed from all involved Governors?
- What if a state is only in the surveillance zone? Animals in a surveillance zone will be under movement restriction. Will indemnity or compensation be provided if there are no confirmed cases in that state, but no animals can be moved?
- Is a confirmed case needed to declare a disaster?
- Industry believes that three pieces should be required to be in place before initiating any depopulation:
  1. Confirmed Diagnosis (for liability reasons)
  2. Agreement/Declaration that it is necessary that is “official statement”
  3. Indemnity funds and formulas in place.
- These pieces will not likely be in place on a presumptive diagnosis so Industry will NOT want any depopulation until there is a confirmed diagnosis.
Regulatory Group

(Dr Ken Waldrup, Moderator)

- Rules for movement control would be the same as for FMD, BSE, etc.
- Public perception could be different for Rinderpest because animals are visibly suffering from the symptoms. Euthanasia of many animals would be accepted as a relief of the suffering from this very ugly disease.
- Carcass disposal by any of the various means will also be better accepted by media because so many will be dying. Discussed composting, burying, burning, incineration/rendering.
- With FMD, carcass disposal becomes an issue when regulators begin the depopulation. In the case of Rinderpest, the issue of carcass disposal is immediate. Cattle will be dying of the disease just as the disease is being diagnosed.
- Cattle will be dying of the disease with profuse diarrhea, and these fluids will be contaminating the soil in the pens, the feed and water troughs, the fencing, the gates, the alleys and all machinery used in moving the carcasses to disposal areas. Cleaning and disinfection will be needed for all of the surfaces that have come in contact with these infectious fluids.
- Research is needed to determine how long Rinderpest virus survives in the environment or in compost.
- Will there be adequate laboratory capability to handle the samples in the Panhandle area?
- The diagnostic challenge will be early identification of Rinderpest with just the initial deaths from bloody diarrhea. Because feedlot cattle are fed high carbohydrate diets, an increase in diarrhea is usually viewed as a problem with the ration rather than an infectious problem.
- Once Rinderpest has been diagnosed, is total depopulation of the facility necessary if the disease can be confined to a few pens?
Allied Group

(Res. Suzanne Burnham, Moderator)

The problems associated with carcass disposal that the allied group identified included:

1. **Burning**
   - Who will control the burn?
   - What if there is a burn ban in effect?
   - How will sparks be contained? Will adjacent private property be protected from igniting? A spark can travel on the winds in West Texas for a long distance.
   - Will it be possible to burn the carcasses before liquefaction/autolysis/putrefaction occur? Will plumes of fire raise parts of the carcass? Will the virus survive?

2. **Burial**
   - Will there be enough machinery to handle the volume?
   - Can it be disinfected within the local infected zone?
   - We need to learn more about composting at feedlots.

3. **Cleaning and Disinfecting**
   - Can a “pear” burner* be used?
   - Can Natural gas burners safely destroy the virus?
   - Will high-pressure sprayers and VirkonS® be available? What is the water source going to be?
   - How will the black birds or other scavengers be controlled and prevented from carrying the virus from pen to pen?
   - If pens are scraped will that be sufficient? Where will the scraped dirt go?

**General Comments on the scenario:**
Rinderpest does not pose a threat to the food supply. We would still eat. The impact to the economy would be substantial and it is imperative that Industry become involved in planning the strategies to handle the outbreaks.

What will the sensitivity of the diagnostic information be? Will the diagnosis remain classified for a period of time? How will the information be disseminated? If accidental or deliberate?

Can Homeland Security Plans handle Agro terrorism? Department of Homeland Security needs to hear from Industry to understand the threat of this scenario. DHS does not have enough concern for agriculture at this time.

*A “pear burner” is a hand-held device, usually fueled by propane, that burns the needles off of prickly pear cactus. The cactus can then been eaten by livestock.*
There needs to be more infrastructure to handle the threat because USDA alone cannot handle the very large numbers on animals at risk. The resources will need to come from several other sources.

We need to have other groups like Farm Bureau and the FBI at the table as well to develop the strategic planning on the national basis as well as local levels. If a Rinderpest outbreak was an agro-terrorist act, we would not know how to handle the crime scene, nor would we know who would have the security clearance to act.

Also this group believes that we need to inspire the Industry to become more engaged, to use the available technology, and to take lead roles with proposals to protect their interests.

**Discussion**

Rinderpest brings a different focus than FMD. Since Rinderpest causes such high mortality in cattle, this disease would present a massive and immediate carcass disposal problem, perhaps even larger than an FMD outbreak. Because of the loss of body fluids in infected animals and the high amount of virus in those fluids, cleaning and disinfection would be a huge undertaking. As previously stated, there is no “indemnity” program for animals which die of a disease. Federal and/or state “indemnity” is paid for animals which are destroyed to control the disease but does not apply to disease mortalities. The Farm Services branch of USDA does have a farm program for compensation for catastrophic damages from storm, drought, flood, etc., and presumably feedlot losses from a disease like Rinderpest would qualify. However, there is no precedent for such compensation, and Farm Services has not been invited to participate in previous exercises. Further discussion with Farm Services is needed to clarify the situation.

Industry representatives have expressed their belief that plans need to be in place before a potential disease hits. That opinion is certainly shared by many regulatory veterinarians. Development of operational plans and policies will require funds, personnel and commitment by state and federal governments.

