Modernizing Animal Disease Reporting in the state of Kansas

Presented by: Mychal Davis
7/1/13
Overview

- Background
- Objectives
- Methods
- Results
- Discussion
- Conclusion
Background
Kansas Department of Agriculture (KDA)

- Agricultural Commodities Assurance Program
- Agricultural Laboratory
- Agricultural Marketing, Advocacy and Outreach Team
- Dairy in Kansas
- Dairy Inspection
- Division of Animal Health (DAH)
- Division of Conservation
- Division of Water Resources
- Emergency Management
- Food Safety and Lodging
- Grain Warehouse
- Meat and Poultry Inspection
- Pesticide and Fertilizer
- Plant Protection and Weed Control
- Weight & Measures
Division of Animal Health

- Created in 1969
- Three programs
  - Animal Disease Control and Traceability
  - Brands
  - Animal Facilities Inspection
Animal Disease Control and Traceability

- Purpose is to eradicate infectious disease in livestock in the state of Kansas
- Monitors at risk animals
- Composed of veterinarians, field inspectors, and office staff
- Kansas livestock are considered free of the following: Brucellosis (*B. abortus* & *B. melitensis*), Pseudorabies, and Tuberculosis
Brand Program

- Identify lost, stolen, or stray livestock
- Over 18,000 registries in the state of Kansas

*Photo courtesy of helpformylife.org*
Animal Facilities Inspections

- Authorized from the Kansas Pet Animal Act
- Licenses and inspects companion animal facilities
  - Kennels, Boarding facilities, Pet shops, etc.

*Photo courtesy of Creature Comforts*
Kansas Department of Health and Environment (KDHE)

- Environment
- Health Care Finance
- Laboratories
- Public Health
Bureau of Epidemiology and Public Health Informatics

- **Purpose:** collect, analyze, and interpret data that provide information on a variety of conditions of public health importance and on the health of the population
- **Infectious Disease Epidemiology and Response (IDER)**
Infectious Disease Epidemiology and Response

- Conducts surveillance and outbreak investigations
- Provides expertise on reportable diseases
KDHE Epidemiology Rounds

- Reports
- Discussions
- Range: 15mins – 60mins
Disease Reporting

- Make results visible to the public
- Standardize reporting methods
- Outline authority

*K Photo courtesy of KDHE*
# Disease Surveillance

<table>
<thead>
<tr>
<th>Humans</th>
<th>Animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic</td>
<td>Paper based</td>
</tr>
<tr>
<td>Accessible</td>
<td>Moving Towards Electronic</td>
</tr>
<tr>
<td>Annually Revised</td>
<td>Complaint Based</td>
</tr>
</tbody>
</table>
Field Experience

*Photo Courtesy of Kansas Office of the Securities Commissioner*
Zoonosis

- Disease that can be transmitted to humans from animals

*Photo courtesy of Texas Department of State Health Services*
Zoonotic Reportable Diseases in Kansas

- The following diseases are reportable to both DAH (in animals) and KDHE (in humans):
  - Anthrax
  - Brucellosis
  - Rabies
  - Tuberculosis

*Photo courtesy of Department for Environment, Food & Rural Affairs
*Photo courtesy of EHS
Species of *Brucella*

- *B. melitensis* (sheep and goats)
- *B. abortus* (cattle)
- *B. suis* (swine)
- *B. neotomea* (rodents)
- *B. canis* (dogs)
- *B. ovis* (sheep)

*Photo courtesy of The Hunting Dog*
Brucella canis (Canine Brucellosis)

- Etiology
- Transmission
- Clinical signs
Etiology

- First case of human infection diagnosed in 1966
- Facultative intracellular pathogen
- Gram negative coccobacillus
Transmission

- Sexually (Canines)
- Aerosol (Laboratory)
- Bodily Fluids
  - Milk, Ocular, Urine, Semen, etc.
- Placenta
- Fetus
## Clinical Signs

<table>
<thead>
<tr>
<th>Canines</th>
<th>Humans</th>
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</thead>
<tbody>
<tr>
<td>Infertility</td>
<td>Fever</td>
</tr>
<tr>
<td>Sudden Abortion</td>
<td>Chills</td>
</tr>
<tr>
<td>Vaginal Discharge</td>
<td>Lethargy</td>
</tr>
<tr>
<td>Epididymitis</td>
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</table>

