Integration of the Kansas Department of Agriculture Division of Animal Health Zoonotic Diseases into the EpiTrax Online Reporting System.

by

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Abstract

The Kansas Department of Agriculture (KDA) was the United States first state department of agriculture. The agency is devoted to the total support of agriculture in Kansas. The department works for the entire Kansas agriculture sector, including farmers, ranchers, food establishments and agribusinesses. Within this role, the Kansas Department of Agriculture also fulfills its responsibility of regulating business functions in accordance with state law. KDA is organized in a variety of divisions and programs that provide different services; there are a total of 13 different departments or services.

The EpiTrax system is currently utilized through the Kansas Department of Health and Environment (KDHE) for maintenance, surveillance and tracking of reportable human health diseases in the state of Kansas. The Department of Agriculture Division of Animal Health wants to partner with KDHE to offer a similar system for the tracking and surveillance of reportable zoonotic and animal-only diseases. The Epitrax system employs Disease Investigation Guidelines, Disease Fact Sheets and Individual Case Reporting Forms as a way to manage and maintain information in a useful manner. This report presents the details of an internship completed at the Department of Agriculture Division of Animal Health (KDA-DAH). Projects worked on during this internship included designing these "Disease Investigation Guidelines", creation of the disease information fact sheets and development and implementation of disease case report templates. These templates are the core structure behind being able to online report and track disease information to facilitate disease control through the KDA-DAH. I also participated in general rounds held by the Kansas Department of Health and Environment (KDHE).

The Department of Agriculture Division of Animal Health hosted a Rip Stop exercise during the second week in October. This was a functional exercise designed to portray a "real-life" simulation of a Foot and Mouth Disease (FMD) outbreak originating in Alabama and ending up at the Kansas State Veterinary Health Center. This involved all levels of local, state and federal agencies; it was designed to monitor the response and management of an FMD outbreak.

All projects were completed within the internship timeframe and provided valuable experience and awareness of the intertwined working relationships at the state level of public and animal health.

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Chapter 1 – Introduction

Kansas Department of Agriculture

The Kansas Department of Agriculture (KDA) was the United States first state department of agriculture. The agency is devoted to the total support of agriculture in Kansas. The department works for the entire Kansas agriculture sector, including farmers, ranchers, food establishments and agribusinesses. Within this role, the Kansas Department of Agriculture also fulfills its responsibility of regulating business functions in accordance with state law. KDA is organized in a variety of divisions and programs that provide different services; there are a total of 13 different departments or services.

Division of Animal Health

The Division of Animal Health was created in 1969 by consolidating all of the activities of: the Livestock Sanitary Commission and the State Brand Commission. Currently, it is divided into three programs, 1)disease control, 2)animal facilities inspection and 3)brands. As per the mission stated on the website, the main goal of the agency is to "ensure the public health, safety and welfare of Kansas' citizens through prevention, control and eradication of infectious and contagious disease and conditions affecting the health of livestock and domestic animals in the state" (https://agriculture.ks.gov/divisions-programs/division-of-animal-health/). Department veterinarians are responsible for testing programs, epidemiology of disease outbreaks and technical support for the administration. The Animal Facilities Inspection Program regulates companion animal facilities required to be licensed under the provisions of the Kansas Pet Animal Act. The Act requires licensing and inspection of all dog and cat breeders who produce, offer or sell three or more litters during the state fiscal year, pounds and shelters, pet shops, research facilities, distributors, out-of-state distributors, boarding facilities, animal rescues and foster homes. The brands area directs an effective registration and inspection program to assist in identifying owners of lost or stolen livestock.

Internship Overview

The internship consisted of a total of 240 on-site hours at the Kansas Department of Agriculture Division of Animal Health in Topeka, Kansas. Under the guidance of Dr. Tarrie Crnic, I worked on projects for the EpiTrax online monitoring and surveillance system for reportable zoonotic diseases and animal diseases. The internship began September 4, 2013 and ended November 1, 2013.

One main project was completed throughout the course of the internship. This large project included three subsection pieces for each disease. The online disease reporting system, EpiTrax, is currently utilized by the Kansas Department of Health and Environment to coordinate tracking of human diseases; the goal was to extend this program to animal diseases. There were three documents that need to be developed in order to make this transition. First, is the Disease Investigation Guideline; these were in-depth descriptions of the disease process, including the following for each disease: agent, clinical description, reservoir, transmission, incubation period, communicability, susceptibility, resistance, treatment, investigator responsibilities, managing special situations, data management and reporting. The second piece was a one or two page fact sheet providing a brief overview of the diseases. This fact sheet was to be utilized by investigators in the field to provide to the public. Finally, was the development of the case report templates for guiding investigation questions for entering into EpiTrax. The KDA-DAH has a list of reportable diseases; the diseases I completed throughout my experience were as follows: anthrax, brucellosis, contagious equine metritis, equine infectious anemia, rabies, vesicular stomatitis, tuberculosis, vesicular exanthema and trichomoniasis.

I was also involved in the Department of Agriculture Division of Animal Health's Foot and Mouth Disease exercise named "Rip Stop" during the second week in October. This was a functional exercise designed to portray a "real-life" simulation of a Foot and Mouth Disease outbreak originating in Alabama and ending up at the Kansas State Veterinary Health Center. I was located in the Sim-Cell of the operation; this was the location that monitored all levels of the exercise and made sure that activities were continuing as planned. The Sim-Cell monitored

activities of all the locations and players involved and provided injects (activities that spurred play) if needed. It was an advantage to be located in the Sim-Cell to be able to observe all aspects of play and really have a good understanding of the overall situation. This involved all levels of local, state and federal agencies; it was designed to monitor level of response and management of a FMD outbreak.

The internship also provided the opportunity to attend various planning and strategy meetings for different sections within the Division of Animal Health: State Trichomoniasis Regulations and hearings and Rip Stop Exercise pre and post planning.

I also participated in general rounds held by the Kansas Department of Health and Environment (KDHE). Rounds consisted of a daily overview of any calls that came in to KDHE that specific day. Each day an individual is assigned to answer calls and then report at the end of the day any situations that may have come up or if any trends may be happening. This allows all individuals involved to understand what is happening around the state and if any further action needs to be taken.

Chapter 2- Learning Objectives

Learning objectives are statements about what an individual can expect to learn by the end of an experience. Three learning objectives were identified for my internship with the assistance of my internship coordinator and major professor. The specific activities and projects completed during the internship evolved and changed throughout its course but the original objectives were still fulfilled.

Objectives:

1. Understand how zoonotic disease surveillance is or can be incorporated from human and animal health agencies.
2. Understand infectious disease reporting requirements.
3. Describe the steps of a case investigation and an outbreak investigation.

Objective one was accomplished through my work on the Disease Investigation Guidelines. I was able to apply my veterinary education knowledge not only to develop the guidelines but also to develop the case reporting templates to integrate the information in a usable and efficient system. This was also accomplished by researching the importance and relevance of zoonotic disease.

Objective two was accomplished by transitioning the Kansas Department of Agriculture Division of Animal Health disease reporting protocols to become integrated into the EpiTrax reporting system. The current EpiTrax system, utilized by KDHE, is suited for human diseases. The KDA-DAH collaborates with KDHE on zoonotic diseases, but other animal diseases are also monitored. The Disease Investigation Guidelines and Case Reporting Templates were designed to incorporate the animal side of the reporting requirements while molding together the human side in order to provide the highest quality of data tracking.

The last objective was accomplished through the development of the Disease Investigation Guidelines and the Case Reporting Templates, but was also accomplished through participating in the Rip Stop exercise. The Case Reporting Templates were created to “walk” the investigator, of the suspect case, through the investigation process. The Rip Stop exercise was

a functional description of objective 3; meaning, this was a “real-life” practice of a Foot and Mouth Disease outbreak investigation. The monitoring of operation communications and coordination, physical protective measures and supply chain integrity and security were included for a complete picture of all the steps of an outbreak investigation.

Chapter 3 –Importance of Tracking Zoonoses

Overview

There is a growing trend to try to understand the linkage between human health, animal health and the environment. Through the integration of human medicine, veterinary medicine and environmental science the concept of "one health" was developed to improve the lives of all species. The One Health initiative is a movement to unite scientific, environmental and health professions, to expound on collaborations between disciplines and try to align world health to enhance world human and animal health and safety. This initiative could help save, protect and expand knowledge on a world wide scale for years to come. It allows for a true connection among medical disciplines which, in turn, will help save lives of both human and animals (www.onehealthinitiative.com). Veterinarians are the individuals working to keep animals healthy and are often the front-line defense for disease detection. They are the individuals that will be the first to see and often recognize disease and they are the key to prevention and treatment. Many of these diseases are zoonotic. Zoonoses are defined by the World Health Organization as "diseases and infections which are transmitted naturally between vertebrate animals and man" (WHO, 1959). Zoonoses are infections that have multiple hosts that include both animals and humans (Cleveland et al 2001). The importance of zoonotic diseases cannot be overstated. A survey completed by Taylor (et al) showed that, of the 1415 species known to be pathogenic to humans, 61% (868) are zoonotic. While 75% of diseases considered to be emerging versus non-emerging are also zoonotic. Zoonotic pathogens causing disease in humans can very often cause little or no obvious clinical disease in their animal hosts' (Taylor et al, 2001). The ability of these diseases to go undetected means the role of monitoring and surveillance is critical in maintaining public health.

Tracking of these diseases is crucial; the organization responsible for international tracking is the World Organization for Animal Health. This was originally formed by 25 countries as the Office of International des Epizootes (OIE) in response to an outbreak of rinderpest in Europe. It is still known as OIE and now consists of over 170 countries with its main goal to inform countries of disease that could endanger human or animal health. OIE also maintains

data on what diseases are currently located in different areas as well as if a country is disease free of certain diseases (www.oie.int). Tracking of disease is vital in order to better understand prevention efforts, enable health professionals to make timely and accurate decisions on treatment and management and to quantify the burden of zoonoses. In order to appropriately respond, health professionals need to be able to track and manage the diseases that are prevalent as well as be able to recognize as soon as possible outbreak occurrences.

Diseases emerge for many different reasons with regards to both human and animal health. Many of the reasons are intertwined and include increasing human population, increasing numbers of food producing animals, climate change and an ever-changing environment. Travel is also much easier and more prevalent than in the past and illegal movement of animals and animal by-products continues to be a problem (Wood et al 2012). Human infections can be a warning of disease risk to animals and vice versa. Many pathogens do not cross infect, but as time continues organisms can mutate and adapt to new environments and allow them to cross species lines where they may not have previously. The relationship between the environment, infectious disease and health outcomes for humans and animals can all be inter-related.

There are many reasons why zoonoses need to be considered serious threats to public health. First, a disease that starts as zoonotic may have the potential to develop into a major human communicable disease. Bennett and Begon (1997) highlight this regarding some viral diseases. Some communicable diseases cannot sustain themselves in the human population below a critical minimum population size or density. These conditions that are prime for development were not established until more recently (last few thousand years); with continued population growth these previously “quiet” diseases have found footing and have become able to grow and adapt from other species. This is not true for all communicable diseases, but is true for a few very important diseases in human history including, influenza and AIDS (although HIV can now sustain itself entirely in the human population) (Grant and Olsen 1999). Over time, as populations grow and change, communicable and zoonotic diseases will shift, thus they need to be seriously considered in order to minimize the threat to public health.

An important way to control human risk from zoonoses is to be constantly vigilant in monitoring and surveillance for possible infections. The majority of veterinarians and human medical professionals have a basic knowledge of zoonoses and have some understanding of the threat they may pose to human health. In practice many health professionals either fail to consider the possibility that they may be dealing with zoonoses or ignore the implications of these types of infections on public health (Cripps, 2000).

As the population continuously increases there is a rise in food demand, which leads to new areas for food production and development. Increasing animal trade for food is also contributing to the spread of zoonoses. Humans are traveling more frequently and in all areas around the world allowing for more exposure to the possibility of zoonoses (Seimenis 1998).

Numerous zoonoses are considered biological agents for use by terrorists and provide an additional reason for in-depth plans of tracking and surveillance. Many zoonotic diseases have been utilized as biological weapons, including anthrax, plague, botulism and brucellosis (Ryan 2008). As programs are developed to help protect humans and animals from naturally occurring disease, attention also needs to be paid to protect from biological warfare agents.

Broad interdisciplinary approaches are needed to better understand the complex interactions of factors that act together to increase or reduce risks to animal and human health. In the One Health Initiative a unified approach between veterinary and human medicine is used to improve global health for people and animals'. It's the responsibility of every veterinary and medical professional to work together to battle against zoonotic diseases across the globe. The problem of zoonoses is multi-factorial with one of the major constraints in controlling zoonoses being the lack of resources. However, much can be done by education, and in particular by increasing the awareness of different health professionals, and facilitating communication and collaboration between veterinary, public health and human health personnel. This will help us to approach and control zoonotic diseases in as efficient and effective a way as possible.

Chapter 4 EpiTrax

In spring of 2012, the Kansas Department of Health and Environment (KDHE) went live with their new electronic disease surveillance system, EpiTrax. This system replaced KS-EDSS. EpiTrax is an open source, highly configurable, comprehensive surveillance and outbreak management application designed for public health. It allows local, state, and federal agencies to identify, investigate, and mitigate communicable diseases, environmental hazards, and bioterrorism events. EpiTrax supports electronic laboratory reporting (ELR) and offers sophisticated analysis, visualization, and reporting of contact and case information. EpiTrax increases overall effectiveness in preventing morbidity and mortality through decreased reporting time, automated assignment and routing processes, easy form creation tools, trend analysis, detection of anomalies and quality assurance.

Certain infectious disease must be reported to KDHE and KDA-DAH. They receive these reports by phone, mail, or fax. They reports are sorted and routed to the appropriate section.
The KDA-DAH currently tracks information for their reportable diseases via database with hardcopies as back-up. In order to be better prepared, the department needs to be able to manage, report, track and provide surveillance in a quick and efficient manner. KDA-DAH needs to be able to get accurate and quality information quickly to individuals in the instance of an outbreak or suspect case of bioterriosm; in order to meet this need, the EpiTrax system is going to be utilized by KDA-DAH. This would provide an opportunity for KDA-DAH and KDHE to work together in cases of zoonotic disease. KDA-DAH will also be able to efficiently have access to information on previous cases, current cases and have the most current information on diseases affecting public health through the EpiTrax system. My internship produced background information data entry templates and reporting guideline for 9 pathogens of concerns for KDA-DAH (anthrax, brucellosis, tuberculosis, vesicular exanthema, vesicular stomatitis, rabies, equine infectious anemia, contagious equine metritis, trichomoniasis)

Chapter 5 Rip Stop

Foot and Mouth Disease FMD

The purpose of the exercise was to present a real-life scenario that would initiate a state and local response to an agriculture emergency. The state of Kansas has been preparing for many years to respond to a foreign animal disease (FAD) issue within the state as well as a preventative response to keep it from entering the state. Kansas State University, the land grant university within the state, has been involved throughout this planning process. Its role has been primarily to support the state's response. This exercise was designed to look directly at KSU's response to a FAD on campus and its impact on areas outside of animal agriculture programs. In addition, the exercise focused on the state's response and the cooperative and coordinated responses between state, local and university resources.

The exercise was a functional exercise, planned for 2 days at multiple locations in the state of Kansas, including Topeka, Manhattan, Riley County, Pottawatomie County and Woodsen County. Exercise play was limited to the interactions between participating functional areas and the Simulation Cell (Sim Cell). Over the course of the two days, the scenario and associated injects established a learning environment for federal, state, and local agencies to practice their response protocols. Injects were fictional activities or processes that were implemented to monitor the response and/or to provide an additional element to the exercise that hadn't been considered. For example, one inject, in the exercise, was for the simulation cell to execute a tornado warning for the Manhattan, KS area and then to analyze the response from the various players. The exercise was not an inspection and was conducted in a no-fault atmosphere. However, the functional nature of the exercise provided evaluators an opportunity to meaningfully evaluate player actions regarding current plans and capabilities.

Rip Stop
Locations of Play

Exercise play was conducted at the following locations:

SimCell
109 SW 9th Street, 4th Floor (Kansas Department of Agriculture [KDA])
Topeka, Kansas
Point of Contact (POC) during exercise: Jami Grace 785-221-8414

Kansas State Emergency Operations Center (SEOC)
2800 SW Topeka Boulevard
Topeka, Kansas
POC: Jonathon York 785-274-1406

Movement Control Branch
Building #282 Forbes Field
Topeka, Kansas
POC: Sherry Turvey 785-862-2415

KSU Veterinary Health Center (VHC)/Veterinary Diagnostic Laboratory (VDL)
KSU, Mosier Hall
1800 Denison Avenue
Manhattan, Kansas
POC: Dr. Shirley Arck 785-313-4020

KSU Emergency Operations Center (EOC)
KSU, Edwards Hall (Basement)
Denison Avenue
Manhattan, Kansas
POC: Steve Galitzer 785-532-5856

KSU Animal Sciences and Industry (ASI) EOC
KSU, Call Hall
Mid Campus Drive,
Manhattan, Kansas
POC: Dr. Larry Hollis 785-532-1246

KDA Unified/Area Command, Movement Control Branch, Disease Control Branch, Public Information Officer/Joint Information Center (separate rooms)
Biosecurity Research Institute (BRI) – Pat Roberts Hall
Denison Avenue,
Manhattan, Kansas
Government-issued identification required for entry

POC: Craig Beardsley 783-532-3352

Riley County EOC
Law Enforcement Center
1001 South Seth Child Road
Manhattan, Kansas
POC: Pat Collins 785-537-6333

Potawatomie County EOC (initially co-located with Riley County at the Riley County EOC)
106 North 1st Street
Westmoreland, Kansas
POC: Chris Trudo 785-457-3358

Rip Stop
Core Capabilities

This functional exercise focused on the following core capabilities:

1. Operational Communications - Ensure the capacity for timely communications in support of security, situational awareness, and operations by any and all means available, among and between affected communities in the impact area and all response forces.
2. Operational Coordination - Establish and maintain a unified and coordinated operational structure and process that appropriately integrates all critical stakeholders and supports the execution of core capabilities.
3. Physical Protective Measures - Reduce or mitigate risks, including actions targeted at threats, vulnerabilities, and/or consequences, by controlling movement and protecting borders, critical infrastructure, and the homeland.
4. Supply Chain Integrity and Security - Strengthen the security and resilience of the supply chain.

Rip Stop

General Guidance for a Functional Exercise

There was a minimum of nine functional areas participating in this exercise, over a two-day period involving approximately 300-350 individuals. The involvement of many of these functional areas was predicated by actions taken by other functional areas. Because of this, it was important for all participants to realize that while they may not have been immediately engaged in the exercise at the start on day one, they became engaged in the exercise sometime later. For example, KDA became engaged in the exercise with the initial injects; however, the two functional areas representing Riley and Pottawatomie Counties did not become engaged in the exercise until they were called upon by the state, the university, or a concerned citizen. Therefore, it was critical that all players not immediately engaged in the exercise were ready to respond as soon as they were contacted by the appropriate entity. This also provided realistic simulation of initial response times. While the controller and evaluator for a functional area were present at the exercise venue, they expected the participants in that functional area to conduct normal business until they were drawn into the exercise. In addition, this was a functional exercise. All players were reminded that action must be taken up to the point of moving equipment or personnel. This commitment of resources was tracked in detail and any real-time constraints on deployment were observed. For example, if law enforcement units were to be dispatched to a quarantine, the officers, units and other associated supplies were detailed and the travel time for the resources were accounted for (had passed) before these resources were active in the response. If the law enforcement units took two hours to arrive and set up the road block, the road in question was considered open for two hours and the resources deployed could not do any other job until they were demobilized. To further reinforce this aspect and condition of the exercise, all participants were invited to participate in a conference call, approximately one week prior to the exercise, where this aspect of the exercise was explained and discussed.

Chapter 6 - Reflection

The Internship

Overall I feel that this internship was a valuable experience for me and gave me good insight into the field of public health at the state government level. My biggest challenge was to prioritize each disease and ensure I had time to complete them all within the time frame of the internship. I enjoyed being a part of the Rip Stop functional exercise the most as it was more hands on and I had the opportunity, being in the Sim Cell, to really get an overview of all the areas participating. It was easy to see which departments or participants had prepared and knew what was in place and how to implement protocols.

I also enjoyed developing the Disease Investigation Guidelines, Fact Sheets and Templates for Case Reporting and investigations. I feel like it was an excellent use of my veterinary education and background. It also gave me the opportunity to meet and work with individuals throughout the Division of Animal Health, including state veterinarians, livestock commissioner and those vets that had been through FADD training. It was a great networking opportunity and a wonderful benefit to have these individuals in the offices surrounding my own. I also enjoyed being a part of the Trichomoniasis legislation meetings and sitting in on the hearings with producers, livestock markets and veterinarians.

Another valuable part of the internship was the opportunity to attend and participate in office meetings. This included having the opportunity to sit in on the KDHE topic rounds daily. Those rounds discussions were often the highlight of the day and I found myself including information from those within the projects I was working on.

The internship was a useful addition to the coursework I have completed in the Master in Public Health as well as an excellent complement to my veterinary education. The internships allowed me to take the courses and information and turn them into “real life” situations with the Rip Stop exercise and to utilize my background to develop documents that could help in numerous aspects of public health tracking, monitoring and surveillance. Another important aspect that I learned was about funding and what it truly would take to manage an outbreak of FMD. The

KDA spent over 110,000 dollars to organize, plan, and execute the Rip Stop exercise; that was just to have the exercise, not including what would happen to the state if there was an outbreak of FMD.

Chapter 7 – Bibliography

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Appendix A-1

Anthrax Disease Investigation Guideline

Anthrax

Disease Management and Investigative Guideline

CONTENT:	Version Date:
Investigation Protocol:	
• Investigation Guideline	09/2013
Supporting Materials (found in attachments):	
• Fact Sheet	09/2013
• Case Report Form	09/2013

Anthrax

Disease Management and Investigative Guideline

CASE DEFINITION (CDC 2010)

Clinical Description for Public Health Surveillance:

A systemic toxemic disease caused by Bacillus anthracis. It can affect all domestic animals, but is most common in ruminants(cattle, sheep and goats are most susceptible, horses intermediate, pigs and dogs are generally resistant, wild ruminants are susceptible). Sudden death may often be the only sign. In ruminants, high fever is usually seen and death within 1-2 days. A few animals will exhibit staggering, depression, dyspnea leading to collapse and convulsions. Pregnant cows may abort, milk production can suddenly decrease and often swelling of the neck and thorax is seen. Post mortem signs seen include rigor mortis that is incomplete and the spleen is often extremely large with a jelly-like consistency that may exude thick, dark or black colored blood when cut. Lymph nodes are generally large and hemorrhage and edema are common with rapid decomposition. Necropsy on suspect animals is not recommended. Tissues from suspected cases should not be exposed to air due to the long term bioavailability of the spores.