This discussion has demonstrated the different perspectives with regard to the initiation of any depopulation program. The industry’s perspective is that animals should not be destroyed until it is demonstrated to be absolutely necessary. This is a very reasonable position. On the other hand, regulatory personnel want to respond to a disease situation at the earliest possible time and are willing to take some risk to gain time. There is a considerable amount of paperwork that needs to be in place, including appraisal and state/federal approval forms, before any depopulation operation would commence.

Because Rinderpest is not as contagious as FMD, this disease could probably be less difficult to control than FMD on a statewide basis, but it will still be devastating to any feedlot affected.
References


4. Rinderpest, a Report by Dr Linda Logan, Texas A&M University, updated 2003.

## Appendix One

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Appendix Two

Report of Carcass Composting at Cactus Feeders
Amarillo, Texas

Prepared by
Dr. Daniel Thomson, Cactus Feeders
Dr. Suzanne Burnham, TAHC

Photography by Dr. Suzanne Burnham unless otherwise noted
Introduction

Participants of the Panhandle exercise in Amarillo, Texas reviewed the consequences of outbreaks of foreign animal diseases (FAD) such as Foot-and-mouth disease (FMD) or Rinderpest, both being cattle diseases that would adversely impact the industry, the state economy and ultimately the economy of the country. Because of the high concentration of cattle in feedlots in the Panhandle of Texas and the surrounding regions, the consequences would be complex and costly. One of the complex topics in the discussion concerned the disposal of infected or exposed carcasses. In the most recent outbreak of FMD in the UK, infected animals were burned in pyres or buried under 6 feet of soil which are both considered acceptable means of disposal. In such an emergency, disaster managers of the Panhandle region will have to consider all safe and effective methods in order to handle the large quantity of potentially affected animals.

Primary consideration must be given to controlling the spread of disease and minimizing contamination of animals, premises, vehicles and farm equipment during carcass disposal.

One alternative to burn and burial currently under review is composting. One member of the tabletop exercise described the process of composting in use at one of the major feedlots near Amarillo. Dr. Daniel Thomson, consulting veterinarian for Cactus Feeders, invited several guests to observe first hand the process in place at the feedlot. Granted, the composting at Cactus Feeders handles only the few deaths that occur at the feedlot and large numbers had not yet been considered. Dr. Thomson is now studying the possibilities of preparing for just such a horrendous eventuality.
The Basic Process of Composting
Employed at Cactus Feeders

Preparing the Pad
Manure that has been cleared from the pens is moved to the composting area where it is turned twice before using in carcass disposal. This aged manure is used to create a “pad” approximately 1 foot deep and 14 feet wide. The length depends on the space and number of head to be composted. A carcass is laid on the pad and covered with manure. Between 1.5 and 2 tons of manure is required per head. Note: Death loss is variable at the feedlot, and a pad may not be entirely loaded with carcasses all at one time.

Active Composting
The mound is left undisturbed for 60 days from the day the last carcass is covered. Active composting begins after this interval and the mound is turned every 10-14 days until it has been turned 10-12 times. The internal temperature of the composting mound reaches from 135-150 degrees which is monitored with a Reotemp© bimetal core thermometer with a 36 inch probe. Composting is completed in 3 months producing a mound of dry organic material.

photo by Carla Everett
A pad of composted manure is laid approximately 12 inches deep.

The number on the mound corresponds to records of the composting schedule.
The pile is turned at regular intervals until the process is complete.

Over time the particle size becomes smaller.
Bone fragments may still be seen during the first month of the composting period.

When the process is completed the organic meal is dry and has no odor of decay.
**Considerations for disposal of FMD infected carcasses using composting:**

1. How much manure will be needed to cover pads containing near finished cattle vs lighter calves?
2. How much space will be needed to lay pads for one hundred head of cattle? Or 10,000 head?
3. Will there be enough composted manure on hand to compost 50% of the feedlots capacity? 75%? 100%?
4. Are there other sources for composted manure nearby? What are the regulations/restrictions for bringing it to the feedlot from other areas?
5. Can the already processed manure used to compost other animals be used again? Will there be adequate nitrogen levels to compost 2-3 times?
6. Are the pads far enough away to avoid contamination from drainage in case of rain?
7. Can pathways be arranged to minimize contamination throughout the feedlot as animals are transported from pens to the pads?
8. Will there be equipment on hand that can be used for the handling of infected carcasses and can it be cleaned and disinfected?
Animals infected with FMD that have been euthanized can be buried beneath 6 feet of soil as an accepted method of disposal. If an outbreak of Rinderpest occurred, however, animals would be found dead in the pens within 3-5 days, many with infective diarrhea. Dr. Thompson proposes a combination of burial and composting within the pens to deal with the problems of potential contamination that would occur when the infected animals were moved.

Logistic considerations for In-the-pen composting/burial

1. Could a quarantine zone be delineated around the affected pens including alleyways?
2. Live animals would be shifted to the alley way or adjacent pens while the burial holes were dug. Can this be done without further infecting other animals?
3. Is there a portable squeeze chute on hand to work the infected cattle?
4. As the animals were euthanized and dropped into the pit can it all be done humanely? (considerations of press people on site)
5. How many animals will fit into the pit created in the average sized pen? Using both burial and composting will 1 pen be sufficient to dispose of the animals it contains?
6. Can all the equipment used be cleaned and disinfected adequately?
7. Is there a place for the dead cattle to be maintained until the pits are dug?