* Photo courtesy of Center for Food Security & Public Health
## Testing Procedures in Canines

<table>
<thead>
<tr>
<th></th>
<th>Test</th>
<th>Price</th>
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<tbody>
<tr>
<td><strong>K-State Diagnostic Lab</strong></td>
<td>Card Agglutination*</td>
<td>$25.00 per sample</td>
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<tr>
<td></td>
<td>Blood</td>
<td>$2.50 per sample</td>
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<tr>
<td><strong>Missouri Diagnostic Lab</strong></td>
<td>Tissue Culture</td>
<td>$8.00 per sample</td>
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<tr>
<td></td>
<td>Card Agglutination</td>
<td>$5.00 per sample</td>
</tr>
<tr>
<td></td>
<td>Tube Agglutination Test</td>
<td>1-10 samples $5.00</td>
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</table>
Testing Procedures in Humans

- Culture
- Serological Test
  - Enzyme-linked immunosorbent assay (ELISA)
  - Polymerase chain reaction (PCR)
Colony Morphology

*B. abortus*  
* Photo courtesy of Encyclopedia of Life

*B. canis*  
* Photo courtesy of National Institute of Infectious Diseases
Treatments in Canines

- Isolation
- Antibiotics
- Euthanasia (Recommended)
Objectives
Create Disease Investigative Guideline (D.I.G.) *(B. canis)*

Develop Disease Reporting Template *(B. canis)*

Produce Joint Reportable Disease Guide
Methods
Gathered positive cases of *B. canis* retrospectively that were reported to KDA from 2007–2012

Conducted literature review of *B. canis* protocols from other states and scientific journals

Complied descriptive factors of *B. canis*
Results
Retrospective Case Study

- Identify 5 case reports of *B. canis* from 2007–2012
- Data was maintained in hand written paper files
- No standardized form for reporting *B. canis*
<table>
<thead>
<tr>
<th>Case</th>
<th>Year</th>
<th>Female</th>
<th>Male</th>
<th>Tested</th>
<th>True +</th>
<th>Neutered/Spayed</th>
<th>Euthanized</th>
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<tr>
<td>1</td>
<td>2007</td>
<td>19</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>0</td>
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<tr>
<td>2</td>
<td>2008</td>
<td>145</td>
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<td>16</td>
<td>1</td>
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<tr>
<td>3</td>
<td>2009</td>
<td>60</td>
<td>15</td>
<td>75</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>4</td>
<td>2012</td>
<td>106</td>
<td>42</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>?</td>
</tr>
<tr>
<td>5</td>
<td>2012</td>
<td>40</td>
<td>7</td>
<td>31</td>
<td>13</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>370</td>
<td>119</td>
<td>132</td>
<td>22</td>
<td>8</td>
<td>14</td>
</tr>
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</table>
Canine Brucellosis Reporting Template

- Created in Electronic Database Program (Epi–Trax)
- Database is secure and restricted
- Template can be made into a PDF and printed off for accessibility
B. Canis Disease Investigative Guideline

- Creates case definition and classification
- Provides background information
- Comes with educational material for public

* Photo courtesy of KDHE
Canine Brucellosis (D.I.G.)

- **CASE DEFINITION**
- Clinical Description for Surveillance:
  - An illness characterized by infertility or sudden abortion in canines. Other signs include one or more of the following: prolonged mucus discharge from the vagina, still births, epididymitis, unwillingness to mate, decreased ejaculate, or recurrent uveitis.
  - Detection of *Brucella* DNA in a clinical specimen by polymerase chain reaction (PCR) assay
Canine Brucellosis D.I.G.

- **Laboratory Criteria for Case Classification:**
  - **Definitive:**
    - Culture and identification of *B. canis* 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 weeks apart
  - **Presumptive:**
    - Positive reading using 2-mercaptoethanol Rapid Slide Agglutination Test (ME-RSAT), the Tube Agglutination Test (TAT), or the Indirect Fluorescent Antibody test (IFAT) with a 1:200 titer
Case Classification:

**Confirmed**: A clinically compatible illness with definitive laboratory evidence of *Brucella* Infection/isolation of *Brucella* from a clinical specimen by culture

**Probable**: A clinically compatible case and elevated antibody serology to *B. canis*; or detection of *B. canis* 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.
Joint Reportable Disease Guide

- Notifies who the disease should be reported to
- Easy accessibility to the public
- Increase surveillance
Canine Brucellosis Fact Sheet

What is canine brucellosis?
Canine brucellosis is a variant of Brucella canis which is a gram negative coccocond gram-negative coccobacillus. This serotype of Brucella is found prevalent worldwide. In the United States, B. canis is associated with breeding kennels and boarding facilities; although, more data needs to be compiled to validate the prevalence of B. canis in the population.