Anthrax

Disease Management and Investigative Guideline

Case Classification

Confirmed: A clinically compatible illness with one of the following:

- Culture and identification of B. anthracis from clinical specimens
- Documented anthrax environmental exposure
- Evidence of B. anthracis DNA (polymerase chain reaction) in clinical specimens collected from a normally sterile site (ideal is aqueous humor) or lesion of other affected tissue (skin, pulmonary, reticuloendothelial, or gastrointestinal).

Probable: A clinically compatible illness that does not meet the confirmed case definition, but with one of the following:

- Epidemiological link to a documented anthrax environmental exposure;

Suspected: An illness that is suggestive of one of the known anthrax clinical forms but no definitive, presumptive, or suggestive laboratory evidence of B. anthracis, or epidemiologic evidence relating it to anthrax.

LABORATORY ANALYSIS—

• Culturing B. anthracis from clinical specimens remains the gold standard and in animals preferred specimen is aqueous humor

IMPORTANT: Upon verification of B. anthracis, the laboratory who handled any specimens or isolates must use appropriate forms to report the identification or verification of the select agent or related toxins and of the final disposition of that identified agent or toxin and the specimens that were presented for diagnosis, verification, or proficiency testing, as well as any seizure of the select agents or toxins by federal law enforcement agencies. Refer to: www.selectagents.gov

Anthrax

Disease Management and Investigative Guideline

EPIDEMIOLOGY

Anthrax is a serious zoonotic disease; humans are accidental hosts. In the developed countries, anthrax is infrequent and sporadic, and is primarily an occupational hazard of workers who process hides, wool, hair and bone and of veterinarians, agriculture and wildlife workers who handle infected animals. Human anthrax is endemic in the agricultural regions of the world, such as Africa, Asia and the Middle East. Livestock are at risk of infection from animal feed containing contaminated bone meal as well as movement of soil where spores are located. Anthrax has been used as a bioterrorist agent.

DISEASE OVERVIEW

A. Agent:

Bacillus anthracis is a gram-positive, aerobic, encapsulated, spore-forming, non-motile rod. The spores are resistant to heat, sunlight, drying and many disinfectants. Spores need to be exposed to air to become active.

B. Clinical Description:

Signs include acute death, enlarged lymph nodes and spleen that when cut exudes dark black blood. Bleeding can be seen from remaining body orifices. In humans there are three main clinical presentations of anthrax:

Cutaneous: The most common clinical presentation. Initial itching at the affected site is followed by a lesion that becomes papular then vesicular, developing in 2-6 days into a depressed black eschar.

Inhalational: Initial symptoms are mild and nonspecific and may include fever, malaise, and mild cough or chest pain; acute symptoms of respiratory distress, including stridor, sever dyspnea, hypoxemia, diaphoresis, shock and cyanosis and death shortly after.

Gastrointestinal: Lesions lie at any point of the intestinal tract and are ulcerative and massively edematous, leading to hemorrhage, obstruction, perforation and extensive ascites. Abdominal distress is characterized by pain, nausea and vomiting followed by fever, signs of septicemia, and death. A rare oropharyngeal form is characterized by edematous lesions, necrotic ulcers and swelling in the oropharynx and neck.

Anthrax

Disease Management and Investigative Guideline

All forms of anthrax if untreated can develop into systemic illnesses that include fever, shock, and meningitis that is usually fatal.

C. Reservoirs:

B. anthracis usually occurs in limited geographic regions. Most common reservoirs are usually hoofed animals. Spores are produced when exposed to air and can remain viable for years in soil or in hides of infected animals.

D. Mode(s) of Transmission:

Disease spreads through animals by contaminated soil, feed, and possibly biting flies. Human-to-human transmission is extremely rare and has only been reported in the cutaneous form.

E. Incubation Period:

In animals it is 1-20 days but infections typically become apparent in 3-7 days.

In humans it is usually 1-7 days, but periods up to 60 days are possible.

F. Period of Communicability:

Large populations of bacteria can be present in the blood and carcasses; products made from hides of infected animals and soil contaminated with the spores may remain infectious for decades.

G. Susceptibility and Resistance:

Susceptibility is determined by occupation and geographic location; there is some evidence of inapparent infection among those in frequent contact with the agent.

H. Treatment

Animals can be treated with antibiotics, primarily oxytetracycline, and supportive care; sick animals should be isolated. Deceased animals should be incinerated as well as bedding, manure and contaminated food and other materials that were in contact with the contaminated animal.

Anthrax

Disease Management and Investigative Guideline

I. Vaccine: In endemic areas there is a modified live vaccine available for livestock; it is not recommended to vaccinate and utilize antimicrobials at the time of an outbreak due to the vaccine being modified live.

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

As a potential bioterrorism agent, all confirmed or suspected anthrax cases shall be reported within 4 hours by phone:

1. Health care providers and hospitals: report to the local public health jurisdiction, KDA-DAH or KDHE-BEPHI (see below)

2. Local public health jurisdiction: report to KDA-DAH and KDHE-BEPHI (see below)

3. Laboratories: report to KDA-DAH or KDHE-BEPHI (see below)

4. KDA-DAH or KDHE-BEPHI will contact the local public health jurisdiction by phone within one hour of receiving any suspected anthrax report.

Kansas Department of Agriculture-Division of Animal Health (KDA-DAH)

Phone: 1-785-296-2326

Fax: 1-785-296-1765

Kansas Department of Health and Environment (KDHE)

Bureau of Epidemiology and Public Health Informatics (BEPHI)

Phone: 1-877-427-7317

Fax: 1-877-427-7318

Anthrax

Disease Management and Investigative Guideline

Further responsibilities of state and local health departments to the CDC:

As a nationally notifiable condition, anthrax cases require an IMMEDIATE, EXTREMELY URGENT or IMMEDIATE, URGENT report to the Center of Disease Control and Prevention (CDC) depending on the circumstances.

1. An anthrax case whose 1) source of infection is unknown; 2) is recognized as bioterrorism exposure/potential mass exposure; or 3) is a serious illness not responding to treatment represents a situation requiring IMMEDIATE, EXTREMELY URGENT reporting.
   • KDHE epidemiologist must call the CDC EOC at 770-488-7100 within 4 hours of a being notified of the confirmed or probable case.
   • KDHE-BEPHI will notify the Local public health jurisdiction immediately to coordinate on follow-up for the report information needed to complete the electronic form before the next business day.
   • KDHE-BEPHI will file an electronic case report the next business day.
2. An anthrax case that is naturally-occurring or occupational and is responding to treatment requires IMMEDIATE, URGENT reporting.

   • KDHE epidemiologist to call the CDC EOC at 770-488-7100 within 24 hours of a case meeting the confirmed or probable criteria.

   • Local public health jurisdiction will report information requested on the disease reporting forms as soon as possible, completing the forms within 7 days of receiving a notification of an anthrax report.

   • KDHE-BEPHI will file an electronic case report the next regularly scheduled electronic transmission.

   (KDHE-BEPHI files electronic reports weekly with CDC.)

Anthrax

Disease Management and Investigative Guideline

INVESTIGATOR RESPONSIBILITIES

1) Use current case definition, to confirm diagnosis with the medical provider.

2) Conduct a case investigation to identify potential source of infection.

3) Conduct contact investigation to identify additional cases.

4) Identify whether the source of infection is major public health concern.

- Source is unknown, or bioterrorism or mass exposure is indicated
- Serious illness not responding to treatment

5) Initiate control and prevention measures to prevent spread of disease.

6) Complete and report all information requested via the state electronic surveillance system.

7) As appropriate, use the disease fact sheet to educate individuals or groups.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Case Investigation

1. Contact the medical provider who ordered testing of the case or is attending to the case and obtain the following information. (This includes medical records for hospitalized animals.)

- Using the Case Report Form, identify any symptoms of anthrax:

− Record earliest onset date, noting the first symptom.

− Record any other symptoms experienced.

- Examine the laboratory testing that was done to ensure all testing that could confirm the case has been reported in Epi-Trax.
- Examine and record the therapy that the case received.
- Record outcomes: recovered or date of death

2. Interview the case or proxy to determine source and risk factors; focus on a 6 week incubation period prior to illness onset.

3. Investigate epi-links among cases (clusters, household, co-workers, etc.).

• For suspected outbreaks go to Managing Special Situations section.

Contact Investigation

1) Any person in contact with the source of infection is defined as a contact. This may include physical contact with an infected animal or a contaminated product, ingestion of contaminated food, or inhalation of aerosolized spores.

• Any exposure that results in a suspected case of anthrax requires a public health investigation to identify if other exposures in the same setting might have led to other cases of anthrax.

2) Examine all potential exposures based on the possible source and potential modes of transmission to define who may be at-risk.

3) Identify those who participated in at-risk activities and contact them to identify if they are experiencing any symptoms.

4) Investigate the clinical laboratory that handled the B. anthracis isolate to ensure standard procedures were in place to minimize the risk of transmission.

Isolation, Work and Daycare Restrictions

1) Hospitals: Standard precautions (contact precautions for wound care); no isolation required.

Anthrax

Disease Management and Investigative Guideline

Case Management

Report on any changes in patient status (i.e., discharge, death).

Contact Management

1) Symptomatic acquaintances, household members, associates, or co-workers should be strongly urged to contact their physician for a medical evaluation and are followed-up as suspect cases.

2) Contact Monitoring:

- Depending on type of exposure, asymptomatic animals who were potentially exposed should continue to be monitored for clinical signs.
- A veterinarian should be consulted immediately if symptoms develop.

3) Exposure circumstances direct decisions on prophylaxis and/or vaccination not the test results.

Anthrax

Disease Management and Investigative Guideline

Environmental Measures

1) Animal or meat product as sources of infection:

• Verify the location, or previous location, of the source of infection (i.e., state or country of origin of meat or animal product).

• Implicated food items must be removed from the environment. If a commercial food item is implicated or if any domestic animal(s) that reside in the state of Kansas is affected by anthrax, the Kansas Department of Agriculture- Division of Animal Health should be notified immediately (785-296-3556).

Education

1) Use fact sheets and materials from CDC (www.bt.cdc.gov/agent/anthrax/) to educate individuals and groups. 2) Educate workers who handle potentially contaminated articles about the modes of anthrax transmission and disease prevention methods, including care of skin abrasions, general hygiene, other personal protective measures, appropriate carcass disposal and barrier precautions.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

A single case of inhalation anthrax is so unusual that it should be reported and investigated immediately as a potential bioterrorist event. Two or more cases of cutaneous or gastrointestinal anthrax with a common source or suspected common source should be investigated as an outbreak with adequate resources applied to the investigation.

1) Consider the possibility of an outbreak when there is an unusual clustering of cases in time and/or space

2) Notify KDA-DAH (1-785-296-3556) or KDHE (1-877-427-7317) immediately.

3) Active case finding will be an important part of any investigation.

B. Intentional Contamination

Anthrax is a potential bioterrorism weapon; inhalation of aerosolized spores is of the highest concern. A single case of inhalation anthrax is so unusual that it should be reported and investigated immediately as a potential bioterrorist event. Other forms of anthrax whose case has no remarkable travel history and is not employed in an occupation that is prone to exposure, should result in an intentional event being considered. Because the laboratory confirmation could be delayed, specific epidemiological, clinical, and microbiological findings that suggest an intentional release of anthrax should result in the issue of a health alert and the proper notifications.

Anthrax

Disease Management and Investigative Guideline

Safety Considerations:

• Anthrax is not transmitted person-to-person.

• Greatest risk to human health occurs during the period or primary aerosolization in which anthrax spores remain airborne thus it is not recommended to open the carcass of suspect animals.

• Response personnel are not likely to be at risk during the investigation. A possible exception would be a mechanism designed to disseminate spores into an enclosed space over an extended period of time.

• Decontamination: Any facilities or equipment coming in direct physical contact with a substance alleged to be anthrax should be thoroughly washed with disinfectant. Removable equipment (halters, lead ropes, etc…) should be placed in a plastic bag, sealed, and labeled.

Risk Communication Materials:

• Factsheet for anthrax

• Communicating in the First Hours: www.bt.cdc.gov/firsthours/anthrax/

Anthrax

Disease Management and Investigative Guideline

Surveillance:

• Arrange for active surveillance for 60 days for the development of signs and symptoms of anthrax among all animals exposed.

Diagnosis of Anthrax Infection:

• Veterinarians who suspect anthrax should take immediate steps for protection of humans by instigating isolation of suspect animals utilizing appropriate precautions and notify local authorities as well as the KDA-DAH. Alert the laboratory to the possibility of anthrax and the need for special safety procedures and guidance on correct methods for acquiring and submitting samples. Laboratories should consult with state public health entities prior to or concurrent testing protocols.

• Microbiological findings: Peripheral bloods smear or collection of aqueous humor with gram-positive bacilli or blood culture growth of large gram-positive bacilli with preliminary identification of Bacillus sp. Other rapid assays may also be available.

• Pathological findings: hemorrhagic mediastinitis, hemorrhagic thoracic lymphadenitis, hemorrhagic meningitis; or DFA stain of infected tissues

DATA MANAGEMENT AND REPORTING TO THE KDA-DAH and KDHE

A. Organize, collect and report data.

B. Report data via Epi-Trax.

• Especially data collected during the investigation that helps to confirm or classify a case.

Appendix A-2

Anthrax Fact Sheet

Anthrax Fact Sheet

Introduction

Anthrax is a potentially fatal disease of all animals caused by the spore-forming bacterium *Bacillus anthracis*. Species susceptibility varies. Cattle, sheep and goats are considered highly susceptible to anthrax, horses are intermediately susceptible, pigs and dogs are generally resistant, and birds are considered highly resistant. Anthrax is common in Africa and Asia with outbreaks also occurring in the USA. States that have had outbreaks include: Texas, Minnesota, Montana, California, Colorado and both North and South Dakota.

Anthrax Agent

The anthrax bacterium is found in two forms – the vegetative form and the spore form. The vegetative form grows and reproduces in the animal; exposure of this vegetative form to oxygen causes sporulation. The spores contaminate the environment and may remain viable in the soil for decades. The spores are resistant to temperature changes (extreme heat or cold), most disinfectants and drying. The spores can survive in water up to 2 years. Carcasses will rapidly decompose and thus destroy the vegetative form of the bacterium.

Transmission

Transmission in animals typically occurs by ingestion of soil contaminated with spores. Animals may directly ingest the spores from grazing or from feed that has been grown on anthrax-infected soil. Exposure will increase in times of flooding, drought of after disruption of the soil (tilling or plowing). Once these spores are ingested they revert to the vegetative form and can produce toxins within the animal. Some animals may develop a localized reaction/infection by exposure via breaks in the skin.

Clinical Signs in Ruminants

Ruminants are the most susceptible to anthrax with rapid onset of symptoms or death. Sudden death may occur with no other signs; or the animal may have a high fever, stagger, tremble, collapse with difficulty breathing or seizure. These animals will bloat very rapidly after death and may have a bloody discharge from mouth, nose, anus or vulva. The most notable sign is the lack of rigor mortis after death. **Necropsy is NOT recommended!** (due to the possibility of releasing spores) This is especially important in areas where anthrax is present (states listed above). Take precautions and call your veterinarian immediately.

Clinical Signs in Horses

Generally horses will develop acute clinical signs including: fever, anorexia, depression, colic, and bloody diarrhea. Edema may also be present in the neck, sternum, lower abdomen and external genitalia. Death most often occurs within 1-3 days (some may survive up to a week).

Clinical Signs in Pigs

Pigs typically have localized swelling in the neck that may progress to swelling in the throat causing difficulty in breathing and swallowing. Often they will have a fever, enlarged lymph nodes and loss of appetite. The disease may be mild to chronic with some pigs recovering with no clinical signs. These pigs will often have localized infection of the tonsils and lymph nodes found at slaughter.

Diagnosis and Treatment

In areas that are prone to the disease, anthrax should always be on the differential diagnosis list. A veterinarian should rule out anthrax on any suspect cases before the carcass is handled by anyone else. A diagnosis is confirmed by positive identification of the bacteria in samples from the dead animal, either microscopically or via fluorescent antibody test. The optimal sample for diagnosing anthrax in dead animals is aqueous humor aspirated from the eye- remember- no necropsy!

Control

- Quarantine of the premises should be instituted immediately
- Carcasses should be burned or deeply buried; this includes bedding, manure and other materials- (check with local regulations governing disposal)
- Appropriate decontamination of pens, panels and equipment using a solution of 10% sodium hydroxide or 5% formaldehyde
- Isolate other sick animals
- Prevent scavenger animals access to the carcass
- Vaccination may be an option on exposed animals
- Restrict grazing in pastures that are known to be contaminated

Prevention

Annual vaccination of livestock in anthrax endemic areas with a modified live anthrax vaccine may aid in prevention of the disease. Initially a two-dose series is recommended with annual boosters to follow.

Zoonotic Potential

Anthrax is not known to spread from human to human, but humans who handle products from infected animals or by inhaling the spores (even from dried hides) are the main forms of transmission. Anthrax can also be spread by eating undercooked meat from infected animals. Anthrax spores can and have been used as a bioterrorist weapon. Since anthrax has been sent through the USPS protocols have been developed for individuals involved in all aspects of mail handling.

For information on anthrax in humans, contact the local County Public Health Department or visit: http://www.kdheks.gov/epi/disease_investigation_guidelines.htm or http://www.cdph.ca.gov/healthinfo/discond/Pages/Anthrax.aspx

This fact sheet is for information only and is not intended for self-diagnosis or as a substitute for consultation. If you have any questions about the disease described above or think that your animal may have an infection, consult with your veterinarian.

Appendix A-3

Anthrax EpiTrax Case Report Template

Case Report Anthrax

Demographics

Case #

Investigator-

- Name
- Email
- Phone #

Veterinarian-

- Name
- Address
- Cell #
- Work #
- Email
- Clinic name

Owner-

- Date reported
- Name
- Address
- County
- DOB
- Home #
- Cell #
- Work #
- Email
- Gender
- Primary language

Other Contacts-

Any other humans in contact with suspect animal?

- Name
- Address
- Phone
- Date of contact with suspected animal
- Type of contact

Animal Demographics

Species

Breed

Gender

State of Origin

Age at disease onset

Quarantined

Deceased

Was animal euthanized-

If yes, method of euthanasia used

Carcass disposal?

How, when, where

Were other animals exposed to the suspect animal

If yes, are they sick or showing the same clinical signs or dead

If no, were they isolated from the suspect animal

Are other animals eating the same forage (same pasture) or the same feed as the suspect animal?

If yes, where are the pastures or where was the feed purchased

Exposure History

How long has the animal been owned by the current owner?

Where did owner get animal?

Other animals that are in contact with currently sick or dead animal? Please describe

If yes, what species, how many, type of contact

Other animals with the same or similar clinical signs

If yes, please complete an additional form for each animal

Any other animals before now (days, week, months, years) become sick or die with similar clinical signs

Where has the animal been housed, located or pastured for the last 60 days

Has the animal traveled in the last 60 days

If yes, please explain where, for what purpose and for how long

Is there any known illness in humans that have handled or been around the animal

If animal is deceased, have any humans examined the carcass

If yes, please list name, address, phone contacts

Any humans necropsied or cut into the carcass?

If yes, please list name, address, phone

Laboratory information

Name

Number

Specimen collection date

Specimen collected

Who collected specimen

Name, number

Was personal protection utilized to collect specimens?

If yes, please explain

Was PEP given

Date treatment was started

If yes, what type, dose, concentration and duration

Name of test

Result of test

Date medical care sought

Symptomatic:

- Acute death
- Incomplete rigor mortis
- Bleeding from orifices- mouth, nose, anus or vulva
- Fever
- Depression
- Lymphadenopathy
- Swelling of neck/thorax
- Convulsions
- Staggering
- Muscle tremors
- Excitement
- Abortion
- Rapid decrease in milk production
- Other, please explain

Appendix B-1

Contagious Equine Metritis Disease Investigation Guideline

Contagious Equine Metritis

Disease Investigation Guideline

Content:	Version Date:
Investigation Protocol:	
Investigation Guideline	09/2013
Supporting Materials found in attachments:	
Fact Sheet	09/2013
Case Report Form	09/2013

Contagious Equine Metritis

Disease Management and Investigative Guideline

CASE DEFINITION

Clinical Descriptions for Public Health Surveillance:

Contagious Equine Metritis (CEM) Contagious Equine Metritis (CEM) is a very contagious venereal disease of horses caused by *Taylorella equigenitalis*. It is primarily spread via an infected stallion to mares either through natural breeding or through artificial insemination. It is endemic in some countries, and the causative agent had been eliminated from the United States (from 1970's to 2008). CEM has been reintroduced via contaminated imported animals or semen. The disease effects horses of all breeds but does not affect humans or other animals.

Laboratory Criteria for Case Classification:

- Definitive:
    - Culture of swabs of the genital tract primarily of the mare.
    - Confirmation utilizing polymerase chain reaction (PCR)
- Presumptive:
    - A positive test result utilizing identification of specific antibodies- using slide agglutination, latex agglutination, direct or indirect immunofluorescence
    - Positive identification of the bacteria on a microscopic examination

Case Classification:

- **Confirmed:** A positive result from a cultured test or in a clinical specimen by utilizing polymerase chain reaction
- **Probable:** A positive on identification of specific antibodies or microscopic evidence of the bacteria
- **Suspect:** Any horses exhibiting clinical signs consistent with returning to estrus earlier than expected, purulent vaginal discharge 10-14 days post breeding or a group of mares who experience either of the aforementioned that were bred to the same stallion

Contagious Equine Metritis

Disease Management and Investigative Guideline

EPIDEMIOLOGY

Contagious Equine Metritis (CEM) is not a zoonotic disease, and there is no record of it affecting other species. This disease has worldwide geographic distribution and is most commonly carried by asymptomatic stallions. It is then transmitted to mares during natural breeding or artificial insemination; it can also be transmitted via contaminated medical equipment (reusing speculums and other equipment used for AI). Once a horse tests positive, they will need to undergo treatment and quarantine until they become test negative. This treatment is usually one round of treatment in stallion, but can take numerous treatments in infected mares. The organism lives on the external genitalia of stallions and in the reproductive tract of mares.

DISEASE OVERVIEW

A. Agent:
Contagious Equine Metritis (CEM) is caused by the gram negative bacterium, *Taylorella equigenitalis*.

B. Clinical Description:
Signs include but are not limited to:

Stallions: no clinical signs noted

Mares: Acute, Chronic, Asymptomatic Carriers

- Acute: copious amounts of thick white to grey colored vaginal discharge 10-14 days after breeding
- Chronic: less vaginal discharge and mild uterine inflammation—this is the most common form as well as the most difficult to eliminate
- Asymptomatic Carrier: post infection, mares can carry bacteria for months
- Although rare: CEM can cause abortions and long term problems with fertility

C. Reservoirs:
CEM affects equines. It is not transmitted to other species or humans.

D. Mode of Transmission:
Transmission is venereal through natural breeding or via artificial insemination. CEM can also be transmitted by using contaminated equipment during surgeries, or equipment used in artificial insemination. If the mare is able to maintain a pregnancy, she can pass CEM to her foal during birth. Asymptomatic stallions carrying the organism easily pass this to mares, often undetected until the mare shows clinical signs.

Contagious Equine Metritis

Disease Management and Investigative Guideline

E. Incubation Period:

Variable incubation period, ranging from 3 days to 3 weeks in mares. Often a purulent grey to white vaginal discharge will show up after breeding. Some mares can become chronic carriers. Stallions are often asymptomatic.

F. Period of Communicability:

Infected stallions can transmit CEM at any point during natural breeding or during collection for artificial insemination. Infected stallions can be asymptomatic for months. Mares may also show no clinical signs, but most commonly will have vaginal discharge. A large group of mares with vaginal discharge or returning to estrus prematurely that were bred by the same stallion need to be evaluated for CEM. Biosecurity and herd management are crucial to maintain CEM free animals.

G. Susceptibility and Resistance:

Susceptibility is determined by herd management, this includes: upkeep, appropriate screening and quarantine of newly acquired animals.

H. Treatment:

Treatment usually consists of physical cleaning of the external genitalia of the stallion along with systemic antibiotic therapy. The mare also requires cleaning of external genitals along with systemic antibiotic therapy. Cleansing needs to happen daily for a minimum of five days. The mare may need continued and repeated antibiotic therapy. Additionally, the organism prefers to live in the clitoral sinus of the mare. Special care needs to be taken when cleaning this area; if a mare is unable to clear the infection, surgical removal of the sinuses may be recommended. Horses will need to test negative for CEM prior to being allowed back into the breeding pool.

I. Vaccine:

There is no vaccine.

Contagious Equine Metritis

Disease Management and Investigative Guideline

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

Contagious Equine Metritis CEM infections shall be designated as infectious or contagious in their nature, and cases or suspect cases shall be reported within 24 hours:

1. Veterinarians and producers: report to KDA-DAH (see below)
2. Laboratories: report to KDA-DAH (see below)

Kansas Department of Agriculture – Division of Animal Health (KDA-DAH)
Phone: 1-785-296-2326
Fax: 1-785-296-1765

Outbreaks, unusual occurrences of CEM, should be reported WITHIN 7 days by telephone to 1-877-296-2326.

INVESTIGATOR RESPONSIBILITIES
1) Use current case definition, to confirm diagnosis.
2) Conduct a case investigation to identify potential source of infection.
3) Conduct contact investigation to identify additional cases.
4) Initiate control and prevention measures to prevent spread of disease.
5) Complete and report all information requested via the state electronic surveillance system.
6) As appropriate, use the disease fact sheet to educate individuals or groups.

STANDARD CASE INVESTIGATION AND CONTROL METHODS
Case Investigation
1) Contact the veterinarian who ordered testing of the case and obtain the following information.

- Using the case report form, identify any symptoms of CEM:
  - Record onset date
  - Determine if the onset was acute or insidious
- Examine the laboratory testing that was done to ensure all testing that could confirm the case has been reported in Epi-Trax.
- Examine and record the therapy that the case received, including any surgeries or artificial insemination, if any.
- Collect case demographic data and contact information (birth date, county, sex, addresses for previous year)
- Record outcomes
- Collect mingling history from previous year and note any previous contact with positive CEM animals or premises previous documented positive

2) Investigate epi-links among cases (clusters from same facility, county, herd, farm or bloodline, etc…).

Contact Investigation

1) Contacts are those with possible exposure to the source of infection.
2) Examine all potential exposures based on possible sources and potential modes of transmission, investigating surrounding farms, fence-lines, co-mingling possibilities (has the stallion gotten out), veterinarian case histories (annual exams, artificial inseminations, surgeries, etc…)

Case Management

Report when negative test result is found.

Contact Management

1) Other at-risk animals should be quarantined, tested and if positive treated. Once animals are negative they can be allowed back in the herd.
2) Individuals should test all new animals entering the herd.
3) Individuals should maintain up-to-date CEM tests on all equines.
4) Care should be taken to prevent iatrogenic transmission: disinfect or sterilize all surgical supplies, artificial insemination equipment and other equipment

Environmental Measures

1) Maintaining good quality artificial insemination standards
2) Avoid buying and introducing untested equines

Education

1) Educate veterinarians about disinfecting equipment to help prevent iatrogenic transmission.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

There are no formal outbreak definitions; however, the investigator may consider the possibility of an outbreak when there is an unusual clustering of cases in time and/or space.
1) Notify KDA-DAH (785 296 2326) immediately.
2) Active case finding will be an important part of any investigation.

B. Intentional Contamination

Safety Considerations:

- Risks to public health, health care and emergency response personnel are not significant. CEM has not been shown to be a potential bioterrorism weapon.

Post exposure prophylaxis (PEP):

- Post exposure prophylaxis is not utilized

Surveillance:

- Arrange for active surveillance for equines to maintain a CEM free herd; to include: monitor for mares not getting pregnant and returning to an early estrus, or have a mucopurulent discharge 10-14 days after breeding or either of the previously mentioned symptoms occurring in a number of mares all bred by the same stallion.

C. Laboratory Exposure to Contagious Equine Metritis isolates:

1) Laboratory exposure does not constitute harm at this time

DATA MANAGEMENT AND REPORTING TO THE KDA-DAH

A. Organize and collect data.

B. Report data via the Kansas electronic surveillance system.

• All essential data that was collected during the investigation, especially data that helps to confirm or classify a case.

Appendix B-2

Contagious Equine Metritis Fact Sheet

Contagious Equine Metritis (CEM) – Fact Sheet

What is Contagious Equine Metritis?

Contagious Equine Metritis (CEM) is a very contagious venereal disease of horses caused by *Taylorella equigenitalis*. It is primarily spread via an infected stallion to mares either through natural breeding or through artificial insemination. It is endemic in some countries; the causative agent had been eliminated from the United States, but imported animals or semen has periodically re-introduced the disease. The disease effect horses of all breeds; it does not affect humans or other animals.

How is CEM Transmitted?

Natural CEM transmission occurs from one infected animal to another animal usually by natural breeding. Mares can be infected by artificial insemination and by fomites (equipment). Stallions are the most common source of the infection.

What are the clinical signs of CEM?

Stallions generally have no outward clinical signs. Mares will develop acute inflammation of the uterus causing temporary infertility. In some cases the only sign may be an early return to estrus during a short cycle. Some mares will develop a white/grey colored vaginal discharge post breeding (up to 1-2 weeks). The discharge is usually grey to white and in complicated cases a mixed bacterial infection is present. Upon examination of the reproductive tract, endometritis and vaginitis may be seen. Most infected mares will not conceive; the rare mares that do continue to have a normal pregnancy may give birth to foals that are apparently healthy but are carriers of the organism. Although uncommon, abortions can occur. Infertility generally only lasts a few weeks, but mares can carry the organism for months. The initial exposure and infection are typically severe with subsequent infections less severe. Morbidity is high and mortality is low, although economic costs can be very high with loss of breeding, pre-screening breeding exams, treatment, etc…

CEM should be suspected if a mare has white/grey vaginal discharge about 2 weeks after breeding, or a mare returns to estrus early or if a group of mares bred to the same stallion all have similar signs of discharge and/or return to estrus prematurely.

What is the incubation period for CEM?

The incubation period is most commonly 2-14 days with infections becoming apparent 10-14 after breeding.

How is CEM detected?

A microscopic exam of the uterine discharge shows a gram-negative coccobacilli and large numbers of inflammatory cells. *T. equigenitalis* is pleomorphic and will sometimes show bipolar staining. Confirmation is via culture of swabs of the genital tract and/or PCR testing. CEM is difficult to grow on culture, thus utilization of a lab familiar (NVSL-National Veterinary Services Laboratory) with *T. equigenitalis* is important. Additionally, identification can be completed with specific antibodies (slide or latex agglutination and direct or indirect immunofluorescence). Stallions may only carry a few of the organisms, indicating that testing

needs to be completed on mares. All CEM testing must be performed at an approved laboratory and positive results must be reported to state and federal animal health officials.

Which equines have to be tested/screened?

- Equines entering countries that are free of CEM
- Mares exhibiting clinical signs
- High risk stallions (first time breeders, exposed to infected premises or mated to mare with unknown status)

What if my equine tests positive for CEM?

If there is a positive test, CEM can be treated. A combination of antibiotics and disinfectants is usually used. Stallions often only need a single course of treatment, while mares may take months and numerous courses of treatments to completely rid them of infection. Once a horse is test negative for *T. equigenitalis* they can be used for breeding again. The external genitalia will need to be cleaned with disinfectants (including chlorhexidine, detergents or sodium hypochlorite); in addition, a local antibiotic ointment can be utilized, taking care of the external skin and folds (clitoral sinuses) as this is the primary location the organism can be found. Removal of the clitoral sinus can also be used as treatment in mares that don't respond to other treatment. Systemic antibiotics are often used in cases. An epidemiological investigation will need to be completed to determine cause and location of infection.

What will happen to animals in close contact with the animal found CEM positive?

Horses that are found to be positive will need to be quarantined, treated and re-tested. Upon a negative test result the horses can be returned to breeding. The epidemiologic investigation will determine the infected equine's movement history and identify exposed horses. Management practices will be assessed to identify the potential of inadvertent spread by humans not handling horses and equipment properly. Any mare considered exposed to a CEM positive stallion or contaminated equipment will be quarantined and tested.

How can I protect my horse from CEM?

- Obtain a negative CEM test before purchasing a new equine to confirm a negative disease status and to reduce the risk of disease entry onto the premises
- Only purchase horses from geographic areas that are considered CEM free, quarantine and re-test animals once on your premise
- Disinfect or sterilize all equipment, instruments and premises

This fact sheet is for information only and is not intended for self-diagnosis or as a substitute for consultation.

If you have any questions about the disease described above or think that your animal may have an infection, consult with your veterinarian.

Appendix B-3

Contagious Equine Metritis EpiTrax Case Report Template

Case Report : Contagious Equine Metritis

Demographics

Case #

Investigator-

- Name
- Email
- Phone #

Veterinarian-

- Name
- Address
- Cell #
- Work #
- Email
- Clinic name

Owner-

- Date reported
- Name
- Address
- County
- Home #
- Cell #
- Work #
- Email

Animal Demographics

Species

Breed

Gender

Age at diagnosis

State of Origin

County of Origin

Quarantined

If yes, how long? start date of quarantine?

Is this the first time CEM has been diagnosed on this premises

Were other equines exposed to the suspect animal

If yes, have they been tested for CEM

Results and testing protocols utilized

If no, were all other equines isolated from the suspect animal

Exposure History

How long has the equine been owned by the current owner?

Where did owner get equine?

If previously owned – please provide history of name, address and phone of previous owner(s)

Has the equine ever had a CEM test?

If yes, when and where

Results?

Has the mare been artificially insemination?

If yes, when and by whom

Name and contact information of the stallion used for collection?

Has the equine had any other medical procedures completed?

If yes, what procedures and by whom

Where has the equine been housed, located or pastured the last 60 days

If positive CEM test, has the animal been quarantined?

Please describe the level of quarantine:

Has the animal had received treatment?

If yes, please explain

Medications given: dose, concentration, date

Is the equine symptomatic:

- Early estrus
- Mucopurulent vaginal discharge
- Other, please explain

Laboratory information

Name

Number

Specimen collection date

Specimen collected

Who collected specimen

Name, number

Name of test

Result of test

Appendix C-1

Equine Infectious Anemia Disease Investigation Guideline

Equine Infectious Anemia

Disease Investigation Guideline

Content:	Version Date:
Investigation Protocol:	
Investigation Guideline	09/2013
Supporting Materials found in attachments:	
Fact Sheet	09/2013
Case Report Form	09/2013

Equine Infectious Anemia

Disease Management and Investigative Guideline

CASE DEFINITION

Clinical Descriptions for Public Health Surveillance:

Equine infectious anemia (EIA) is a retroviral disease of equids that may be characterized by acute and/or chronic recurring clinical signs including fever, anemia, edema and weight loss in some animals. Many horses have very mild or inapparent signs on first exposure, and carry this virus subclinically. The owners of these animals are unlikely to realize that they are infected unless serological testing is done. All infected horses, including those that are asymptomatic, become carriers and are infectious for life. Infected animals must either be destroyed or remain permanently isolated from other equids to prevent transmission.

Laboratory Criteria for Case Classification:

- Definitive:
    - Serology is commonly used- agar gel immunodiffusion (AGID) also known as the Coggins test.
    - Confirmation utilizing reverse-transcriptase polymerase chain reaction (RT-PCR)
- Presumptive:
    - A positive test result utilizing the ELISA (enzyme-linked immunosorbent assays test. A confirmatory AGID Coggins test must be completed to confirm status.
    - EIA should be among the differentials in individual horses with weight loss, edema and intermittent fever. Also if several horses experience fever, anemia, edema, progressive weakness or weight loss, particularly if a new animal has been introduced or one of the herdmates has died, EIA should be considered.

Case Classification:

- **Confirmed:** A positive result from a AGID/Coggins test or in a clinical specimen by utilizing RT-polymerase chain reaction
- **Probable:** A positive on the ELISA test
- **Suspect:** Any horses exhibiting clinical signs consistent with weight loss, edema, anemia and intermittent fever with a history of a new introductions in the herd or a herdmate dying.

Equine Infectious Anemia

Disease Management and Investigative Guideline

EPIDEMIOLOGY

Equine Infectious Anemia (EIA) is not a zoonotic disease, and there is no record of it affecting other species. This disease has worldwide geographic distribution and is most commonly carried by asymptomatic horses. EIA can then be transmitted via biting insects, contaminated equipment (needles, surgical supplies), milk, semen and sharing bridle bits. Once a horse is infected, they are infectious for life and slaughter or euthanasia is recommended. If euthanasia is not selected, quarantine with specific requirements is mandatory- 200 yards away from other equines or a screened-in stall, hot iron or freeze branding and interstate travel is extremely restricted.

DISEASE OVERVIEW

J. Agent:

Equine infectious anemia is caused by infectious anemia virus, a lentivirus in the family Retroviridae.

K. Clinical Description:

Signs include but are not limited to: 3 phases of the disease are diagnosed.

- Acute: severe anemia, hemorrhage, pitting edema, tachypnea, tachycardia, petechiae, thrombocytopenia, epistaxis or melena and death
- Chronic: slow weight loss, mild fever, edema, anemia, jaundice, depression and petechiae on mucus membranes
    - Ophthalmic lesions, characterized by depigmentation with prominent choroidal vessels
- Recurrent: often not recognized, inapparent signs of a "come-and-go" mild fever
    - Equines may have episodes of illness divided by periods of health; at any point during illness episodes the equine may die.

Infects equids only; no known human form of the disease. Once a horse is positively identified, they are infected for life and can and will transmit the disease.

L. Reservoirs:

EIA primary effects horses and ponies, but has also been seen in mules. It is also possible in donkeys and zebras or crosses of any of the previous mentioned. It is not transmitted to other species.

Equine Infectious Anemia

Disease Management and Investigative Guideline

M. Mode of Transmission:

Transmission is mechanical via the mouthparts of biting insects, most commonly the horse fly. Horses that are experiencing symptoms are more likely to transmit the disease as the viremia is at a higher level in the blood. EIA can also be transmitted by using contaminated equipment during surgeries, dental floats or not using new needles while injecting or vaccinating horses. Mares can pass EIA to foals in utero or in milk. The virus can also be spread by sharing bridle bits. The virus can also be found in semen, although venereal transmission extremely rare. Aerosol transmission is also a possibility although not been proven.

N. Incubation Period:

Variable incubation period, ranging from 1 week to 60 days. Some horses may remain asymptomatic until they are stressed, develop a concurrent illness or are put into intense work or exercise.

O. Period of Communicability:

Infected horses can transmit EIA at any point, but are considered more viremic while exhibiting clinical signs. The sicker the horse the more virus that is traveling in the blood. Infected horses can be asymptomatic for years, and only show clinical signs during times of stress, illness or heavy work. Biosecurity and herd management are crucial to maintain EIA free animals.

P. Susceptibility and Resistance:

Susceptibility is determined by herd management, upkeep and appropriate testing and quarantine of newly acquired animals.

Q. Treatment:

There is no known treatment. Euthanasia is recommended in EIA positive animals. Quarantine can be utilized with the following requirements: 1) maintain at least 200 yards from any other equids, 2) place positive animals in a screened-in stall only (no turn out aloud) **AND** 3) they have to be hot iron or freeze branded based on state regulations.

- Interstate travel of EIA positive horses is **EXTREMELY** restricted and difficult. In the United States most sanctioned events (horse shows, rodeos and eventing) require negative Coggins on all participants.

R. Vaccine:

There is no vaccine or treatment available.

Equine Infectious Anemia

Disease Management and Investigative Guideline

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

Equine Infectious Anemia EIA infections shall be designated as infectious or contagious in their nature, and cases or suspect cases shall be reported within 24 hours:

1. Veterinarians and producers: report to KDA-DAH (see below)
2. Laboratories: report to KDA-DAH (see below)

Kansas Department of Agriculture – Division of Animal Health (KDA-DAH)
Phone: 1-785-296-2326
Fax: 1-785-296-1765

Outbreaks, unusual occurrences of EIA, should be reported WITHIN 7 days by telephone to 1-877-296-2326.

INVESTIGATOR RESPONSIBILITIES

1) Use current case definition, to confirm diagnosis.
2) Conduct a case investigation to identify potential source of infection.
3) Conduct contact investigation to identify additional cases.
4) Initiate control and prevention measures to prevent spread of disease.
5) Complete and report all information requested via the state electronic surveillance system.
6) As appropriate, use the disease fact sheet to educate individuals or groups.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Case Investigation

1) Contact the veterinarian who ordered testing of the case and obtain the following information.

- Using the case report form, identify any symptoms of EIA:
  - Record onset date
  - Determine if the onset was acute or insidious
- Examine the laboratory testing that was done to ensure all testing that could confirm the case has been reported in Epi-Trax.
- Examine and record the therapy that the case received, including any vaccinations or injections of any sort, surgeries, dental floats, if any.
- Collect case demographic data and contact information (birth date, county, sex, addresses for previous year)
- Record outcomes: euthanasia or quarantine

- Collect mingling history from previous year and note any previous contact with positive EIA animals

3) Investigate epi-links among cases (clusters from same county, herd, farm or bloodline, etc…).

Contact Investigation

1) Contacts are those with possible exposure to the source of infection.
2) Examine all potential exposures based on possible source and potential modes of transmission, investigating surrounding herds/farms, fence-lines, co-mingling possibilities, veterinarian case histories (annual exams, dental floats, vaccines, surgeries, etc…)

Contact Management

5) Other at-risk animals should be quarantined and tested, and then retested at the 60 day quarantine mark prior to allowing back into herd.
6) Individuals should test all new animals entering the herd.
7) Individuals should maintain up-to-date Coggins tests on all equids and only attend events that require current Coggins tests to enter.
8) Care should be taken to prevent iatrogenic transmission: use disposable needles and syringes only one time; disinfect or sterilize all surgical supplies, dental floats and other equipment

Environmental Measures

3) Maintaining good quality insect control can help to interrupt transmission during an outbreak.
4) Avoid buying and introducing untested equids

Education

2) Educate veterinarians about disinfecting equipment and utilizing single use needles and syringes only one time to help in preventing iatrogenic transmission.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

There are no formal outbreak definitions; however, the investigator may consider the possibility of an outbreak when there is an unusual clustering of cases in time and/or space.
1) Notify KDA-DAH (785 296 2326) immediately.

2) Active case finding will be an important part of any investigation.

B. Intentional Contamination

Safety Considerations:

- Risks to public health, health care and emergency response personnel are not significant. EIA has not been shown to be a potential bioterrorism weapon.

Post exposure prophylaxis (PEP):

- Post exposure prophylaxis is not utilized

Surveillance:

- Arrange for active surveillance for equids to maintain an EIA free herd; to include: monitor for low grade fevers, anemia, slow weight loss or any otherwise healthy equine that suddenly dies.

C. Laboratory Exposure to equine infectious anemia isolates:

1) Laboratory exposure does not constitute harm at this time

DATA MANAGEMENT AND REPORTING TO THE KDA-DAH

A. Organize and collect data.

B. Report data via the Kansas electronic surveillance system.

• All essential data that was collected during the investigation, especially data that helps to confirm or classify a case.

Appendix C-2

Equine Infectious Anemia Fact Sheet

Equine Infectious Anemia (EIA) – Fact Sheet

What is Equine Infectious Anemia?

Equine Infectious Anemia (EIA) is potentially fatal blood-borne viral disease that affects all equines (i.e. horses, mules and donkeys) worldwide. It is a lentivirus that replicates in red blood cells; the destruction of the red blood cells causes anemia. There are three phases of EIA: acute, chronic and recurrent. Acute phase equines will typically be very sick with anemia and often die. Chronic and recurrent phase equines may or may not look sick or may present with mild fever or with slow chronic weight loss. Both clinical and asymptomatic EIA-infected horses become carriers of the virus and are infectious for life. There is no effective treatment or vaccination for EIA and euthanasia is recommended. The disease does not affect humans or other animals.

How is EIA Transmitted?

Natural EIA transmission occurs from one infected animal to another animal by biting insects, such as horse flies(most common), deer flies and mosquitoes. The virus can also be spread by use of contaminated needles, equipment or surgical instruments as well as in milk and semen.

What are the clinical signs of EIA?

The clinical signs can very, from an acute infection with slight to high fever for a few days and small hemorrhages, to progressive weakness, weight loss, depression and neurological deficits (disorientation, stumbling). Although uncommon, acute, rapid death can be the only clinical sign. There is no vaccine or treatment for EIA, and it is often difficult to differentiate from other fever-causing diseases (influenza and encephalitis). The most common form of EIA diagnosed is the chronic form, in which the horse has repeated fever episodes and develops other clinical signs including edema, weight loss, and severe anemia.

What is the incubation period for EIA?

The incubation period is most often 1- 3 weeks, but may be as long as 3 months.

How is the virus detected?

A serologic test can confirm the diagnosis of EIA. The two most commonly used serologic tests are the agar gel immunodiffusion (AGID), commonly known as the Coggins Test, and the enzyme-linked immunosorbent assay (ELISA) test. The Coggins test detects the presence of EIA-specific antibodies in the blood. A positive reading indicates the horse is infected and therefore a carrier of the EIA virus. The ELISA test can detect antibodies earlier than the Coggins, but the ELISA will more often have false positives, thus a confirmation with the Coggins test is standard practice. All EIA testing must be performed at an approved laboratory and positive results must be reported to state and federal animal health officials.

Which equines have to be tested?

- Equines being entered into exhibitions or competitive events(including shows and rodeos)
- Equines being moved across state lines
- Equines changing ownership

- Equines entering horse auctions or sales

What if my equine tests positive for EIA?

If there is a positive test, a veterinarian will quarantine the animal and obtain additional samples for confirmatory testing. If confirmed EIA positive, management options are as follows: a) euthanasia, b) lifetime quarantine with permanent isolation a minimum of 200 yards from all other horses or c) lifetime confinement in a screened stall. If quarantine is elected, the animal will need to be identified by hot iron or freeze branding in accordance with state requirements. State of Kansas regulations are managed by the State Livestock Commissioner through the Department of Agriculture Division of Animal Health at 1-785-296-2326. As a lifetime carrier/reservoir of disease, the movement of an EIA-infected animal is severely restricted to prevent the potential for transmission.