How is canine brucellosis spread?
B. canis is most commonly spread through sexual intercourse between two breeding dogs, it is also known for the bacterium to cross the placental barrier and infect the offspring. B. canis can be spread through contact with placental tissue, urine, ocular fluid, saliva, and feces. Inhalation of Brucella organisms is not a common route of infection, but it can be a significant hazard for people in certain occupations. Brucellosis is not known to be transmitted from person-to-person.

Who is more likely to become infected by canine brucellosis?
Dogs which are bred without being tested are more at risk of acquiring the agent, opposed to dogs that are tested prior to mating to rule out the disease. People are at risk of contracting B. canis based on occupation. Breeders and facility workers should always use protective wear when assisting in breeding or whelping. Laboratory staff which tests for B. canis should take precaution to do procedures underneath a safety cabinet, since it is known for B. canis to aerosolize.

Can canine brucellosis be used for bioterrorism?
The Centers for Disease Control and Prevention lists Brucella as a possible bioterrorist agent; however, it has never been successfully used in this manner.

What are the clinical signs of canine brucellosis?
In dogs, B. canis is most commonly associated with infertility or sudden abortion. A mucous discharge can be seen in the female dog for a few days after abortion has occurred. In humans, B. canis has a wide range of symptoms; some of those are similar to the flu and include: fever, chills, sweats, headaches, muscle aches, joint pains, back pain, and physical weakness. B. canis may also cause long lasting symptoms, including recurrent fever, joint pain, and fatigue.

How soon after exposure does clinical appear?
Clinical signs can appear anywhere from 5-69 days after exposure to the bacteria. Most people wait to show symptoms within 21-28 days after exposure.

How is canine brucellosis diagnosed?
B. canis is diagnosed through blood culture and serology. Rapid slide agglutination test (RST) is the most common method because of the fast time for results. Other tests should be conducted to verify RST. RST should not be the only test due to its high sensitivity, many of the positives could be false.

Can canine brucellosis be treated?
Yes, but treatment can be difficult for dogs. Vets recommend neutering/spaying the dog which can reduce shedding of the bacteria and antibiotics should be used in conjunction. It is recommended that dogs with B. canis should be euthanized since relapse can occur later in life. Doctors can prescribe effective antibiotics for treatment in humans. Usually, doxycycline and rifampin are used in combination for 3-4 weeks to prevent reoccurring infection. Depending on the timing of treatment and severity of illness, recovery may take a few weeks to several months.

Is there a vaccine for canine brucellosis?
There currently is no vaccine for B. canis.

Is there a way to prevent infection?
Yes. Before breeding dogs make sure the dog is from a B. canis free facility. Test the facility 2-4 times a year for the agent. If the dogs are breeding extensively test them twice every 4-6 weeks. Remember to wear protective gear when handling dogs that are breeding or whelping.

My dog has been diagnosed with canine brucellosis. Is that a risk for me?
B. canis, the Brucella species that infects dogs has occasionally been transmitted to humans. The clinical signs for the disease vary, and it is believed to be underreported. Veterinarians hold a high risk of exposure, but pet owners are not considered to be at risk for infection because it is unlikely that they will come in contact with blood, semen, or placenta of the dog. Immunocompromised persons (cancer patients, HIV-infected individuals, or transplantation patients) should not handle dogs known to be infected with B. canis.

Where can I get more information?
http://www.cdc.gov/ncidod/dbs/bd/oraldefense_disease/os_bd.html
Discussion

- Found underreporting in labs
- Update/Reevaluate annually
- Lack of Information
Conclusion

- Underreporting of canine brucellosis occurs in Kansas
- Increase collaboration between agencies creates benefits
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Questions?

Contact:
mychal.davis89@gmail.com
References

Thank You