What will happen to animals in close contact with the animal found EIA positive?

The epidemiologic investigation will determine the infected equine's movement history and identify exposed horses. Management practices will be assessed to identify the potential of iatrogenic spread of disease through use of contaminated needles and equipment. Any equine considered exposed to an EIA positive horse will be quarantined and tested for EIA. An exposed horse that tests negative is retested 60 days after removal of the infected horse from the premises to confirm the negative result. Quarantine will remain in effect on exposed horses until the 60 day retest results are received and are test negative.

How can I protect my horse from EIA?

- Obtain a negative Coggins test before purchasing a new equine to confirm a negative disease status and to reduce the risk of disease entry onto the premises
- Participate only in equine events that require evidence of a negative Coggins test
- Use disposable needles and syringes for injecting equines and properly dispose of used needles/syringes after a single use to prevent needle contamination and disease transmission
- Disinfect or sterilize all equipment or instruments

This fact sheet is for information only and is not intended for self-diagnosis or as a substitute for consultation.

If you have any questions about the disease described above or think that your animal may have an infection, consult with your veterinarian.

Appendix C-3

Equine Infectious Anemia EpiTrax Case Report Template

Case Report : Equine Infectious Anemia

Demographics

Case #

Investigator-

- Name
- Email
- Phone #

Veterinarian-

- Name
- Address
- Cell #
- Work #
- Email
- Clinic name

Owner-

- Date reported
- Name
- Address
- County
- Home #
- Cell #
- Work #
- Email

Animal Demographics

Species

Breed

Gender

Age at diagnosis

State of Origin

County of Origin

Quarantined

If yes, how long? start date of quarantine?

Is this the first time EIA has been diagnosed on this premises

Were other equines exposed to the suspect animal

If yes, have they been tested for EIA

Results and testing protocols utilized

If no, were all other equines isolated from the suspect animal

Exposure History

How long has the equine been owned by the current owner?

Where did owner get equine?

If previously owned – please provide history of name, address and phone of previous owner(s)

Has the equine ever had a Coggins test?

If yes, when and where

Results?

Has the equine been given any injections?

If yes, when, by whom and what

Has the equine had a dental exam done?

If yes, when and by whom

Has the equine had any other medical procedures completed?

If yes, what procedures and by whom

Where has the equine been housed, located or pastured the last 60 days

If positive EIA test, has the animal been quarantined?

Please describe the level of quarantine: is the equine no closer than 200 yards to other, equines or in a screened in stall

Has the quarantined equine been branded appropriately for identification of being EIA positive?

Has the equine been sent to slaughter or euthanized

Was the equine identified as EIA positive when sent to slaughter

Is the equine symptomatic

- Fever
- Progressive weakness
- Chronic weight loss
- Edema
- Anemia
- Acute death
- Depression
- Neurological signs
- Other, please explain

<u>Laboratory information</u>

Name

Number

Specimen collection date

Specimen collected

Who collected specimen

Name, number

Name of test

Result of test

If a PCR test was utilized, was it followed up with an AGID ?

Appendix D-1

Rabies Disease Investigation Guideline

Rabies

Disease Management and Investigative Guideline

CONTENT:	Version Date:
Investigation Protocol:	
• Investigation Guideline	09/2013
Supporting Materials (found in attachments):	
• Fact Sheet	09/2013
• Case Report Form	09/2013

Rabies

Disease Management and Investigative Guideline

CASE DEFINITION (CDC 2011)

Clinical Description for Public Health Surveillance:

Rabies is a fatal zoonotic disease found worldwide caused by a Lyssavirus. All mammals are believed to be susceptible and it causes generalized, acute, fatal encephalopathy. In the United States, multiple rabies virus variants are maintained in wild mammalian reservoir populations such as raccoons, skunks, foxes, and bats. The United States is declared free of the canine variant, but due to the wild population the reintroduction is a risk.

Rabies virus usually is transmitted from animal-to-animal and animal-to-human through bites as the virus is shed in saliva. The incubation period is highly variable and ranges from a few days to six months or longer. Clinical signs include anorexia, dysphagia, cranial nerve deficits, abnormal behavior, ataxia, paralysis, altered vocalization, seizures and death. There is no known effective treatment for rabies. Clinical signs of rabies in humans are very nonspecific and include general malaise, headache and fever. As rabies progresses, neurological dysfunction can be seen: agitation, anxiety, confusion, excitation, hallucinations, difficulty swallowing, hypersalivation, paralysis and hydrophobia. Death is within a few days of the onset of symptoms.

Case Classification:

Confirmed: A clinically compatible case that is laboratory confirmed.

- A positive direct fluorescent antibody test (preferably performed on central nervous system tissue), or isolation of rabies virus (in cell culture or in laboratory animal)

Suspected: A clinically compatible illness that does not meet the confirmed case definition, but with one of the following:

- Epidemiological link to a documented rabies exposure;
- Evidence of having interaction with bats; including having a bat in a confined space that an individual or animal has also occupied (i.e. house or building) that was not previously occupied by a bat

LABORATORY ANALYSIS—

1. Detection of Lyssavirus antigens in a clinical specimen (preferably the brain or the nerves surrounding hair follicles in the nape of the neck) by direct fluorescent antibody test,

2. Isolation (in cell culture or in a laboratory animal) of a Lyssavirus from saliva or central nervous system tissue

3. Identification of Lyssavirus specific antibody (i.e. by indirect fluorescent antibody (IFA) test or complete rabies virus neutralization at 1:5 dilution) in the CSF

4. Detection of Lyssavirus viral RNA (using reverse transcriptase-polymerase chain reaction [RT-PCR]) in saliva, CSF, or tissue

A. Animal Testing:

• Kansas State University (KSU) Rabies Laboratory performs animal testing: there is a charge for processing and testing.

− **Prior** to preparation and shipping of samples, consult with KSU Rabies Laboratory at 785-532-4483 to coordinate sample submission.

• Animals can only be tested for rabies by euthanizing them. A fresh cross section of the brainstem and cerebellum is required for testing (Obex is preferred specimen).

− Euthanize in accordance with the American Veterinary Medical Association's Guidelines on Euthanasia.

− When handling small animals it is preferred that the whole animal is submitted for testing. For large animals, send animals head only.

B. Human Samples:

• The Centers for Disease Control and Prevention (CDC) performs human sample testing for both antemortem and postmortem diagnosis.

• Contact KDHE to coordinate collection and submission of human samples.

− Exercise caution when decapitating the animal. Do not damage the brain or brain stem or put people at risk of exposure. Appropriate PEP needs to be utilized while working on the animal.

• Packaging and shipping of animal specimens:

− Pack the head or small animal in a primary leak-proof container.

− The primary container is placed into a secondary container with enough cold packs to maintain refrigerator temperatures until reaching the lab.

− The specimen should not be frozen and dry ice is not recommended as it may freeze.

− Samples should be sent to:

Veterinary Diagnostic Laboratory/RABIES Laboratory
College of Veterinary Medicine
Kansas State University – VCS Building
1800 North Denison Ave.
Manhattan, KS 66506-5601

Rabies

Disease Management and Investigative Guideline

EPIDEMIOLOGY

Rabies is present on all continents except for Antarctica, but more than 95% of human deaths occur in Asia and Africa. Once symptoms of the disease develop, rabies is nearly always fatal. The World Health Organization estimates more than 55,000 people die of rabies every year; with 40% being under the age of 15. In the United States, there are more than 6,000 cases of animal rabies reported each year. Raccoons, skunks and bats are the most frequently diagnosed. Dogs are the source of the majority of human rabies deaths. It occurs mainly in remote rural communities where measures to prevent dog to human transmission have not been implemented in third world countries.

DISEASE OVERVIEW

A. Agent:

Rhabdovirus of the genus Lyssavirus causes rabies.

B. Clinical Description:

Rabies virus infects the central nervous system, causing encephalopathy and ultimately death. Some animals may die rapidly with minimal clinical signs. In animals, there are three types of rabies; 1)encephalitic (furious) rabies where animals are hyperexcitable, hostile, bite, choke and hypersalivate, 2) dumb rabies where an animal is timid, shy and depressed and often rejects food 3)paralytic – where the animal exhibits lameness and depressed spinal reflexes. Signs of animal rabies include: changes in behavior, problems swallowing, hypersalivation, wild animals appearing abnormally tame or sick, animals that bite at everything if excited, difficulty moving or paralysis, and death.

Clinical signs of rabies in humans are nonspecific: fever, headache, and general malaise. As the disease progresses, neurological symptoms appear: insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hypersalivation, difficulty swallowing, and hydrophobia with rapid progression to death.

C. Reservoirs:

In the United States, raccoons, skunks, foxes, and bats are the major reservoirs. In developing countries, dogs remain the main reservoir. Small rodents and lagomorphs (e.g., squirrels, hamsters, guinea pigs, gerbils, chipmunks, rats, mice, wild rabbits) have not been known to transmit rabies to humans.

D. Mode(s) of Transmission:

Rabies is spread through the saliva of infected animals via a bite, scratch, or contact with mucous membrane or a break in the skin. Skin breaks or mucous membrane exposure to nervous tissue (e.g., brain, spinal cord) of an infected animal may also pose a risk of transmission.

E. Incubation Period:

In animals, the incubation period is general 15-50 days, but can be several months or longer.

In humans, the incubation period is generally 2 weeks to 2 months, but can be greater than a year. The incubation period may be less if it has been a severe exposure or if the bite is closer to the central nervous system, like a bite to the face.

F. Period of Communicability:

Dogs, cats, and ferrets have been shown to shed the virus in their saliva up to 10 days before the onset of clinical signs and continue to shed throughout the course of disease. Wild animals, such as skunks, bats, and foxes, may have virus present in saliva for longer periods before onset of clinical symptoms.

G. Susceptibility and Resistance:

All mammals are susceptible to rabies.

H. Treatment:

Experimental treatment options for humans may be available on a case-by-case basis. However, once symptoms occur, the outcome is almost always fatal.

I. Vaccine:

Animals: There are numerous animal rabies vaccines available to be given either yearly or every three years; generally starting around 16 weeks of age. Requirements vary by country/state/town).

Humans: There is a human vaccine available for at risk individuals (veterinarians, veterinary technicians, animal control officers, parks and wildlife). It needs to be given in a 3 shot sequence, with titers checked every other year.

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Disease Management and Investigative Guideline

NOTIFICATIONS (ANIMAL RABIES)

The following notifications occur as a result of rabies investigations:

1. Positive and unsuitable laboratory reports:

- Kansas State University Rabies Laboratory will notify the submitter of the specimen (i.e. veterinarian) KDA and KDHE.

- The KDHE Epidemiologist-on-call will notify the local health department with jurisdiction over the area that the animal was found.

2. Negative laboratory reports:

- KSU Rabies Laboratory will notify the submitter of the specimen by fax (i.e. report to veterinarian).

- For unusual circumstances, requests for additional notifications on negative laboratory tests may be requested through KDA and KDHE.

INVESTIGATION GUIDELINES: Veterinarians and livestock inspectors should conduct the following steps.

A. When a positive or unsuitable animal rabies laboratory report (or a verbal account of a situation involving a potentially rabid animal) is received:

1) Identify if any human or other animal exposure occurred with the animal.

a) Positive lab reports: considered a high risk situation if exposure is identified; start PEP and/or begin to manage exposed animals.

b) Unsuitable reports: investigate as if positive.

B. If a person was bitten or exposed to animal saliva or brain material: refer them to the Kansas Department of Health and Environment at the following address:

http://www.kdheks.gov/epi/Investigation_Guidelines/Rabies_Disease_Investigation_Guideline.pdf

C. If an animal was bitten or exposed to animal saliva or brain material:

1) Assess the risk of rabies transmission to the animal.

2) Decide on disposition of the exposing animal (source of exposure) and manner how exposure occurred.

3) Recommend quarantine or other disposition of the animal that was potentially exposed.

4) Follow-up to assure compliance with recommendations.

D. For cases of Human Rabies Identify if there was any human or animal exposure and refer them to the Kansas Department of Health and Environment at

http://www.kdheks.gov/epi/Investigation_Guidelines/Rabies_Disease_Investigation_Guideline.pdf

Assess the risk of rabies transmission

Animal exposures can be classified into three categories, they are: high risk, low risk, and no risk. The boundary between these categories is often unclear and a risk assessment is needed to decide if the animal was rabid and if post exposure prophylaxis (PEP) or other action is needed.

The risk assessment is based upon the following the following criteria:

- The type of exposure, as defined above.
- The risk that the animal is rabid.

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Disease Management and Investigative Guideline

The risk that an animal is rabid depends on the following circumstances:

- Is it a species that can be infected with and transmit rabies?
- Was it possible that the animal had contact with any other species that are known to be susceptible to rabies?
- Is/was the animal exhibiting signs and symptoms of rabies?

Type of animal causing the exposure:

Bats: Rabid bats are increasingly implicated as an important wildlife reservoir. Transmission can occur from minor unrecognized bites; it is important to make every effort to safely capture and test the bat involved in an exposure incident. Bats are considered a high risk exposure and rabid unless negative by laboratory tests.

Wild Animals: Wild animals are an important rabies reservoir; in Kansas, skunks are most often implicated. Clinical signs can be varied, but any animal not acting normally is suggestive of rabies. Vaccinating wild animals has unknown efficacy and is not recommended. Treat any wild animal acting strange as rabid, until laboratory proven otherwise. `

- It is illegal to keep skunks, raccoons, foxes, and coyotes as pets (K.A.R. 28-1-14); they must be sacrificed and tested.
- Wild species cross-bred with domestic dogs and cats (owned or not), shall be sacrificed immediately and the head submitted for laboratory examination for evidence of rabies (K.A.R. 28-1-13 and 28-1-14).
- Stray or feral dogs, cats, and ferrets are more likely to have had contact with wild animals and less likely to have been vaccinated. Treat as wild and regard as rabid unless animal tests negative for rabies.

Livestock: Vaccinated and/or healthy animals are unlikely to be rabid. Livestock exhibiting signs of rabies or that died suddenly should be investigated as a suspect rabies case.

Large rodents (woodchucks and beavers): Large rodents have been found to have rabies in the Eastern U.S. where the raccoon-variant rabies virus is circulating. Even though the risk is low, it should be evaluated.

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Small rodents and lagomorphs: Squirrels, chipmunks, rats, mice, hamsters, guinea pigs, gerbils and lagomorphs (rabbits and hares) are rarely infected and have not been known to transmit rabies to humans.

Non-mammalian animals: Non-mammals do not transmit rabies.

Steps for animal that is the source of the exposure:

When investigating a potential rabies exposure of a human or other mammal, the management of the animal causing the exposure shall be as follows:

1. **Domestic dog, cat, or ferret** that is owned or wanted shall be quarantined 10 days.
    - The 10-day quarantine period begins on day 0, which is the date exposure occurred and is completed at the end of day 10.
    - The quarantined animal will be kept in an approved location with allowance to maintain follow up during the quarantine period. These may be at the owners' residence, veterinary clinic, or currently licensed shelter.
    - If at any time during quarantine the animal exhibits clinical signs of rabies, it shall be humanely euthanized and tested.
    - Healthy animals shall be released to owner at the conclusion of quarantine upon payment of any boarding fees.
2. **Stray dogs, cats or ferrets** that are healthy can be held for three business days to await claim in a facility with a current shelter license.
    - If the stray begins to experience symptoms of rabies, it shall be humanely euthanized immediately and tested.
    - For high risk situations due to the severity and/or location of the bite, the holding period may be waived in lieu of testing urgency.
3. **Horses, cattle or sheep** management shall be determined by the KDA or designee in consultation with KDHE.
4. **Other mammals** which are known to be involved in rabies transmission shall be humanely euthanized immediately and head submitted for testing.
    - This includes hybrids of species known transmit rabies.
    - Any vaccinated mammal if its virus shedding period is unknown.
5. **Small rodents and lagomorphs** (squirrels, chipmunks, mice, rats, gerbils, guinea pigs, hamsters, rabbits, hares and other species not involved in the transmission of rabies) do not need to be sacrificed; unless circumstances, in the judgment of the KDA, indicate otherwise.

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Post Exposure Protocol if human suspected exposure- please refer to the Kansas Department of Health and Environment and CDC for PEP guidelines at:
http://www.kdheks.gov/epi/Investigation_Guidelines/Rabies_Disease_Investigation_Guideline.pdf

Note: The 2010 ACIP recommendations for post-exposure prophylaxis do differ from current rabies
vaccine label instructions. Refer to the following:
http://www.cdc.gov/mmwr/pdf/rr/rr5902.pdf.

Rabies

Disease Management and Investigative Guideline

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

All confirmed or suspected rabies cases shall be reported:

1. Health care providers and hospitals: report to the local public health jurisdiction, KDA-DAH or KDHE-BEPHI (see below)

2. Local public health jurisdiction: report to KDA-DAH /KDHE-BEPHI (see below)

3. Laboratories: report to KDA-DAH or KDHE-BEPHI (see below)

4. KDA-DAH or KDHE-BEPHI will contact the local public health jurisdiction by.

Kansas Department of Agriculture-Division of Animal Health (KDA-DAH)

Phone: 1-785-296-2326

Fax: 1-785-296-1765

Kansas Department of Health and Environment (KDHE)

Bureau of Epidemiology and Public Health Informatics (BEPHI)

Phone: 1-877-427-7317

Fax: 1-877-427-7318

Rabies

Disease Management and Investigative Guideline

Quarantine or management of *EXPOSED* animal

When investigating a potential exposure of rabies to an animal, the following applies:

1. Determine the rabies immunization status of owned and wanted dogs, cats, ferrets, horses, cattle, and sheep. A current vaccination is verified by the owner providing a rabies vaccination certificate that contains the following:

    • Positive identification for each mammal showing current vaccination by a licensed veterinarian with an approved vaccine for species and

    • Expiration date of the rabies vaccine.

    If the initial vaccination was administered at least 28 days previously or booster vaccinations have been administered in accordance with Part III of the Compendium of Animal Rabies Prevention and Control (http://www.cdc.gov/mmwr/pdf/rr/rr6006.pdf), the animal is considered current on vaccination.

    Evaluate overdue booster vaccinations individually (e.g., severity of exposure, time elapsed since last vaccination, number of prior vaccinations, current health status and local rabies epidemiology). In most cases, overdue animals will not be considered current on rabies vaccination.

    There are no USDA licensed biologics for PEP of unvaccinated domestic animals; post-vaccination in unvaccinated animals is not considered effective.

2. Disposition based on animal and vaccination status:

    • The animal shall be quarantined or observed based on vaccination status, type of species and ownership status of the animal.

- Observation: exposed animal is kept by the owner as per normal handling procedures in a manner that allows the animal to be watched for any changes of behavior or health.

- Quarantine: exposed animal is kept in a manner that assures the exposed animal is effectively restricted from any contact with humans or animals known to contract and transmit rabies. This requires that there be no possibility of the animal gaining exit from or another animal gaining entry to the quarantine space (including digging under or climbing over fencing) and that there is no possibility of contact through spaces in a confining fence by the use of solid fencing material or double fence construction with wire mesh.

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Rabies

Disease Management and Investigative Guideline

• Any illness in an animal under quarantine or observation should be reported immediately to the local health department. If signs suggestive of rabies are present, the animal should be euthanized and tested.

• Owned dogs, cats, ferrets, horses, cattle and sheep that are current with vaccinations are immediately re-vaccinated and under the owner's control for a 45-day observation period.

• Dog, cat, or ferret that is not currently immunized against rabies but is owned or wanted and shall be quarantined for six months.

- Locations of quarantine: residence of the owner, a veterinary hospital, or a facility holding a current state pound or shelter license (based upon the owner's ability to comply with quarantine measures)

- Immunize against rabies one month prior to release from quarantine.

- Release: healthy animals are released with KDA-DAH or designee's authorization upon payment of a boarding fee.

• Stray, unclaimed, or unwanted dogs, cats or ferrets shall be humanely euthanized immediately.

• Horses, cattle, and sheep not vaccinated with an approved vaccine shall be sacrificed immediately or quarantined for six months under conditions satisfactory to the local health officer or designee. The local health officer or designee shall authorize the release of the animal upon payment of any boarding fees.

• Other mammals who are currently vaccinated with an approved vaccine for that species shall be revaccinated immediately and quarantined for at least 90 days under conditions satisfactory to the local health officer.

• Other mammals (not vaccinated) shall be sacrificed immediately. Animals maintained in USDA-licensed research facilities or accredited zoological parks should be evaluated on a case-by-case basis.

Note: It is not necessary to test animals that are sacrificed as a result of their rabies exposure unless the animal is also being investigated as a potential "exposing" animal in a separate exposure incident.

Euthanasia of owned animals

• When an owner is making arrangements to euthanize a pet for humane reasons, it is important to have the owner sign an animal euthanasia consent form.

• This form will describe the animal and have the owner attest that to their knowledge it has not bitten anyone in the past 10 days.

– If an animal has bitten someone in the past ten days, the animal must undergo post-mortem rabies testing after euthanasia.

C. Measuring immune response to rabies immunization (in animals)

• Evidence of circulating rabies virus antibodies cannot be used as a substitute for current vaccination in managing a rabies exposure.

D. Educating the Public

• Education of the general public is a good measure to prevent exposures.

• General information can be found on the CDC Rabies website: www.cdc.gov/rabies/

– Rabies Exposure: www.cdc.gov/rabies/exposure/index.html

ADDITIONAL INFORMATION / REFERENCES

- Compendium of Animal Rabies Prevention and Control, 2011 www.nasphv.org/documentsCompendia.html
- Centers for Disease Control and Prevention, www.cdc.gov/rabies/
- Human Rabies Prevention Recommendations (CDC-ACIP) www.cdc.gov/mmwr/preview/mmwrhtml/rr57e507a1.htm
- Use of a Reduced (4-Dose) Vaccine Schedule for Post exposure Prophylaxis to Prevent Human Rabies (CDC-ACIP, 2010) http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5902a1.htm
- Information for State Health Departments www.cdc.gov/rabies/statehealthdept.html
- Kansas State University College of Veterinary Medicine, Rabies Laboratory www.vet.ksu.edu/depts/dmp/service/rabies/index.htm
- Diagnostic Testing and Results for Animals Suspected of Having Rabies: www.vet.kstate.edu/depts/dmp/service/rabies/diagnostic.htm
- Rabies Diagnosis in Animals Submission form www.vet.ksu.edu/depts/dmp/service/rabies/pdf/Rabies.pdf
- World Health Organization www.who.int/health_topics/rabies/en/
- American Veterinary Medical Association: www.avma.org/public_health/default.asp#rabies
- www.avma.org/issues/policy/rabies_control.asp

- A Community Approach to Dog Bite Prevention: www.avma.org/public_health/dogbite/dogbite.pdf
- AVMA Guidelines on Euthanasia: www.avma.org/issues/animal_welfare/euthanasia.pdf
  Animals and Rabies: www.cdc.gov/rabies/exposure/animals/index.html

Further responsibilities of state and local health departments to the CDC:

As a nationally notifiable condition, rabies cases require an IMMEDIATE, EXTREMELY URGENT or IMMEDIATE, URGENT report to the Center of Disease Control and Prevention (CDC) depending on the circumstances.

INVESTIGATOR RESPONSIBILITIES

1) Use current case definition, to confirm diagnosis with the Kansas State University Rabies Laboratory or veterinarian on the case.

2) Conduct a case investigation to identify potential source of infection.

3) Conduct contact investigation to identify additional cases.

4) Identify whether the source of infection is major public health concern.

5) Initiate control and prevention measures to prevent spread of disease.

6) Complete and report all information requested via the state electronic surveillance system.

7) As appropriate, use the disease fact sheet to educate individuals or groups.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Case Investigation

1. Contact the veterinarian who ordered testing of the case and obtain the following information.

   • Using the Case Report Form, identify any symptoms of rabies:

   - Record earliest onset date, noting the first symptom.
   - Record any other symptoms experienced.

   • Examine the laboratory testing that was done to ensure all testing that could confirm the case has been reported in Epi-Trax.

   • Examine and record the therapy that the case received.

   •

- Collect case's demographic data and contact information (birth date, county, sex, occupation, address, phone number(s))
- Record hospitalizations: location, admission and discharge dates
- Record outcomes: date of death

2. Interview the owner (if one) to determine source and risk factors.
3. Investigate epi-links among cases (geographic clusters or contact with similar animals, etc.).
    - For suspected outbreaks go to Managing Special Situations section.

Contact Investigation- Human Contact

1) Any human in contact with the source of exposure is defined as a contact. This may include physical contact with an infected animal or a contaminated animal specimen.

- Any exposure that results in a suspected case of rabies requires a public health investigation to identify if other exposures in the same setting or geographic location might have led to other cases of rabies.

Contact Management

1) Symptomatic acquaintances, household members, associates, or co-workers that were also potentially exposed should contact their physician for a medical evaluation and are followed-up as suspect cases.

2) Contact Monitoring:

- Depending on type of exposure, asymptomatic persons who were potentially exposed should also see medical care.
- A medical provider should be consulted immediately if symptoms develop.

3) Exposure circumstances direct decisions on PEP. Please see "Post Exposure Protocol and Schedule" above.

4) Recommendations may change with additional CDC guidance.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

A single case of rabies in the United State is so unusual that it should be reported and investigated immediately. If a cluster of domesticated animals are diagnosed an investigation is also warranted to determine cause and vaccination status for control and limit spread to humans.

1) Consider the possibility of an outbreak when there is an unusual clustering of cases in time and/or space

2) Notify KDA-DAH (1-785-296-3556) or KDHE (1-877-427-7317) immediately.

3) Active case finding will be an important part of any investigation.

Safety Considerations:

• Rabies can be transmitted person-to-person (although rare); the infected individual would have to bite another human or transmit saliva to another individuals open wound.

• Greatest risk to human health occurs in locations where dog rabies is prevalent and when humans handle or feed wild animals.

• Response personnel would be at risk if transmission is through a live animal. Necessary precautions need to be taken in management and handling of the animal if rabid.

• Decontamination: Rarely necessary.

Risk Communication Materials:

• Factsheet for rabies

Rabies

Disease Management and Investigative Guideline

Diagnosis of Rabies Infection:

Veterinarians who suspect rabies should take immediate steps for protection of humans by instigating quarantine of suspect animals, utilizing appropriate precautions and notify local authorities as well as the KDA-DAH.

- Procedures and guidance on correct methods for acquiring and submitting samples should be completed by a licensed veterinarian. Proper handling of specimen(s) is crucial in allowing for accurate testing.

Treatment:

Once clinical signs are present, rabies is almost always fatal and no treatment has been shown effective.

DATA MANAGEMENT AND REPORTING TO THE KDA-DAH and KDHE

A. Organize, collect and report data.

B. Report data via Epi-Trax.

- Especially data collected during the investigation that helps to confirm or classify a case.

Appendix D-2

Rabies Fact Sheet

RABIES Fact Sheet

Rabies is a disease caused by a Lyssavirus from the Rhabdoviridae family that affects the nervous system of humans and other mammals. Human rabies is very rare in the United States, but most commonly caused by bats. In Kansas, most animal cases of rabies are found in skunks, but also can be seen in bats, raccoons and cats. Other mammals including dogs, ferrets, and livestock can get rabies if they are not vaccinated. Rabies is rarely reported in rabbits and small rodents, such as squirrels, hamsters, guinea pigs, gerbils, chipmunks, rats, and mice. Rabies is present in every state in the United States, except for Hawaii.

Is Rabies fatal?

Rabies infections are almost always fatal once symptoms of the disease have started.

How is rabies spread?

Rabies virus is found only in the brain, spinal cord, and saliva of animals sick with rabies. The rabies virus is most often spread through a bite (that breaks the skin) from an infected animal; other ways it is transmitted is via saliva contacting an open wound/scratch or mucous membrane (eyes, nose or mouth).

The following are NOT exposures to rabies:

- Being scratched by the animal
- Contact with blood, urine or feces
- Contact with dried saliva
- Petting the hair of a rabid animal
- Touching bowls, equipment (gates/trailers), halters/lead ropes, or other surfaces the rabid animal contacted

How can you tell if an animal is rabid?

The most common clinical sign is that most rabid animals don't behave normally. Wild animals may appear friendly or nocturnal animals may be seen during the day. Animals may stagger, be paralyzed, drool, or have seizures. Some normally friendly animals may become very aggressive. In humans, rabies can cause headaches, high fever, confusion, hydrophobia and seizures. Rabies will progress to paralysis, coma and almost always death. If an animal is acting strange, or has clinical signs suggestive of rabies, stay a safe distance away. If a human or another animal is bitten or exposed to the body fluids containing the rabies virus, the only way to know whether the animal has rabies is to have it tested. There is no rabies test for live animals. It is important to realize that brain tissue is the specimen and it needs to be undamaged. This includes: not shooting the animal in the head or crushing the skull. Specimens need to be refrigerated not frozen until they can be delivered to the laboratory.

What steps should be taken following an animal bite?

1. Wash all bite wounds immediately with soap and water, use a disinfectant if available, and continue washing for 5-10 minutes.
2. Contact your health care provider as soon as possible. Animal bite wounds contain bacteria, so a tetanus booster and/or antibiotics may be needed.

3. If possible, safely catch or restrain the animal. Your local animal control or police may be able to help catch the animal; if the animal must be killed, try to do so without damaging the head. If the animal has an owner, get contact information (name, address, phone number) and information about the animal's rabies vaccination history.
4. Immediately report the exposure to your local county health agency, health department or police.
5. Treatment should be considered if a bat was present and exposure cannot be ruled out (a sleeping person awakens to find a bat in the room or a bat is seen in the room with a previously unattended child). 6. Any bats (dead or alive) found in your home should be tested for rabies; do not dispose or release any bat without contacting your local animal control.

What do you do if you suspect rabies?

The animal bite to human:

- If a rodent or rabbit caused the bite, these are very low risk and rabies vaccination is usually not recommended, but always, check with local animal control or public health department.
- If the biting animal was a dog, cat, or ferret (not owned by the bite victim and not currently vaccinated), the animal should be quarantined with a licensed veterinarian for ten days.
- Dogs, cats, and ferrets (not owned by the bite victim and currently vaccinated) may be allowed to be quarantined by the animal owner or licensed veterinarian for 10 days.
- If the animal dies or is euthanized during the 10 day quarantine, it should be tested for rabies.
- If the dog, cat, or ferret remains healthy after ten days no further action is needed.
- The local animal control and public health department should be contacted. Animals, other than dogs, cats, or ferrets, may need to be quarantined for 30 days under the care of a veterinarian, or euthanized and tested depending on the exposure and vaccination status.

The animal bite to another animal:

- If the animal bitten is owned/wanted but not vaccinated, the animal should be quarantined for 6 months by the animal owner or licensed veterinarian and vaccinated 1 month prior to conclusion of quarantine period.
- If the animal bitten has proof of current vaccination, the animal should immediately be given a booster vaccine and be quarantined for 45 days by the animal owner or licensed veterinarian.

When do you need treatment?

People bitten by an animal that tests positive for rabies should always receive the post exposure prophylaxis (PEP). PEP generally consists of four doses of rabies vaccine and rabies immune globulin (RIG), usually given at the same time as the first vaccine dose. An individual may also want to receive pre-exposure rabies vaccines; these individuals would be inclined to have frequent contact with potentially rabid animals or be traveling to a location (foreign country) where dog rabies is common.

How long after exposure will the first symptoms start?

The time interval between the exposure to the rabies virus and onset of clinical signs is variable. In animals the time interval is generally between 3-8 weeks, but can be as long as six months; in humans, the interval is usually 4-12 weeks after exposure.

How can rabies be prevented?

- Be a responsible pet owner! Make sure all pets are current on their rabies vaccinations, this includes horses and other livestock.
- Keep dogs and cats close to home, they should not be allowed to roam freely.
- If your pet comes into contact with a skunk or bat, contact your veterinarian as soon as possible. Keep the animal away from other animals and people and wear gloves while handling it.
- Do not handle or feed wild animals and do not keep them as pets. If you see an injured wild animal, contact the nearest animal control agency or wildlife rehabilitation facility for assistance.
- Teach children to avoid contact with any wild animals or animals that are unfamiliar to them.
- Do not leave pet food outdoors for long periods of time, keep trash cans tightly sealed and keep brush piles cleared away from buildings to help discourage wild animals from being around your house.
- Try to prevent bats from having access inside your home, use screens and chimney caps and remember, whether alive or dead, they should be tested for rabies.

This fact sheet is for information only and is not intended for self-diagnosis or as a substitute for consultation. If you have any questions about the disease described above or think that your animal may have an infection, consult with your veterinarian.

Appendix D-3

Rabies Case Report Template

Case Report Rabies

Demographics

Case #

Investigator-

- Name
- Email
- Phone #

Veterinarian-

- Name
- Address
- Cell #
- Work #
- Email
- Clinic name

Owner-

- Date reported
- Name
- Address
- County
- DOB
- Home #
- Cell #
- Work #
- Email

Whomever was bitten or exposed-

- Has the individual previously received the vaccine series? When?
- When were the titers last checked and what were they?

- Has the individual had a tetanus vaccine within the last five years?

Any other humans in contact with suspect animal?

- Name
- Address
- Phone
- Date of contact with suspected animal
- Type of contact

Animal Demographics

Species

Breed

Gender

State of Origin

Age at disease onset

Quarantined

Deceased

Was animal euthanized-

If yes, method of euthanasia used

Carcass disposal?

How, when, where

Were other animals exposed to the suspect animal

If yes, are they sick or showing the same clinical signs or dead

If no, were they isolated from the suspect animal

What is the vaccination status of the exposing animal?

What is the vaccination history?

Were the vaccines administered by a licensed veterinarian?

If the suspect animal bit another animal, what is the vaccine status of the animal that was bitten?

Exposure History

How long has the animal been owned by the current owner?

Was the owner bitten or in contact with the saliva of the suspect animal?

Was anyone else bitten by or in contact with the saliva of the suspect animal?

If a human was bitten, what was the anatomical site bitten (i.e. hand, arm, leg, face, etc..)?

What were the circumstances surrounding the bite? Please be specific; certain instances animals may be more inclined to bite- things like protecting its food or surroundings, or if an animal was hit by a car—please explain the events that led up to the bite.

Where did owner get animal?

Other animals that are in contact with currently sick or dead animal? Please describe

If yes, what species, how many, type of contact

Has the animal been exposed to wild life or other rabies vectors?

Has the animal traveled in the last 60 days

If yes, please explain where, for what purpose and for how long

For the animal causing the exposure (or animal that completed the bite) Actions taken:

___ Dog, cat or ferret quarantined for 10 days. (Start date: _____ End date: _____)

Location of quarantine:_____
Animal euthanized and tested for rabies. (Test result: _____)
Other(please explain):_____

For the animal exposed (or animal that was bitten) Actions taken:

___ Animal was euthanized. Date _____

___ Animal was revaccinated and quarantined for 45 days (previously vaccinated animal)

Location of quarantine:_____

Animal was quarantined for 6 months then vaccinated 1 month prior to release (non-vaccinated animal)

Location of quarantine:_____

Laboratory information

Name

Number

Specimen collection date

Specimen collected

Who collected specimen

Name, number

Was personal protection utilized to collect specimens?

If yes, please explain

Was PEP given

If yes, what type, dose, concentration and duration

Name of test

Result of test

Symptomatic

- Acute death
- Hyperexcitable
- Aggressive
- Hypersalivation
- Choke/problems swallowing
- Depressed
- Anorexic
- Lameness
- Not acting normal for that animal (i.e. friendly animal becomes very aggressive, or a wild animal is suddenly not fearful of humans)

- Unexplained behavior changes
- Paralysis
- Hydrophobia
- Other, please explain

Appendix E-1

Trichomoniasis Disease Investigation Guideline

Bovine Trichomoniasis

Disease Investigation Guideline

Content:	Version Date:
Investigation Protocol:	
Investigation Guideline	09/2013
Supporting Materials found in attachments:	
Fact Sheet	09/2013
Case Report Form	09/2013

Trichomoniasis

Disease Management and Investigative Guideline

CASE DEFINITION

Clinical Descriptions for Public Health Surveillance:

- A venereal disease of cattle caused by a flagellated protozoan parasite, *Tritrichomonas foetus* (Trich), transmitted by infected, usually asymptomatic bulls to heifers or cows during mating. Clinical signs are early pregnancy loss (peak loss is at 70-90 days gestation) and low pregnancy rates that can progress through different herds within the same farm. Other signs include one or more of the following: pyometra, abortion and retained fetal membrane. Generally bulls will be asymptomatic carriers, but can have a small amount of purulent discharge during the first two weeks of infection.

Laboratory Criteria for Case Classification:

- Definitive:
    - KDA-DAH recommends identification via polymerase chain reaction (PCR)
    - Additional confirmation via culture and identification of *T. foetus* from clinical specimens; utilizing InPouch TF (Biomed Diagnostics) Gold standard: 6 weekly samples and production standard is 3 weekly samples with not mating in between samples.
- Presumptive:
    - The flagellated parasites can be identified by direct microscopic examination of collected fluids (vaginal, preputial secretions, amniotic, allantois or abomasal fluids).
    - Samples can be inoculated into media (commonly Diamonds' or Claussen's media) and allowed to grow in vitro until adequate numbers of parasites are present

Case Classification:

- **Confirmed:** A clinically compatible illness with definitive laboratory evidence of *T. foetus* infection/ isolation of *T. foetus* from a clinical specimen by culture or in a clinical specimen by utilizing polymerase chain reaction
- **Probable:** A clinically compatible case and evidence of the flagellated parasite on microscopic exam of collected fluids or post in vitro growth in an appropriate media
- **Suspect:** A clinically compatible case that is epidemiologically linked to a confirmed case.

Trichomoniasis

Disease Management and Investigative Guideline

EPIDEMIOLOGY

Bovine Trichomoniasis (Trich) is not a zoonotic disease, but there is a human strain that is unrelated to the bovine strain. This disease has worldwide geographic distribution and is most commonly carried by asymptomatic bulls. These bulls upon mating will infect cows and heifers. Often cows and heifers will clear the infection in a few months, but some can remain infected through pregnancy and infect bulls in the next season. The cows and heifers do not have long lasting immunity and may become re-infected after clearing the infection. Only bulls less than 3 years old may clear infection, but bulls older than 3 will remain infected for life; this is primarily due to the depth of the epithelial crypts of the penis and prepuice. It is more commonly seen in larger herds and where commingle grazing is common.

DISEASE OVERVIEW

S. Agent:
T. foetus is caused by a parasite with 3 anterior and 1 posterior flagellum, is pyriform in shape, and has an undulating membrane causing characteristic rolling and jerking movement. Time, temperature and type of medium that specimens are maintained in can decrease sensitivity of tests used in diagnosis.

T. Clinical Description:
Signs include but are not limited to: cows/heifers – early fetal loss, abortion, lower birth weight, pyometra and low fertility rates; in bulls- often asymptomatic, may have purulent discharge during the first two week post infection. Cow/heifers and young bulls (under 3 years of age) will generally clear the infection in weeks to months. Bulls over the age of 3 are chronically infected.

U. Reservoirs:
T. foetus primarily affects cattle, but has been shown to be a cause of diarrhea in cats. Other strains can infect pigs, birds and humans.

V. Mode of Transmission:
Transmission occurs through direct contact with infected animals' fluids and/or tissues during natural mating. Artificial insemination is recommended only if appropriate sanitation and methods are maintained.

W. Incubation Period:
Variable incubation period, ranging from 30 minutes to 95 days but may be several months; most commonly will find open cows in a herd (between 120-150 days gestation).

Trichomoniasis

Disease Management and Investigative Guideline

X. Period of Communicability:

Infected Bulls over the age of 3 are considered chronically infected and should be sent to slaughter. Infected cows/heifers can transmit *T. foetus* to bulls during mating, thus resulting in a bull (if they are over 3 yrs) that can then be considered chronically infected. Biosecurity and herd management are crucial to maintain *T. foetus* free animals.

Y. Susceptibility and Resistance:

Susceptibility is determined by herd management, upkeep and appropriate testing and quarantine of newly acquired animals.

Z. Treatment:

There is no known treatment. In bulls over the age of 3 and cows/heifers that are open after 120 days of gestation, culling is recommended.

AA. Vaccine:

There is a vaccine that can be utilized in high risk herds with one vaccine given 2 months prior to the breeding season and then boostered 2-4 weeks later (for cows/heifers only). The vaccine has not been shown efficacious in bulls. This vaccine does not prevent disease but has been shown to reduce the incidence of early fetal loss and abortion.

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

T. foetus infections shall be designated as infectious or contagious in their nature, and cases or suspect cases shall be reported within seven days:

1. Veterinarians and producers: report to KDA-DAH (see below)
2. Laboratories: report to KDA-DAH (see below)

Kansas Department of Agriculture – Division of Animal Health (KDA-DAH)
Phone: 1-785-296-2326
Fax: 1-785-296-1765

Trichomoniasis

Disease Management and Investigative Guideline

Outbreaks, unusual occurrences of trich, should be reported WITHIN 7 days by telephone to 1-785-296-2326.

INVESTIGATOR RESPONSIBILITIES

1) Use current case definition, to confirm diagnosis.
2) Conduct a case investigation to identify potential source of infection.
3) Conduct contact investigation to identify additional cases.
4) Initiate control and prevention measures to prevent spread of disease.
5) Complete and report all information requested via the state electronic surveillance system.
6) As appropriate, use the disease fact sheet to educate individuals or groups.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Case Investigation

1) Contact the veterinarian who ordered testing of the case and obtain the following information.

- Using the case report form, identify any symptoms of Trich:
  - Record onset date (if a reoccurrence – record the earliest onset date)
  - Determine if the onset was acute or insidious
- Examine the laboratory testing that was done to ensure all testing that could confirm the case has been reported in Epi-Trax.
- Examine and record the therapy that the case received, including vaccinations, if any.
- Collect case demographic data and contact information (birth date, county, sex, addresses for previous 2 years)
- Record outcomes: recovered or date of culling
- Collect breeding history from previous two years and note any previous contact with positive Trich animals

3) Investigate epi-links among cases (clusters from same county, herd, farm or bloodline, etc…).

Contact Investigation

1) Contacts are those with possible exposure to the source of infection.
2) Examine all potential exposures based on possible source and potential modes of transmission, investigating surrounding herds/farms, fence-lines, co-mingling possibilities, history of breeding activities or livestock sales

Contact Management

9) Other at-risk animals should be tested, weekly for a minimum of three weeks if using the InPouch TF system or a single PCR test to monitor for any disease.
10) Individuals should try to utilize young breeding bulls or buy only virgin bulls and heifers.

11) Implementation of a very defined breeding season is important in determining pregnancy dates and gestational length to assist in ruling out Trich.
12) Consider keeping bulls in the same breeding groups for numerous breeding seasons.
13) Possibly utilize artificial insemination to help prevent introduction of Trich or to help break the cycle of infection.

Environmental Measures

5) Maintenance of good perimeter fencing to segregate cattle of unknown status is the first line of defense to prevent Trich from entering a herd.
6) If biosecurity measures cannot be maintained or there are other risk factors, vaccination of cows can help in mitigating economic losses.
7) Avoid buying open cows- meaning less than 120 days. If these animals are purchased they must be quarantined and examined prior to joining the herd.

Education

3) Educate veterinarians about sample collection- understand that temperature, methodology of sample collection and submission time can all affect test results.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

There are no formal outbreak definitions; however, the investigator may consider the possibility of an outbreak when there is an unusual clustering of cases in time and/or space.
1) Notify KDA-DAH (785-296-3556) immediately.
2) Active case finding will be an important part of any investigation.

B. Intentional Contamination

Safety Considerations:

- Risks to public health, health care and emergency response personnel are not significant. *T. foetus* has not been shown to be a potential bioterrorism weapon.

Post exposure prophylaxis (PEP):

- Post exposure prophylaxis is not utilized

Trichomoniasis

Disease Management and Investigative Guideline

Surveillance:

- Arrange for active surveillance for cows/heifers and young bulls to maintain a Trich free herd; to include: monitor for low fertility rates, abortion, pyometras among females and consistent testing of bulls.

C. Laboratory Exposure to T. foetus isolates:

1) Laboratory exposure does not constitute harm at this time

DATA MANAGEMENT AND REPORTING TO THE KDA-DAH

A. Organize and collect data.

B. Report data via the Kansas electronic surveillance system.

• All essential data that was collected during the investigation, especially data that helps to confirm or classify a case.

Appendix E-2

Trichomoniasis Fact Sheet

Bovine Trichomoniasis "Trich" Fact Sheet

What is Trich?

Trichomoniasis, commonly referred to as "Trich," is a highly contagious venereal disease in cattle caused by a microscopic protozoan parasite, *Tritrichomonas foetus,* that can result in abortions and infertility. In the cow, the organism lives in the vagina and uterus; while in bulls, the organism lives in microscopic folds, or crypts, on the skin of the penis and prepuce. As a bull ages, conditions on the surface of the penis are more conducive for this protozoa to survive and multiply. It is transmitted from infected bulls to heifers or cows at the time of breeding. It is not a human health issue, although there is another strain of trichomoniasis only found in humans.

Clinical Signs

An infected bull often has virtually no outward signs of infection, even though he is the main source of infection in a herd. Once bulls, that are over the age of 3, are infected, they are considered infected for life and culling is recommended. Bulls that are under the age of 3 can clear the infection, but close monitoring and testing needs to be established in order to utilize these animals as breeders. An infected cow may have very subtle signs; she may have mild vaginal discharge for 1-3 weeks post infection, but in most cases no outward signs are apparent. Most commonly you will see open cows late in the season. These cows will often clear the infection within 120-150 days. They do not develop immunity to the disease and can therefore be re-infected the next breeding season. Some cows can remain chronically infected and still be able to deliver a normal calf; this is very rare, and these cows can continue to be the source of infection to bulls in the next breeding season.

Diagnosis and Why is it Important?

The economic loss to the cattle producer is multifactorial, including lower fertility, lower birth and weaning weights, reduced calf crop with early and some late term abortions. The only way to confirm trich infections is through testing at a certified laboratory. The organism is most readily identified in bulls since they are more likely to become long-term carriers of the disease; whereas cows can often eventually clear the infection. A preputial scraping sample is taken from the bull and stored in special media. This sample can be used for two different types of tests: either a PCR (polymerase chain reaction) or culture to identify the parasite. If culture is used, three sequential tests are required at weekly intervals with no exposure to cows or heifers during the testing timeframe. A negative trich test is valid for 60 days (?) or until a bull mingles with female cattle, whichever comes first.

Control and Prevention

No treatment is available for bovine trich, which makes identifying infected bulls well before breeding season vital. The most effective way to control trich is to prevent the introduction of it into a herd. Some of the best ways to accomplish this are as follows:

- Test all new bulls prior to allowing them contact with your current herd
- Preventing unwanted bulls access to your property through damaged fences
- Keeping a younger breeding bull battery and purchase virgin bulls when possible
- Establish a defined breeding season with early pregnancy diagnosis and culling open cows
- Purchase cows/heifers from reputable sources
- Maintaining good biosecurity of your herd and facility
- Slaughter of infected bulls

A vaccine is available to aid in the control of this disease. The vaccine can be useful in cows but does not protect bulls from becoming infected. Vaccination requires two injections, typically administered 2 to 4 weeks apart with the second dose no earlier than 30 days prior to the start of the breeding season. Consult with your veterinarian when starting a trich vaccination program for your herd.

Shipment Regulations
Cattle producers should be aware of the trich testing requirements for the destination states prior to moving cattle. For the state of Kansas you can find the regulations at: (web address)

Exceptions are:

- Bulls less than 19 months of age that can be certified as virgin bulls
- Bulls consigned directly to slaughter
- Rodeo or eventing animals that travel to the event and then leave the state

This fact sheet is for information only and is not intended for self-diagnosis or as a substitute for consultation. If you have any questions about the disease described above or think that your animal may have an infection, consult with your veterinarian.

Appendix E-3

Trichomoniasis Case Report Template

Case Report : Trichomoniasis

Demographics

Case #

Investigator-

- Name
- Email
- Phone #

Veterinarian-

- Name
- Address
- Cell #
- Work #
- Email
- Clinic name

Owner-

- Date reported
- Name
- Address
- County
- Home #
- Cell #
- Work #
- Email

Animal Demographics

Species

Breed

Gender

Age at diagnosis

State of Origin

County of Origin

Quarantined

If yes, how long? start date of quarantine?

Is this the first time Trich has been diagnosed on this premises

Were other animals exposed to the suspect animal

If yes, have they been tested for Trich

Results and testing protocols utilized

If no, were all other animals isolated from the suspect animal

Exposure History

How long has the animal been owned by the current owner?

Where did owner get animal?

If previously owned – please provide history of name, address and phone of previous owner(s)

If a bull, has current owner used for breeding in the last 60 days?

If yes, natural service or AI

If it was AI, where was semen shipped or used

If natural service, was the bull only used with current owners cows/heifers

-approximate number of cows/heifers exposed

- any of the exposed cows/heifers been tested for Trich

Results and testing protocols utilized

If bull was loan or leased, to whom, where and when

-approximate number of cows/heifers exposed

- any of the exposed cows/heifers been tested for Trich

Results and testing protocols utilized

Has the bull gotten out in the last 60 days?

Where has the animal been housed, located or pastured the last 60 days

If three cultures were performed at weekly intervals, was the bull kept away from cows/heifers during this time frame

Was bull kept away from cows/heifers for 14 days prior to initial (or first) test

Was the animal on any medications at the time of testing

If yes, name, dose, concentration, duration

At a positive diagnosis, was the animal treated

If yes, treatment type, dose, concentration and duration

Currently being treated

Has the animal been vaccinated for trich

Has the animal been sent to slaughter

Was the animal identified as Trich positive when sent to slaughter

Is the animal symptomatic

- Preputial swelling
- Purulent discharge from penis
- Increased number of cows/heifers open after 120-150 days of gestation
- Low grade fever
- Pyometra
- Abortion
- Retained fetal membranes

- Low fertility rates in a herd
- Other, please explain

Laboratory information

Name

Number

Specimen collection date

Specimen collected

Who collected specimen

    Name, number

How was specimen collected- please be very specific

    Was specimen kept in an incubator or warmed

    How long between sample collect and submission

Name of test

Result of test

    Organism name

    Organism species

    Organism serotype or serogroup (if known)

Appendix F-1

Vesicular Exanthema Disease Investigation Guideline

Vesicular Exanthema

Disease Management and Investigative Guideline

CONTENT:	Version Date:
Investigation Protocol:	
• Investigation Guideline	10/2013
Supporting Materials (found in attachments):	
• Fact Sheet	10/2013
• Case Report Form	10/2013

Vesicular Exanthema

Disease Management and Investigative Guideline

CASE DEFINITION

Clinical Description for Public Health Surveillance:

Vesicular exanthema is a highly infectious viral disease of swine characterized by fevers and vesicles on the mouth, snout, coronary band and soles of the feet. These vesicles swell and break, leaving very painful open sores. These animals will often go off feed and water, suffer mild-to-severe weight loss, and may show signs of lameness. It mainly affects swine (rarely horses) and sea mammals; it has not shown to be infective to other species. It also closely mimics three other vesicular diseases (foot-and-mouth disease, swine vesicular disease, vesicular stomatitis). The only method to differentiate between these diseases is through laboratory tests. The geographic distribution is variable depending on the outbreak, but vesicular exanthema was in the United States in the 1950's but intense monitoring and surveillance has led to the disease being eradicated. The United States is currently declared disease free.

Because of the similarity of vesicular exanthema to both vesicular stomatitis and to foot-and-mouth disease, the potential negative impact on livestock production, and its public health implications, the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) works to keep this disease from becoming established in the United States. Vesicular exanthema is recognized internationally as a reportable disease, and exports of swine and animal products from the U.S. would be restricted if vesicular exanthema were allowed to spread here.

Case Classification:

Confirmed: A clinically compatible case that is laboratory confirmed.

- A positive ELISA, complement fixation, virus neutralization or confirmed in culture by immunofluorescence test.

Reverse Transcriptase Polymerase Chain Reaction RT-PCR can also be used.

Suspected: A clinically compatible illness that does not meet the confirmed case definition, but with one of the following:

- Epidemiological link to a documented vesicular exanthema exposure;

• Evidence of having interaction with animal saliva or fluid from vesicles and exhibiting clinical signs

LABORATORY ANALYSIS—

1. Detection of the vesicular exanthema virus in a clinical specimen (preferably the vesicular fluid, epithelial tags from the lesions, or swabs from the lesions); there are three commonly used serologic tests 1)ELISA, virus neutralization 2)complement fixation and 3) PCR test.

2. Isolation (in cell culture or in a laboratory animal)

Animal Testing:

• Please contact the laboratory prior to sending in samples. It is important to handle samples carefully and accurately.

Vesicular Exanthema

Disease Management and Investigative Guideline

EPIDEMIOLOGY

Vesicular exanthema is a highly infectious viral disease of swine characterized by fevers and vesicles on the mouth, snout, coronary band and soles of the feet. These vesicles swell and break, leaving very painful open sores. These animals will often go off feed and water, suffer mild-to-severe weight loss, and may show signs of lameness. It mainly affects swine (rarely horses) and sea mammals; it has not shown to be infective to other species. It also closely mimics three other vesicular diseases (foot-and-mouth disease, swine vesicular disease, vesicular stomatitis). The only method to differentiate between these diseases is through laboratory tests. The geographic distribution is variable depending on the outbreak, but vesicular exanthema was in the United States in the 1950's but intense monitoring and surveillance has led to the disease being eradicated. The United States is declared disease free.

It originally appeared in California in 1932 in pigs found to be fed raw garbage; at that time these animals were thought to have foot-and-mouth disease, were subsequently euthanized, burned and buried. It reappeared in 1933 and 1934 and it was determined that the cause was, in fact, not foot-and –mouth disease or vesicular stomatitis, but was named vesicular exanthema. It appeared again in a severe outbreak in 1939 and was found in a processing plant in 1952 in Nebraska (first time being detected outside California)- but was traced back to raw garbage originating in California. These hogs were shipped out of the plant and within a month vesicular exanthema had been detected in 18 states. A state of emergency was declared and a federal quarantine was implemented.

DISEASE OVERVIEW

A. Agent:

The viruses are members of the family Caliciviridae and genus Vesiculovirus. They are bullet shaped and composed of a single strand of RNA.

B. Clinical Description:

Generally there will be a fever, but often this isn't seen by the time the animal is observed and examined by a veterinarian. Vesicles and erosions around the snout, mouth, coronary band

and feet are generally the first clinical sign. Lameness and anorexia quickly follow with total reluctance to move also possible. Hypersalivation is often seen. Ulcers and erosions on the teats are not uncommon and may result in secondary cases of mastitis. It is generally self-limiting with resolution usually happening within 2 weeks. If the lesions are extremely severe on the coronary band and foot, the hoof may slough and regrowth in pigs can take up to 6 months. Neutralizing antibodies persist, and these swine may continue to be undetected carriers of the disease.

C. Reservoirs:

The main reservoir is other swine. It can go undetected in swine that have recovered from the disease.

D. Mode(s) of Transmission:

Vesicular exanthema spread is not well understood, however, there are believed to be three main modes of transmission. The first is swine that are fed raw garbage(contains pork scraps) have a dramatic increase in likelihood of contraction of disease. It can be spread swine to swine from close contact. The fluid within the vesicle is highly infective of the virus and can be transmitted to pigs that have come into contact with an infected pig. The third mode of transmission is via humans carrying the virus on their clothing, shoes or equipment.

E. Incubation Period:

In general, the incubation period is generally 24 to 72 hours.

F. Period of Communicability:

Animals have been shown to shed the virus in their saliva and from the fluid in the vesicles as they rupture; once these vesicles are healed they generally are not as infective. Humans need to utilize proper biosecurity and cleaning protocols. Swine that have recovered from the virus can become inapparent carriers and their bodily secretions can spread the virus.

G. Susceptibility and Resistance:

Swine, sea lions, other sea mammals and horses are susceptible to vesicular exanthema; morbidity is very high and mortality is low.

H. Treatment:

Treatment consists of supportive care, usually antibiotics are prescribed with secondary infections. The lesions are extremely painful and thus pain control medications are often added. In addition, some animals will need to be given soft or wet food to aid in ease of mastication. Antiseptic cleaning of the open wounds can also promote healing.

I. Vaccine:

There is no vaccine available in the United States.

Vesicular Exanthema

Disease Management and Investigative Guideline

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

Vesicular exanthema infections shall be designated as infectious or contagious in their nature, and cases or suspect cases shall be reported within 24 hours:

1. Veterinarians and producers: report to KDA-DAH (see below)
2. Laboratories: report to KDA-DAH (see below)

Kansas Department of Agriculture – Division of Animal Health (KDA-DAH)
Phone: 1-785-296-2326
Fax: 1-785-296-1765

Outbreaks, unusual occurrences of VE, should be reported WITHIN 7 days by telephone to 1-785-296-2326.

INVESTIGATOR RESPONSIBILITIES
1) Use current case definition, to confirm diagnosis.
2) Conduct a case investigation to identify potential source of infection.
3) Conduct contact investigation to identify additional cases.
4) Initiate control and prevention measures to prevent spread of disease.
5) Complete and report all information requested via the state electronic surveillance system.
6) As appropriate, use the disease fact sheet to educate individuals or groups.

STANDARD CASE INVESTIGATION AND CONTROL METHODS
Case Investigation
1) Contact the veterinarian who ordered testing of the case and obtain the following information.

- Using the case report form, identify any symptoms of VE:
  - Record onset date
  - Determine if the onset was acute or insidious
- Examine the laboratory testing that was done to ensure all testing that could confirm the case has been reported in Epi-Trax.
- Examine and record the therapy that the case received.
- Collect case demographic data and contact information (birth date, county, sex, addresses for previous year)
- Record outcomes
- Collect mingling history from previous year and note any previous contact with positive VE animals or premises previous documented positive

2) Investigate epi-links among cases (clusters from same facility, county, herd, farm or bloodline, etc…).

Contact Investigation

1) Contacts are those with possible exposure to the source of infection.
2) Examine all potential exposures based on possible sources and potential modes of transmission, investigating surrounding farms, fence-lines, co-mingling possibilities, veterinarian case histories

Isolation, Work and Daycare Restrictions

1) It does not infect humans, thus no restrictions
2) Humans need to utilize appropriate biosecurity to prevent spread; appropriate cleaning protocols need to be utilized.

Case Management

Report when negative test result is found.

Contact Management

14) Other at-risk animals should be quarantined, tested and if positive treated. Once clinical signs have passed.
15) Individuals should test all new animals entering the herd.
16) Care should be taken to prevent iatrogenic transmission: disinfect or sterilize all equipment – including feeders, waterers, halters, lead ropes, etc….

Environmental Measures

8) Maintaining good quality biosecurity standards when handling animals
9) Utilize excellent insect control to help prevent spread of disease
10) Avoid buying and introducing untested animals, especially from endemic locations

Education

4) Educate veterinarians about disinfecting equipment to help prevent iatrogenic transmission.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

VE is so rare in the United States that a single case needs to be treated as an outbreak.
1) Notify KDA-DAH (785 296 2326) immediately.
2) Active case finding will be an important part of any investigation.

B. Intentional Contamination

Safety Considerations:

VE is not considered zoonotic and has not been shown to be a potential bioterrorism weapon.

Post exposure prophylaxis (PEP):

Post exposure prophylaxis is not utilized.

Surveillance:

Arrange for active surveillance for animals to maintain a VE free herd; to include any animal that presents with hypersalivation that is a new addition to the herd. Any animal that has oral lesions (vesicles) or has hoof or foot lesions needs to be tested for VE.

C. Laboratory Exposure to Vesicular Stomatitis isolates:

1) Laboratory exposure does not constitute harm at this time

DATA MANAGEMENT AND REPORTING TO THE KDA-DAH

A. Organize and collect data.

B. Report data via the EpiTrax surveillance system.

- All essential data that was collected during the investigation, especially data that helps to confirm or classify a case.

Appendix F-2

Vesicular Exanthema Fact Sheet

Vesicular Exanthema – Fact Sheet

What is Vesicular Exanthema?

Vesicular exanthema is a highly infectious viral disease of swine characterized by fevers and vesicles on the mouth, snout, coronary band and soles of the feet. It affects mainly swine (rarely horses) and sea mammals; it has not shown to be infective to other species. It also closely mimics three other vesicular diseases (foot-and-mouth disease, swine vesicular disease, vesicular stomatitis). The geographic distribution is variable depending on the outbreak, but vesicular exanthema was in the United States in the 1950's but intense monitoring and surveillance has led to the disease being eradicated. The United States is currently declared disease free.

How is Vesicular Exanthema Transmitted?

Transmission most likely occurs via one of three different ways; 1) feeding raw garbage to swine that contains infected pork scraps, 2) pig to pig, direct contact with infected swine, 3) swine that come into contact with infected fomites, including humans (on clothing or shoes), vehicles and equipment.

What are the clinical signs of Vesicular Exanthema?

The most common clinical signs will be vesicles and ulcers around the snout, nose, and mouth but may also be present around feet, coronary band, between claws or udder. They start as vesicles and generally rupture to become erosions or ulcers. Excessive salivation is often the only or first clinical sign noticed. Often a fever will be present along with going off-feed. If it is noticed on the udder often mastitis will be seen. Lameness or unwillingness to move is also a common clinical sign due to pain. Weight loss can be severe due to the reluctance to eat.

What is the incubation period for Vesicular Exanthema?

The incubation period is most commonly 24-72 hours after exposure to the virus. Swine will often have a fever and develop vesicles, which subsequently rupture 24-48 hours later; then the swine will have another fever episode anytime from 24-72 hours after the original vesicles rupture. Swine with active infections are more likely to spread disease, but recovered swine may also be undetected carriers of the virus.

How is Vesicular Exanthema detected?

Presumptive diagnosis in swine is based on fever and the presence of vesicles, which break within 24–48 hours to form erosions. Diagnosis can be confirmed by ELISA, reverse transcriptase-PCR, complement-fixation tests, and electron microscopy on epithelial tissue, or after passage in swine tissue cultures. All vesicular exanthema testing must be performed at an approved laboratory and positive results must be reported to state and federal animal health officials.

Which animals have to be tested/screened?

- Animals that are coming from areas where vesicular exanthema is currently endemic
- Animals exhibiting clinical signs
- Import/Export of animals- check with destination location for regulations

What if my animal tests positive for Vesicular Exanthema?

If there is a positive test, vesicular exanthema can be treated with supportive care; more importantly, steps need to be taken in order to prevent further spread. Depending on the severity of the disease and if secondary bacterial infection is present, antibiotics may be utilized as well as medications to help deal with pain control and anti-inflammatories. Quarantine of infected animals is crucial to limit spread and disinfectants need to be used on equipment and supplies. Most animals will clear the disease on their own after a period of time, but, a combination of antibiotics and disinfectants can be used. An epidemiological investigation will need to be completed to determine cause and location of infection.

What will happen to animals in close contact with the animal found to have Vesicular Exanthema?

Animals will need to be quarantined, treated and re-tested. Upon negative test result the animals are free to return to the herd. The epidemiologic investigation will determine the infected animal's movement history and identify other exposed animals. Management practices will be assessed to identify the potential of human spreading disease through use of contaminated equipment. Also, it is not recommended to feed raw garbage to swine.

How can I protect my animals from Vesicular Exanthema?

- Only purchase swine from geographic areas that are considered vesicular exanthema free.
- Healthy animals are more disease resistant so provide good nutrition and regular veterinarian care.
- Isolate new animals for at least 21 days before introducing them into the herd. Immediately isolate any ill animal.

- Implement an effective feed management- no raw garbage included in swine feed.
- Use individual rather than communal feeders, clean and disinfect equipment and feeders regularly.
- On farms where vesicular exanthema has been confirmed, handle healthy animals first, ill animals last.
- Anyone handling infected animals should implement proper biosafety methods, including wearing latex gloves, appropriate protective clothing, shoe covers, etc….
- Any swine that have a fever or vesicles or erosions should be isolated, tested and treated.
- If you are sponsoring an event during an outbreak, require a current health certificate on every animal entering the venue.

This fact sheet is for information only and is not intended for self-diagnosis or as a substitute for consultation.

If you have any questions about the disease described above or think that your animal may have an infection, consult with your veterinarian.

Appendix F-3

Vesicular Exanthema Case Report Template

Case Report Vesicular Exanthema

Demographics

Case #

Investigator-

- Name
- Email
- Phone #

Veterinarian-

- Name
- Address
- Cell #
- Work #
- Email
- Clinic name

Owner-

- Date reported
- Name
- Address
- County
- DOB
- Home #
- Cell #
- Work #
- Email

Any other humans in contact with suspect animal?

- Name
- Address
- Phone
- Date of contact with suspected animal

- Type of contact

Animal Demographics

Species

Breed

Gender

State of Origin

Age at disease onset

Quarantined

Deceased

Was animal euthanized

Were other animals exposed to the suspect animal?

If yes, are they sick or showing the same clinical signs

If no, were they isolated from the suspect animal?

Exposure History

How long has the animal been owned by the current owner?

Was the owner in contact with the saliva or fluid from vesicles of the suspect animal?

Was anyone else in contact with the saliva/fluid of the suspect animal?

Where did owner get animal?

What type of feed is the animal currently receiving?

Where is the owner acquiring the feed?

Other animals that are in contact with currently sick animal? Please describe

If yes, what species, how many, type of contact

Has the animal traveled in the last 60 days?

If yes, please explain where, for what purpose and for how long

Has the animal been treated for the lesions?

If yes, with what (name, dose, concentration and duration)

What date did the clinical signs resolve?

Has this premise had animals with lesions similar to the current ones seen at any point prior to this occurrence?

Laboratory information

Name

Number

Specimen collection date

Specimen collected

Who collected specimen

Name, number

Was personal protection utilized to collect specimens?

If yes, please explain

Name of test

Result of test

Symptomatic

- Vesicles- located where?
  Mouth, muzzle, coronary band, feet, hooves, tongue, hard palate, udder
- Hypersalivation
- Fever
- Anorexic- off feed or water
- Weight loss
- Mastitis
- Lameness
- Other, please explain

Appendix G-1

Vesicular Stomatitis Disease Investigation Guideline

Vesicular Stomatitis

Disease Management and Investigative Guideline

CONTENT:	Version Date:
Investigation Protocol:	
• Investigation Guideline	10/2013
Supporting Materials (found in attachments):	
• Fact Sheet	10/2013
• Case Report Form	10/2013

Vesicular Stomatitis

Disease Management and Investigative Guideline

CASE DEFINITION

Clinical Description for Public Health Surveillance:

Vesicular stomatitis is a viral disease which can affect horses, cattle, swine, and occasionally sheep and goats. Additionally, numerous species of wild animals are susceptible including deer, bobcats and raccoons. The virus causing vesicular stomatitis can also infect humans, or anyone in contact with the infected animals. It most commonly occurs from late spring to late fall in the Southwest region of the United States and is often in proximity to rivers. Blister-like lesions may form in the mouth and on the dental pad, tongue, lips, nostrils, hooves, and teats of infected animals. These vesicles swell and break, leaving very painful open sores. These animals will often go off feed and water, suffer mild-to-severe weight loss, and may show signs of lameness. Aside from the economic loss to livestock producers, vesicular stomatitis is significant because the outward signs are similar to those of foot-and-mouth disease. It is important to remember that horses do not get foot-and-mouth disease. The only method to differentiate between these diseases is through laboratory tests.

Because of the similarity of vesicular stomatitis to foot-and-mouth disease, the potential negative impact on livestock production, and its public health implications, the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS)works to keep this disease from becoming established in the United States. Vesicular stomatitis is recognized internationally as a reportable disease, and exports of livestock, horses, and animal products from the U.S. would be restricted if vesicular stomatitis were allowed to spread here.

Case Classification:

Confirmed: A clinically compatible case that is laboratory confirmed.

- A positive ELISA, complement fixation, virus neutralization or confirmed in culture by immunofluorescence test.

Reverse Transcriptase Polymerase Chain Reaction RT-PCR can also be used.

Suspected: A clinically compatible illness that does not meet the confirmed case definition, but with one of the following:

- Epidemiological link to a documented vesicular stomatitis exposure;
- Evidence of having interaction with animal saliva or fluid from vesicles

Vesicular Stomatitis

Disease Management and Investigative Guideline

LABORATORY ANALYSIS—

1. Detection of the vesicular stomatitis virus (there are two distinct serotypes – Jersey and Indiana) in a clinical specimen (preferably the vesicular fluid, epithelial tags from the lesions, or swabs from the lesions); there are three commonly used serologic tests 1)ELISA, virus neutralization 2)complement fixation and 3) PCR test.

2. Isolation (in cell culture or in a laboratory animal)

A. Human Samples:

- Contact KDHE to coordinate collection and submission of human samples.

B. Animal Testing:

- Please contact the laboratory prior to sending in samples. It is important to handle samples carefully and accurately.

Vesicular Stomatitis

Disease Management and Investigative Guideline

EPIDEMIOLOGY

Vesicular Stomatitis is a viral disease characterized by vesicles and ulcers on the mouth, hooves and udder. It can infect all different species of livestock but most commonly affects horses, cattle and swine. Humans are also susceptible. Currently there are numerous different serotypes that cause vesicular stomatitis, but two main serotypes are important in the United States (Jersey and Indiana); it also closely mimics three vesicular diseases not seen in the USA (foot-and-mouth disease, swine vesicular disease, vesicular exanthema of swine). The geographic distribution is variable depending on the strain. There have been outbreaks in North, Central and South America.

DISEASE OVERVIEW

A. Agent:

The viruses are members of the family Rhabdoviridae and genus Vesiculovirus. They are bullet shaped and composed of a single strand of negative sense RNA.

B. Clinical Description:

Generally there will be a mild fever, but often this isn't seen by the time the animal is observed and examined by a veterinarian. Hypersalivation is often the first sign of disease. Vesicles in the oral cavity are rarely observed due to rupture soon after formation; therefore, ulcers are the most common lesion observed during primary examination. Ulcers and erosions of the oral mucosa, sloughing of the epithelium of the tongue, and lesions at the mucocutaneous junctions of the lips and nostrils are commonly seen in both cattle and horses. Ulcers and erosions on the teats are not uncommon in cattle and may result in secondary cases of mastitis in dairy cows. Erosions at the coronary band are observed in some cattle, horses, and pigs, with subsequent development of lameness. Crusting lesions of the muzzle, ventral abdomen, sheath, and udder of horses have been seen in the outbreaks in the western USA. Anorexia is often seen due to the oral lesions and lameness is often seen due to the hoof or foot lesions; both of these are generally short in duration as the disease is self-limiting with resolution usually happening within 2 weeks. Neutralizing antibodies persist, up to or greater than 5 years, but re-infection can occur.

C. Reservoirs:

The main reservoir is the sand fly, although rodents and non-human primates may also harbor the virus. Grasshoppers have also been implicated as a potential reservoir for the vesicular stomatitis virus in cattle.

D. Mode(s) of Transmission:

Vesicular stomatitis spread is not well understood, however, there are believed to be three main modes of transmission. Insect vectors, mechanical transmission and animal movement or transport are all believed to play a role in the transmission. One type of vesicular stomatitis is known to be spread by sandflies. Once introduced onto a property, the disease apparently moves from animal to animal by contact or exposure to saliva or fluid from ruptured vesicles. Humans can contract vesicular stomatitis by not following proper biosafety practices when handling affected animals. Prevalence of this disease in humans may be under-reported because it is self-limiting and often goes undetected or is misdiagnosed.

E. Incubation Period:

In general, the incubation period is generally 2 to 8 days.

F. Period of Communicability:

Animals have been shown to shed the virus in their saliva and from the fluid in the vesicles as they rupture; once these vesicles are healed they generally are not infective. Humans need to utilize proper biosecurity and quarantine when handling infected animals for 30 days after the last clinical sign is seen

G. Susceptibility and Resistance:

All mammals are susceptible to vesicular stomatitis; generally pigs have a higher mortality rate as compared to other animals. Generally morbidity is very high and mortality is low.

H. Treatment:

Treatment consists of supportive care, usually antibiotics are prescribed with secondary infections. The lesions are extremely painful and thus pain control medications are often added. In addition, some animals will need to be given soft or wet food to aid in ease of mastication. Some animals, that will tolerate it, will benefit from mild antiseptic

mouth rinses. Good insect control is also beneficial in preventing the spread of vesicular stomatitis. Antiseptic cleaning of the open wounds can also promote healing.

I. Vaccine:

There is no vaccine available in the United States.

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

Vesicular Stomatitis infections shall be designated as infectious or contagious in their nature, and cases or suspect cases shall be reported within 24 hours:

1. Veterinarians and producers: report to KDA-DAH (see below)
2. Laboratories: report to KDA-DAH (see below)

Kansas Department of Agriculture – Division of Animal Health (KDA-DAH)
Phone: 1-785-296-2326
Fax: 1-785-296-1765

Outbreaks, unusual occurrences of VS, should be reported WITHIN 7 days by telephone to 1-785-296-2326.

INVESTIGATOR RESPONSIBILITIES
1) Use current case definition, to confirm diagnosis.
2) Conduct a case investigation to identify potential source of infection.
3) Conduct contact investigation to identify additional cases.
4) Initiate control and prevention measures to prevent spread of disease.
5) Complete and report all information requested via the state electronic surveillance system.
6) As appropriate, use the disease fact sheet to educate individuals or groups.

STANDARD CASE INVESTIGATION AND CONTROL METHODS
Case Investigation
1) Contact the veterinarian who ordered testing of the case and obtain the following information.

- Using the case report form, identify any symptoms of VS:
  - Record onset date
  - Determine if the onset was acute or insidious
- Examine the laboratory testing that was done to ensure all testing that could confirm the case has been reported in Epi-Trax.

Vesicular Stomatitis

Disease Management and Investigative Guideline

- Examine and record the therapy that the case received.
- Collect case demographic data and contact information (birth date, county, sex, addresses for previous year)
- Record outcomes
- Collect mingling history from previous year and note any previous contact with positive VS animals or premises previous documented positive

2) Investigate epi-links among cases (clusters from same facility, county, herd, farm or bloodline, etc…).

Contact Investigation

1) Contacts are those with possible exposure to the source of infection.
2) Examine all potential exposures based on possible sources and potential modes of transmission, investigating surrounding farms, fence-lines, co-mingling possibilities, veterinarian case histories

Isolation, Work and Daycare Restrictions

1) Monitor for any general flu-like symptoms or illness, as well as, if any lesions occur in humans after handling infected animals
2) Humans need to utilize appropriate biosecurity to prevent spread

Case Management

Report when negative test result is found.

Contact Management

1) Other at-risk animals should be quarantined, tested and, if positive, treated. Once clinical signs have passed, animals need to be quarantined for an additional 30 days before allowing them to rejoin the herd.
2) Individuals should test all new animals entering the herd.
3) Care should be taken to prevent iatrogenic transmission: disinfect or sterilize all equipment – including feeders, waterers, halters, lead ropes, etc….

Environmental Measures

1) Maintaining good quality biosecurity standards when handling animals
2) Utilize excellent insect control to help prevent spread of disease
3) Avoid buying and introducing untested animals, especially from endemic locations

Education

1) Educate veterinarians about disinfecting equipment to help prevent iatrogenic transmission.

Vesicular Stomatitis

Disease Management and Investigative Guideline

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:
VS is so rare in the United States that a single case needs to be treated as an outbreak.
1) Notify KDA-DAH (785 296 2326) immediately.
2) Active case finding will be an important part of any investigation.

B. Intentional Contamination

Safety Considerations:

Risks to public health, health care and emergency response personnel are individually significant for disease or illness. VS has not been shown to be a potential bioterrorism weapon.

Post exposure prophylaxis (PEP):

Post exposure prophylaxis is utilized; humans need to contact their physician to determine course of treatment

Surveillance:

Arrange for active surveillance for animals to maintain a VS free herd; to include any animal that presents with hypersalivation that is a new addition to the herd. Any animal that has oral lesions (vesicles) or has hoof or foot lesions needs to be tested for VS especially if located in the Western states (mainly New Mexico).

C. Laboratory Exposure to Vesicular Stomatitis isolates:
1) Laboratory exposure does not constitute harm at this time

DATA MANAGEMENT AND REPORTING TO THE KDA-DAH

A. Organize and collect data.

B. Report data via the EpiTrax surveillance system.
- All essential data that was collected during the investigation, especially data that helps to confirm or classify a case.

Appendix G-2

Vesicular Stomatitis Fact Sheet

Vesicular Stomatitis – Fact Sheet

What is Vesicular Stomatitis?

Vesicular Stomatitis is a viral disease characterized by vesicles and ulcers on the mouth, hooves and udder. It can infect all different species of livestock but most commonly affects horses, cattle and swine. Humans are also susceptible. Currently there are numerous different serotypes that cause vesicular stomatitis, but two main types are important in the Western hemisphere; it also closely mimics three vesicular diseases not seen in the USA (foot-and-mouth disease, swine vesicular disease, vesicular exanthema of swine). The geographic distribution is variable depending on the strain. There have been outbreaks in North, Central and South America.

How is Vesicular Stomatitis Transmitted?

Transmission is not well understood. Most likely it is transmitted via insect vectors (sand flies, blackflies, culicoides midges, mosquitos). Grasshoppers have also been implicated in cattle when ingested. Once it is in a herd, it can be transmitted from animal-to-animal by direct contact; this includes on fomites including milking machines and equipment. Humans most commonly are infected by contact with lesions or secretions from infected animals. They can also get vesicular stomatitis via insect bites and aerosol infection has happened in laboratory settings

What are the clinical signs of Vesicular Stomatitis?

The most common clinical signs will be vesicles, papules, erosion and ulcers usually around the mouth but may also be present around feet, prepuce or udder. They start as vesicles and generally rupture to become erosions or ulcers. Excessive salivation is often the only or first clinical sign noticed. Often a fever will be present along with anorexia. If it is noticed on the udder often mastitis will be seen. In pigs, often times the vesicles start on the feet and the first clinical sign noted will be lameness. These lesions are varied based on the species, but the lesions are painful and will cause animals to go off-feed and not want to drink. Weight loss may be severe and milk production can suddenly drop. Some animals will slough skin around muzzle, mouth or nostrils and there may be extreme bad breath or bleeding from the mouth. Usually vesicular stomatitis will run its course in 2-3 weeks and the animals will recover. There is evidence that pigs are more likely to die with vesicular stomatitis.

What is the incubation period for Vesicular Stomatitis?

The incubation period is most commonly 2-8 days; the virus is easily killed with sunlight, heat and disinfectants, but can live 3-4 days on fomites that have not been properly cleaned.

How is Vesicular Stomatitis detected?

The preferred way to diagnose vesicular stomatitis is to detect the viral antigens. It can be isolated in culture via immunofluorescence, complement fixation or ELISAs as well as electron microscopy can be used. Reverse-transcriptase- polymerase chain reaction (RT-PCR) can also be used; animals will general develop antibodies within 5-8 days post infection. All vesicular stomatitis testing must be performed at an approved laboratory and positive results must be reported to state and federal animal health officials.

Which animals have to be tested/screened?

- Animals that are coming from areas where vesicular stomatitis is currently endemic
- Animals exhibiting clinical signs
- Import/Export of animals- check with destination location for regulations

What if my animal tests positive for Vesicular Stomatitis?

If there is a positive test, vesicular stomatitis can be treated. Depending on the severity of the disease and if infection is present, antibiotics may be utilized as well as medications to help deal with pain control and anti-inflammatories. Quarantine of infected animals is crucial to limit spread and disinfectants need to be used on equipment and supplies. Most animals will clear the disease on their own after a period of time, but usually, a combination of antibiotics and disinfectants is usually used. An epidemiological investigation will need to be completed to determine cause and location of infection.

What will happen to animals in close contact with the animal found to have Vesicular Stomatitis?

Animals will need to be quarantined, treated and re-tested. Upon negative test result the animals will need to be isolated for an additional 30 days to prevent spread. The epidemiologic investigation will determine the infected animal's movement history and identify other exposed animals. Management practices will be assessed to identify the potential of iatrogenic spread of disease through use of contaminated equipment.

How can I protect my animals from Vesicular Stomatitis?

- Only purchase animals from geographic areas that are considered vesicular stomatitis free.
- Healthy animals are more disease resistant so provide good nutrition, regular exercise, deworming and routine vaccinations.
- Isolate new animals for at least 21 days before introducing them into the herd. Immediately isolate any ill animal.
- Implement an effective insect control program; keep stables, barns, and pens clean and dry.
- Use individual rather than communal feeders; clean and disinfect equipment and feeders regularly.
- On farms where VS has been confirmed, handle healthy animals first, ill animals last.
- Anyone handling infected animals should implement proper biosafety methods, including wearing latex gloves.
- If you are sponsoring an event during an outbreak, require a current health certificate on every animal entering the venue.

This fact sheet is for information only and is not intended for self-diagnosis or as a substitute for consultation.

If you have any questions about the disease described above or think that your animal may have an infection, consult with your veterinarian.

Appendix G-3

Vesicular Stomatitis Case Report Template

Case Report Vesicular Stomatitis

Demographics

Case #

Investigator-

- Name
- Email
- Phone #

Veterinarian-

- Name
- Address
- Cell #
- Work #
- Email
- Clinic name

Owner-

- Date reported
- Name
- Address
- County
- DOB
- Home #
- Cell #
- Work #
- Email

Any other humans in contact with suspect animal?

- Name
- Address

- Phone
- Date of contact with suspected animal
- Type of contact

Animal Demographics

Species

Breed

Gender

State of Origin

Age at disease onset

Quarantined

Deceased

Was animal euthanized

Were other animals exposed to the suspect animal

If yes, are they sick or showing the same clinical signs

If no, were they isolated from the suspect animal

Exposure History

How long has the animal been owned by the current owner?

Was the owner in contact with the saliva or fluid from vesicles of the suspect animal?

Was anyone else been in contact with the saliva/fluid of the suspect animal?

Where did owner get animal?

Other animals that are in contact with currently sick animal? Please describe

If yes, what species, how many, type of contact

Has the animal traveled in the last 60 days

If yes, please explain where, for what purpose and for how long

Has the animal been treated for the lesions?

If yes, with what (name, dose, concentration and duration)

What date did the clinical signs resolve?

Was the animal quarantined for an additional 30 days after last seen clinical sign?

Laboratory information

Name

Number

Specimen collection date

Specimen collected

Who collected specimen

Name, number

Was personal protection utilized to collect specimens?

If yes, please explain

Name of test

Result of test

Symptomatic

- Vesicles- located where?
  Mouth, muzzle, coronary band, feet, hooves, tongue, hard palate
- Hypersalivation
- Fever
- Anorexic- off feed or water
- Lameness
- Other, please explain

Appendix H-1

Brucella Disease Investigation Guideline

Brucellosis

Investigation Guideline

Content:	Version Date:
Investigation Protocol:	
Investigation Guideline	10/2013
Supporting Materials found in attachments:	
Fact Sheet	10/2013
Case Report Form	10/2013

Brucellosis

Disease Management and Investigative Guideline

CASE DEFINITION

Clinical Descriptions for Public Health Surveillance:

- An illness characterized by infertility or sudden abortion. Other symptoms include one or more of the following: prolonged mucopurulent vaginal discharge, still births, epididymitis, unwillingness to mate, decreased ejaculate, and recurrent uveitis.

Laboratory Criteria for Case Classification:

- Definitive:
    - Culture and identification of *Brucella* from clinical specimens
    - Evidence of fourfold or greater rise in *Brucella* antibody titer between acute- and convalescent-phase serum specimens obtained greater than or equal to 2 week apart
- Presumptive:
    - Positive reading using 2-mercaptoethanol Rapid Slide Agglutination Test (ME-RSAT); or the Tube Agglutination Test (TAT) with a 1:200 titer reading gives evidence of an acute reading.
    - Detection of *Brucella* DNA in a clinical specimen by polymerase chain reaction (PCR) assay

Case Classification:

- **Confirmed:** A clinically compatible illness with definitive laboratory evidence of *Brucella* Infection/ isolation of *Brucellae* from a clinical specimen by culture
- **Probable:** A clinically compatible case and elevated antibody serology; or detection of *Brucella* nucleic acids in a clinical specimen by amplification of a specific target by polymerase chain reaction assay
- **Suspect:** A clinically compatible case that is epidemiologically linked to a confirmed case.

Brucellosis

Disease Management and Investigative Guideline

EPIDEMIOLOGY

Brucellosis is a zoonotic disease; humans are accidental hosts. There are different species of zoonotic *Brucella,* including *B. melitensis, B. suis, B. abortus* and *B. canis.* There are also two species that are not considered zoonotic (*B. ovis* and *B. neotomae)*. It is most often seen in breeders, veterinarians, laboratory workers, and other people that directly work with susceptible animals. *B. melitensis* primary hosts are sheep and goats and has been considered eradicated from the USA since the early 1970s. Cases will still arise sporadically with humans who have traveled to areas where the disease is present and have consumed unpasteurized dairy products. *B. suis* primary hosts are swine and most commonly will cause a problem if hunters field dress whild hogs. *B. abortus* primary host is cattle and is considered eradicated from the USA except for wild bison/elk located in Yellowstone National Park. *B. canis* primary hosts are canine and is thought to be present in the USA but regularly testing is not commonly completed in the USA. Some beliefs for the low prevalence of canine brucellosis in the United States can be attributed to underreporting. For the canine brucellosis status of other states, refer to the USDA-APHIS monthly reports at http://www.aphis.usda.gov/animal_health/animal_diseases/brucellosis/.

DISEASE OVERVIEW

A. Agent:
Brucella is caused by gram negative non-motile aerobic intracellular coccobacillus. Once in the environment it is susceptible to common household cleaning supplies and direct sunlight.

B. Clinical Description:
Signs include but are not limited to: epididymitis, testicular atrophy, orchitis, scrotal dermatitis, prostatitis, infertility, loss of libido, diskospondylitis, mucosal vaginal secretions, and sudden abortion or reabsorption.

C. Reservoirs:
B. Melitensis hosts are sheep and goats.
B. suis hosts are swine.
B. abortus hosts are cattle.
B. canis has only been known to be acquired from canines.

D. Mode of Transmission:
Transmission occurs through direct contact with infected animals' fluids and/or tissues including: urine, vaginal discharges, aborted fetuses, placentas, milk and ocular fluids. Airborne transmission may occur through inhalation of aerosols in lab settings. Human-to-human transmission has not been known to occur.

E. Incubation Period:
Variable incubation period, ranging from 5-60 days but may be several months; illness most commonly occurs about 1 month after exposure.

F. Period of Communicability:
Animals may be infectious for years.

G. Susceptibility and Resistance:
Susceptibility is determined by occupation; there is no documented case of being resistant.

H. Treatment:
Administer a combination of rifampin or streptomycin and doxycycline for at least 6 weeks in humans. In animals euthanasia is suggested since it has been known for animals to relapse after being treated. Treatment is only permitted in canines and humans.

I. Vaccine:
There is a vaccine available for cattle (OCV) that must be administered by a licensed veterinarian. Each calf must be identified as receiving the vaccination in compliance with state and federal regulations.
There is no vaccine currently available for humans or canines.

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

Brucellosis infections shall be designated as infectious or contagious in their nature, and cases or suspect cases shall be reported within seven days:

1. Health care providers and hospitals: report to the local public health Jurisdiction, KDA-DAH, or KDHE-BEPHI (see below)
2. Local public health jurisdiction: report to KDA-DAH or KDHE-BEPHI (see below)
3. Laboratories: report to KDA-DAH or KDHE-BEPHI (see below)
4. KDA-DAH or KDHE-BEPHI will contact the local public health jurisdiction by phone within one hour of receiving any suspected brucellosis report.

Kansas Department of Agriculture – Division of Animal Health (KDA-DAH)
Phone: 1-785-296-2326
Fax: 1-785-296-1765

Brucellosis

Disease Management and Investigative Guideline

Kansas Department of Health and Environment (KDHE)
Bureau of Epidemiology and Public Health Informatics (BEPHI)
Phone: 1-877-427-7317
Fax: 1-877-427-7318

Outbreaks, unusual occurrences of brucellosis, and suspect acts of terrorism should be reported WITHIN 4 HOURS by telephone to 1-877-427-7317.

Further responsibilities of state and local health departments to the CDC:

As a nationally notifiable condition, ***multiple brucellosis cases that are temporally/spatially clustered*** *require an* IMMEDIATE, URGENT *report to the Center of Disease Control and Prevention (CDC).*

INVESTIGATOR RESPONSIBILITIES

1) Use current case definition, to confirm diagnosis with the medical provider.
2) Conduct a case investigation to identify potential source of infection.
3) Conduct contact investigation to identify additional cases.
4) Identify whether the source of infection is major public health concern.
5) Initiate control and prevention measures to prevent spread of disease.
6) Complete and report all information requested via the state electronic surveillance system.
7) As appropriate, use the disease fact sheet to educate individuals or groups.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Case Investigation

1) Contact the veterinarian who ordered testing of the case and obtain the following information. (This includes medical records for hospitalized patients.)

- Using the case report form, identify any symptoms of brucellosis:
  - Record onset date (if a reoccurrence – record the earliest onset date)
  - Record the duration of the current illness in weeks
  - Determine if the onset was acute or insidious, recording symptoms
- Examine the laboratory testing that was done to ensure all testing that could confirm the case has been reported in Epi-Trax.
- Examine and record the therapy that the case received, if any.
- Collect owner's demographic data and contact information (birth date, county, sex, occupation, address, phone number(s))
- Record outcomes: recovered or date of death

2) Interview the owner to determine source and risk factors; focus on a 6 month incubation period prior to illness onset.
   - Occupation: Laboratory worker, veterinarian, or persons handling animals and animal by-products
   - Travel to *Brucella* endemic areas (i.e., the Mediterranean Basin, South and Central America, Eastern Europe, Asia, Africa, Caribbean and Middle East)
   - Contact with potentially infected animals or their tissues, particularly postpartum fluid or tissues;
     − Potential contact with cattle, swine, goats, sheep, horses, and dogs

3) Investigate epi-links among cases (clusters, household, co-workers, etc).
   - For suspected outbreaks refer to Managing Special Situations section.

Contact Management- in humans

1) Symptomatic acquaintances, household members, associates, or co-workers should be strongly urged to contact their physician for a medical evaluation.
2) Broader symptoms of brucellosis should be passively monitored for six months from the last exposure. Broader symptoms include:
   - Acute: fever, chills, headache, low back pain, joint pain, malaise, diarrhea
   - Sub-Acute: malaise, muscle pain, headache, neck pain, fever, sweats
   - Chronic: anorexia, weight loss, abdominal pain, joint pain, depression, constipation
3) Recommend PEP to those contacts with high-risk exposures to *Brucella*:
4) For laboratory personnel refer to managing special situations.

Environmental Measures

1) Exercise care when handling placenta and fetus from aborted animals.
2) Disinfect contaminated areas with a bleach solution or other commercial disinfectant.

Education

1) Educate high-risk workers (i.e., veterinarians, kennel breeder etc.) about the risk of brucellosis and stress methods to reduce occupational exposure such as proper ventilation, appropriate carcass disposal and barrier precautions.

MANAGING SPECIAL SITUATIONS

Brucellosis

Disease Management and Investigative Guideline

A. Outbreak Investigation:

There are no formal outbreak definitions; however, the investigator may consider the possibility of an outbreak when there is an unusual clustering of cases in time and/or space.
1) Notify KDA-DAH (785 296 2326) or KDHE (1-877-427-7317) immediately.
2) Active case finding will be an important part of any investigation.

B. Intentional Contamination

Brucella is a potential bioterrorism weapon. If the case has no known exposures or is not employed in an occupation that is prone to exposure, then consider a bioterrorist event. An attack may take the form of dissemination of an aerosol among a large gathering of people or by the contamination of food or water. Because the laboratory confirmation could be delayed, specific epidemiological, clinical, and microbiological findings that suggest an intentional release of *brucella* should result in the issue of a health alert.
If suspected:
1) Notify local law enforcement, the local Health Officer, the on-call epidemiologist (local) and KDHE (1-877-427-7317) immediately.
2) Implement "Chain of Custody" procedures for all samples collected, as they will be considered evidence in a criminal investigation.
3) Work to define population at risk which is essential to guide response activities. Public health authorities will play the lead role in this effort, but must consult with law enforcement, emergency response and other professionals in the process. The definition may have to be re-evaluated and redefined at various steps in the investigation and response.
4) Once the mechanism and scope of delivery has been defined, identify symptomatic and asymptomatic individuals among the exposed and recommend treatment and/or chemoprophylaxis.
5) Establish and maintain a detailed line listing of all cases and contacts with accurate identifying and locating information.

Diagnosis:

- Veterinarians who suspect brucellosis should promptly collect blood or bone marrow for culture. Liver, spleen, joint fluid and abscesses can also be cultured. Serum collected for serologic diagnosis, requires an acute specimen collected as soon as possible after onset and a convalescent phase specimen should be collected > 14 days after the acute specimen.
- Alert the laboratory to the possibility of *Brucella* and need for special safety procedures.
- Serology and Rapid Testing: The standard laboratory test for *Brucella* antibody is the tube agglutination test, but the more rapid simple slide agglutination test is

commonly used in commercial and hospital laboratories. The slide agglutination test is 97%--100% sensitive and may be as low as 88% specific. If used in a population with a low prevalence of disease, the risk for a false-positive result is high. Therefore, diagnostic laboratory testing should be integrated with epidemiologic investigation when assessing potential covert biological terrorism events to rule out false positive laboratory findings. PCR and ELISA testing may also be available.

- Biopsy specimens: *Brucella spp.* can be identified through direct examination of biopsy specimens using direct fluorescent antibody stains.
- Cultures: *Brucella spp.* will grow only in aerobic blood culture bottles after 2-4 days; followed by isolation as typical colonies on BAP and CHOC within 48 hours. Presumptively identified as a small, gram-negative coccobacilli that is oxidase, catalase and urea positive. Confirmatory identification is made by agglutination with specific antiserum in a reference laboratory.

Treatment:

- Drug-resistant organisms might be used as a weapon-~~,~~ conduct antimicrobial susceptibility testing quickly and alter treatments as needed.

Post exposure prophylaxis (PEP):

- In most brucellosis threat situations post exposure prophylaxis is not recommended. However, if the level of suspicion is high, exposed individuals may begin antimicrobial therapy if a definitive determination cannot be made within 5 days.

Surveillance:

- Arrange for active surveillance for 4 weeks for the development of febrile illness and 6 months of passive monitoring for other signs and symptoms of brucellosis among all animals exposed.

C. Laboratory Exposure to *Brucella* isolates:

1) Determine number of workers exposed to *Brucella* isolates and classify exposures into high- and low-risk.
2) Recommend PEP for workers with high-risk exposures to *Brucella*.
3) Discuss PEP with workers with only low-risk exposures.
4) Obtain baseline serum samples from all workers as soon as possible after potential *Brucella* exposure is recognized.
5) Arrange for serologic testing on all workers exposed at 2, 4, 6, and 24 weeks post exposure using agglutination test.

6) Arrange for regular active surveillance for the development of febrile illness (for 4 weeks) or other signs and symptoms of brucellosis (for 6 months).

DATA MANAGEMENT AND REPORTING TO THE KDA-DAH & KDHE

A. Organize and collect data.

B. Report data via the Kansas electronic surveillance system.

- All essential data that was collected during the investigation, especially data that helps to confirm or classify a case.

Appendix H-2

Brucella Fact Sheet

Brucella – Fact Sheet

What is Brucellosis?

Brucellosis is the diseased caused by the *Brucella* bacteria. It is mainly a disease of animals but can be transmitted to humans. The most common animals to be infected with Brucella are cattle, swine and bison. It is endemic in some countries; it can be spread by drinking raw milk or eating unpasteurized cheeses. It is not common in the USA, but a small reservoir is seen in the herd of wild bison/elk in Yellowstone

How is *Brucella* Transmitted?

Most animals get *Brucella* by artificial insemination or natural breeding with an infected animal. They also get it through direct contact with a contaminated environment or from eating contaminated feed. Cows will often lick the placenta and aborted fetuses and spread *Brucella*. It can also be transmitted to calves through infected milk. The spread from one premise to another premise often occurs by bringing on new animals that were previously infected with *Brucella*. Dogs can also get *Brucella* from inhaling or licking infected fetal membranes or urine. People can be exposed by eating contaminated food, by inhalation or getting the bacteria into a wound. Most commonly people will be exposed by eating unpasteurized cheese or drinking raw milk. Inhalation can be an issue for high risk occupations such as veterinarians, slaughterhouse or laboratory workers.

What are the clinical signs of Brucellosis?

The bacteria thrives in the reproductive tract. *Brucella* will primarily cause infertility, weak born animals, retained placentas and abortions. In cattle, most commonly abortion will happen with heifers and usually between 5-7 months of gestation; these cows will typically carry future pregnancies full term. Males may develop scrotal inflammation, go off feed, have a fever and act lethargic. Sometimes horses will develop and open sore in the withers region. In dogs, brucellosis can cause abortion, enlarged spleen and lymph nodes, eye, kidney and spinal disc inflammation and multiple-joint arthritis. Many animals may not show clinical signs. In humans, clinical signs are often flu-like with long-term recurrent fevers, joint pain and fatigue.

What is the incubation period for Brucellosis?

The incubation period is variable and can ranges from 2 weeks to over a year. Most commonly there will be a positive reaction to the test within 30-60 days after infection.

How is *Brucella* detected?

The most commonly used tests for *Brucella* are the blood agglutination test and the card test. These can be done in the field and are utilizing antigen containing dead *Brucella* organisms; these tests are reliable, quick and easy to use. There are other testing options available and involve culturing *Brucella* organisms from infected tissues, milks or aborted calves. Direct culture of the organism from a dead puppy or blood can be used in dogs, but is sometimes difficult. All *Brucella* testing must be performed by a licensed veterinarian utilizing an approved laboratory (if culturing) and positive results must be reported to state and federal animal health officials.

Which animals have to be tested/screened?

- All cattle/bison over the age of 6 months except steers and any spayed females.
- Any dogs that abort late in gestation (usually 45-60 days)
- Active stud dogs especially if part of a large kennel
- Any animal exhibiting clinical signs
- Any animals coming from an endemic area

What if my animal tests positive for *Brucella*?

If there is a positive test, *Brucella* cannot be treated in livestock. Some animals will recover after a period of time, but most commonly the clinical signs disappear but animals remain infected. These animals are dangerous sources of infection for animals they may mingle or mate with. For cattle, there is a vaccine that can be given. There was a vaccine in cattle called strain 19 that was utilized for many years, but a newer vaccine has been approved called RB51. It has less adverse side effects than strain 19 and doesn't interfere with antibodies produced on the testing used. This vaccine is most commonly given between 4-6 months of age and the animal is tattoed/ear tagged.. It also has to be administered by a licensed veterinarian. RB51 is currently approved for cattle only. In dogs, there is no effective treatment or vaccine. One way to help prevent sexual transmission of the disease is to have your pet spayed or neutered. For all animals, the only permanent way to stop the disease from spreading is euthanasia.

How can I protect my animals from *Brucella*?

- Obtain a negative *Brucella* test before purchasing a new animal to confirm a negative disease status and to reduce the risk of disease entry onto the premises
- Only purchase animals from geographic areas that are considered *Brucella* free, quarantine and re-test animals once on your premise
- Disinfect or sterilize all equipment, instruments and premises
- Utilize appropriate sanitation procedures and pasteurization of milk
- Vaccination

This fact sheet is for information only and is not intended for self-diagnosis or as a substitute for consultation.

If you have any questions about the disease described above or think that your animal may have an infection, consult with your veterinarian.

Appendix H-3

Brucella Case Report Template

Case Report : *Brucella*

Demographics

Case #

Investigator-

- Name
- Email
- Phone #

Veterinarian-

- Name
- Address
- Cell #
- Work #
- Email
- Clinic name

Owner-

- Date reported
- Name
- Address
- County
- Home #
- Cell #
- Work #
- Email

Animal Demographics

Species

Breed

Gender

Age at diagnosis

State of Origin

County of Origin

Quarantined

If yes, how long? start date of quarantine?

Is this the first time *Brucella* has been diagnosed on this premises

Were other animals exposed to the suspect animal

If yes, have they been tested for *Brucella*

Results and testing protocols utilized

If no, were all other animals isolated from the suspect animal

<u>Exposure History</u>

How long has the animal been owned by the current owner?

Where did owner get animal?

If previously owned – please provide history of name, address and phone of previous owner(s)

Has the suspect animal been in contact with any other species of animals?

Has the animal mated with another animal?

-If yes, when and what other animal?

- Are those animals ill?

Who has handled the suspect animal?

-Name, contact information

Was the animal on any medications at the time of testing

If yes, name, dose, concentration, duration

At a positive diagnosis, was the animal treated

If yes, treatment type, dose, concentration and duration

Currently being treated

Has the animal been vaccinated for *Brucella*

Has the animal been sent to slaughter or euthanized

Is the animal symptomatic

- Abortion
- Vaginal discharge
- Weak born animals
- Still birth
- Pyometra
- Infertility
- Epididymitis
- UTI
- Fever
- Lethargy
- Diskospondylitis
- Ocular lesions
- Enlarged lymph nodes
- Other, please explain

Laboratory information

Name

Number

Specimen collection date

Specimen collected

Who collected specimen

- Name, number

How was specimen collected- please be very specific

- Was specimen kept in an incubator or warmed
- How long between sample collect and submission

Name of test

Result of test

- Organism name
- Organism species
- Organism serotype or serogroup (if known)

Appendix I-1

Tuberculosis Disease Investigation Guideline

Tuberculosis

Investigation Guideline

Content:	Version Date:
Investigation Protocol:	
Investigation Guideline	10/2013
Supporting Materials found in attachments:	
Fact Sheet	10/2013
Case Report Form	10/2013

Tuberculosis

Disease Management and Investigative Guideline

CASE DEFINITION

Clinical Descriptions for Public Health Surveillance:

- Tuberculosis is a contagious disease caused by an infection in the lymph nodes which is then spread to other organs like the lungs. This disease can infect all mammals, and before control measures were adopted, was one of the major diseases of domestic animals and humans. Bovine tuberculosis is a disease caused by the bacterium *Mycobacterium bovis*. It can infect many species of animals; cattle and bison most commonly. Bovine tuberculosis can spread to humans even though human cases are most commonly caused by *Mycobacterium tuberculosis*. Tuberculosis is common in developing countries, a source of economic loss, and a serious health threat to humans.

Laboratory Criteria for Case Classification:

- Definitive:
  - Culture and identification of *M. bovis* from clinical specimens
  - Detection of *M. bovis* DNA in a clinical specimen by polymerase chain reaction (PCR) assay

- Presumptive:
  - Positive tuberculin skin fold test
  - Gamma interferon test

Case Classification:

- **Confirmed:** A clinically compatible illness with definitive laboratory evidence of Tuberculosis Infection/ isolation of *M. bovis* from a clinical specimen by culture
- **Probable:** A clinically compatible case and elevated antibody serology; or detection of *M. bovis* nucleic acids in a clinical specimen by amplification of a specific target by polymerase chain reaction assay
- **Suspect:** A clinically compatible case that is epidemiologically linked to a confirmed case.

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EPIDEMIOLOGY

Tuberculosis is an infectious, granulomatous disease and is considered one of the oldest recognized diseases in the world. About 1/3 of the human population are infected with tuberculosis (TB). Tuberculosis in animals is a worldwide problem; in the USA there has been a subtle resurgence of the TB in a few species of wild animals (white tail deer, foxes, coyotes, bobcats and opossums). Tuberculosis is a zoonotic disease; humans are accidental hosts of the cattle *M. bovis* species. There are different species of zoonotic *Tuberculosis,* including *M.bovis, M. tuberculosis and M. avium-intracellulare.* Tuberculosis can be either chronic or rapidly progressive, with a wide variety of clinical signs depending on the species infected. In cattle (most common species infected) the disease can remain latent until it is in the final stages or not diagnosed until necropsy. This allows the disease to remain in the environment and have a prolonged period of transmission.

DISEASE OVERVIEW

J. Agent:

Mycobacteria are non-motile, rod shaped, obligate aerobic bacteria classified as acid fast because they have thick, waxy cell walls that are impermeable to stains and dyes. There are more than 120 species and most are not considered pathogenic.

K. Clinical Description:

Signs include but are not limited to: progressive weakness, anorexia, cough, difficulty breathing, lymphadenitis, draining sinus tracks, diarrhea and constipation.

L. Reservoirs:

M. bovis hosts are variable,(usually cattle, bison and humans).
M. avium hosts are birds.
M. tuberculosis hosts are humans.
M. caprae hosts are goats, cattle, pigs and humans.

M. Mode of Transmission:

Transmission occurs through inhalation of infected droplets. It can also occur through direct contact with infected animals' fluids and/or tissues. Airborne transmission may occur through inhalation of aerosols in lab settings. Ingestion is another route of transmission through sharing of feeders, waterers or other equipment.

N. Incubation Period:

Variable incubation period, ranging from 7 to 60 days, but may be several months; illness is extremely variable. Many animals will be infected but may never show clinical signs.

O. Period of Communicability:
Animals may be infectious for years.

P. Susceptibility and Resistance:
Susceptibility in humans is determined by occupation; there is no documented case of being resistant to the bacterium.

Q. Treatment:
Treatment is not recommended for animals and slaughter is advised. In non-herd situations, like a zoo animal, or where the animal is considered a significant economic loss pharmacotherapy has and can be used.

R. Vaccine:
There is no vaccine currently available.

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

Tuberculosis infections shall be designated as infectious or contagious in their nature, and cases or suspect cases shall be reported within seven days:

1. Health care providers and hospitals: report to the local public health Jurisdiction, KDA-DAH, or KDHE-BEPHI (see below)
2. Local public health jurisdiction: report to KDA-DAH or KDHE-BEPHI (see below)
3. Laboratories: report to KDA-DAH or KDHE-BEPHI (see below)
4. KDA-DAH or KDHE-BEPHI will contact the local public health jurisdiction by phone within one hour of receiving any suspected tuberculosis report.

Kansas Department of Agriculture – Division of Animal Health (KDA-DAH)
Phone: 1-785-296-2326
Fax: 1-785-296-1765

Kansas Department of Health and Environment (KDHE)
Bureau of Epidemiology and Public Health Informatics (BEPHI)
Phone: 1-877-427-7317
Fax: 1-877-427-7318

Outbreaks, unusual occurrences of ~~brucellosis~~tuberculosis, and suspect acts of terrorism should be reported WITHIN 4 HOURS by telephone to 1-877-427-7317.

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INVESTIGATOR RESPONSIBILITIES

1) Use current case definition, to confirm diagnosis with the medical provider.
2) Conduct a case investigation to identify potential source of infection.
3) Conduct contact investigation to identify additional cases.
4) Identify whether the source of infection is major public health concern.
5) Initiate control and prevention measures to prevent spread of disease.
6) Complete and report all information requested via the state electronic surveillance system.
7) As appropriate, use the disease fact sheet to educate individuals or groups.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Case Investigation

1) Contact the veterinarian who ordered testing of the case and obtain the following information. (This includes medical records for hospitalized patients.)

- Using the case report form, identify any symptoms of tuberculosis:
  - Record onset date (if a reoccurrence – record the earliest onset date)
  - Record the duration of the current illness in weeks
  - Determine if the onset was acute or insidious, recording symptoms
- Examine the laboratory testing that was done to ensure all testing that could confirm the case has been reported in Epi-Trax.
- Examine and record the therapy that the case received, if any.
- Collect owner's demographic data and contact information (birth date, county, sex, occupation, address, phone number(s))
- Record outcomes: recovered or date of death

2) Interview the owner to determine source and risk factors; focus on a 6 month incubation period prior to illness onset.

- Occupation: Laboratory worker, veterinarian, or persons handling animals and animal by-products
- Contact with potentially infected animals or their tissues

3) Investigate epi-links among cases (clusters, household, co-workers, etc).

- For suspected outbreaks refer to Managing Special Situations section.

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Contact Management

1) Symptomatic acquaintances, household members, associates, or co-workers should be strongly urged to contact their physician for a medical evaluation.

Environmental Measures

1) Exercise care when handling suspect animals.
2) Disinfect contaminated areas with a bleach solution or other commercial disinfectant.

Education

1) Educate high-risk workers (i.e., veterinarians, owners, handlers, etc.) about the risk of tuberculosis and stress methods to reduce occupational exposure such as proper ventilation, appropriate carcass disposal and barrier precautions.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

There are no formal outbreak definitions; however, the investigator may consider the possibility of an outbreak when there is an unusual clustering of cases in time and/or space.
1) Notify KDA-DAH (785 296 2326) or KDHE (1-877-427-7317) immediately.
2) Active case finding will be an important part of any investigation.

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Diagnosis:

- Veterinarians who suspect brucellosis should promptly collect samples for culture
- Alert the laboratory to the possibility of *Tuberculosis* and need for safety procedures.
- Detection of *M. bovis* DNA in a clinical specimen by polymerase chain reaction (PCR) assay
- A suspect case is a case that is epidemiologically linked to a confirmed case.

Treatment:

No treatment is suggested.

C. Laboratory Exposure to *Tuberculosis* isolates:

1) Determine number of workers exposed to isolates and classify exposures into high- and low-risk.
2) Recommend PEP for workers with high-risk exposures to *Tuberculosis.*
3) Discuss PEP with workers with only low-risk exposures.
4) Obtain baseline serum samples from all workers as soon as possible after potential Tuberculosis exposure is recognized.
5) Arrange for regular active surveillance for the development of febrile illness (for 4 weeks) or other signs and symptoms of tuberculosis(for 12 months).

DATA MANAGEMENT AND REPORTING TO THE KDA-DAH & KDHE

A. Organize and collect data.

B. Report data via the Kansas electronic surveillance system.

• All essential data that was collected during the investigation, especially data that helps to confirm or classify a case.

Appendix I-2

Tuberculosis Fact Sheet

Tuberculosis Fact Sheet

Introduction

Tuberculosis is a contagious disease caused by an infection in the lymph nodes which is then spread to other organs like the lungs. This disease can infect all mammals, and before control measures were adopted, was one of the major diseases of humans and domestic animals.

Transmission

Transmission in cattle typically occurs by inhalation; cattle with lung lesions will cough and spew infected airborne droplets. Herd mates will inhale these droplets and become infected. Cattle can also become infected by using contaminated feeders and waterers. Baby calves can acquire the infection via milk from infected mothers. The movement of infected cattle into different herds is the most common way the disease spreads. Cattle that have prolonged close contact have an increased risk. Bovine tuberculosis can produce infection in humans even though most human tuberculosis infections are caused by a different subspecies. Anyone who is in close contact (owners, handlers, veterinarians) with infected cattle can become infected. In suspect human infections, their physician should be contacted.

Clinical Signs in Ruminants

Bovine tuberculosis is usually a slowly progressive and debilitating disease, but can occasionally have a quick onset and progress rapidly. Early stages of the infection often show no signs. As the disease progresses, weight loss, lack of appetite, weakness, and a low-grade fever are common. If the disease involves the lungs, animals will have a cough that is worse in the morning, during cold weather or activity, and they may have difficulty breathing. If the digestive tract is involved, animals may develop diarrhea that comes and goes or may become constipated. Ruminants are the most susceptible to tuberculosis. Infections have also been described in many other animals including sheep, goats, horses, pigs, deer, dogs, cats.

Diagnosis and Treatment

Cattle are usually screened/diagnosed via the tuberculin skin test or through PCR testing. Tuberculosis is a federally regulated disease and veterinarians must report suspected cases. Animals in states where there has been TB diagnosed in the last year have to perform a skin test to see if they have been exposed. If the animal is found positive, slaughter is recommended and an epidemiological investigation will need to be completed. Some wild animal species (e.g. deer, elk) can serve as reservoirs for bovine tuberculosis, so limit their contact with cattle. There is not an effective vaccine and treatment is not advisable.

Control

- Quarantine of the premises should be instituted immediately
- Positive animals should be sent to slaughter
- Appropriate decontamination of pens, panels and equipment
- Isolate other sick animals

- Test all animals prior to adding them to your herd
- Continue testing before quarantine is released if not all animals are euthanized

This fact sheet is for information only and is not intended for self-diagnosis or as a substitute for consultation. If you have any questions about the disease described above or think that your animal may have an infection, consult with your veterinarian.

Appendix I-3

Tuberculosis Case Report Template

Case Report Tuberculosis

Demographics

Case #

Investigator-

- Name
- Email
- Phone #

Veterinarian-

- Name
- Address
- Cell #
- Work #
- Email
- Clinic name

Owner-

- Date reported
- Name
- Address
- County
- DOB
- Home #
- Cell #
- Work #
- Email
- Gender
- Primary language

Other Contacts-

Any other humans in contact with suspect animal?

- Name
- Address
- Phone
- Date of contact with suspected animal
- Type of contact

Animal Demographics

Species

Breed

Gender

State of Origin

Age at disease onset

Quarantined

Deceased

Was animal euthanized-

Was animal sent to slaughter-

Were other animals exposed to the suspect animal

If yes, are they sick or showing the same clinical signs

If no, were they isolated from the suspect animal

Are other animals eating or have access to the same feeders, waters or other equipment as the suspect animal?

Exposure History

How long has the animal been owned by the current owner?

Where did owner get animal?

Other animals that are in contact with currently sick or dead animal? Please describe

If yes, what species, how many, type of contact

Other animals with the same or similar clinical signs

If yes, please complete an additional form for each animal

Any other animals before now (days, week, months, years) become sick or die with similar clinical signs

Where has the animal been housed, located or pastured for the last 60 days

Has the animal traveled in the last 60 days

If yes, please explain where, for what purpose and for how long

Is there any known illness in humans that have handled or been around the animal

If the animal died, was a necropsy preformed?

Results or what was found?

If yes, please list name, address, phone of who completed necropsy

Laboratory information

Name

Number

Specimen collection date

Specimen collected

Who collected specimen

Name, number

Was personal protection utilized to collect specimens?

If yes, please explain

Name of test

Result of test

Date medical care sought

Symptomatic:

- weakness
- Hacking cough
- Difficulty breathing
- Fever
- Depression
- Lymphadenopathy
- Off feed
- Weight loss
- Constipation
- Chronic diarrhea
- Mucus discharge from nose
- Rapid decrease in milk production
- Other, please explain