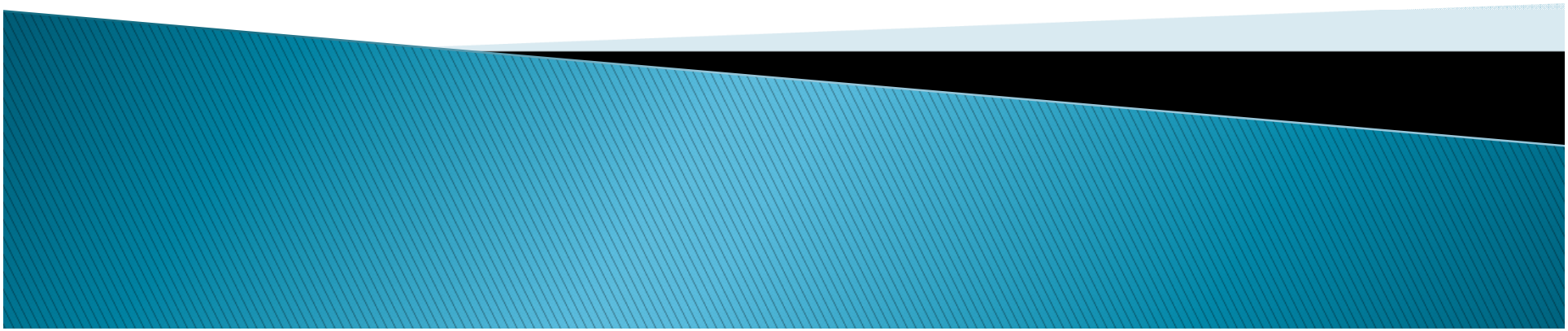
Modernizing Animal Disease Reporting in the state of Kansas

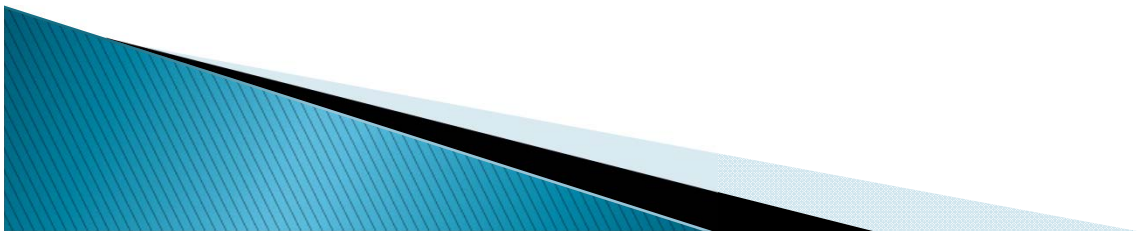
Presented by: Mychal Davis

7/1/13

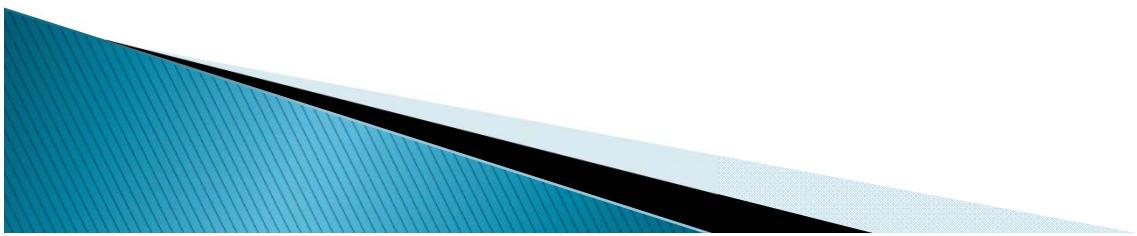


Overview

- Background
- Objectives
- Methods
- Results
- Discussion
- Conclusion



Background



Kansas Department of Agriculture (KDA)

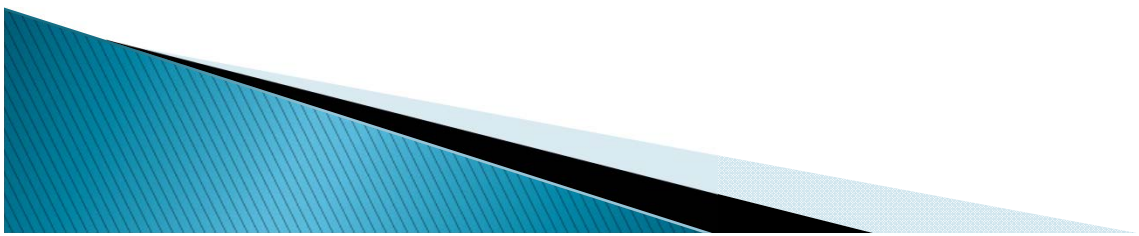
- Agricultural Commodities Assurance Program
- Agricultural Laboratory
- Agricultural Marketing, Advocacy and Outreach Team
- Dairy in Kansas
- Dairy Inspection
- **Division of Animal Health (DAH)**
- Division of Conservation
- Division of Water Resources
- Emergency Management
- Food Safety and Lodging
- 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

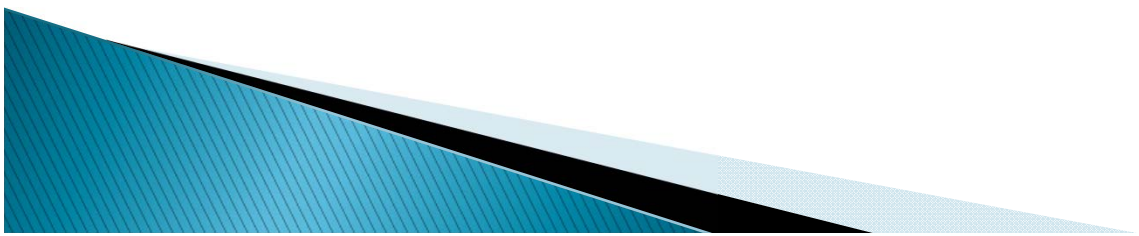
Animal Facilities Inspections

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

*Photo courtesy of Creature Comforts

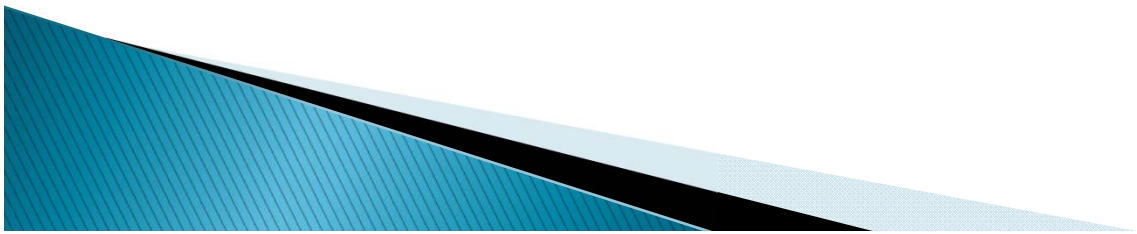
Kansas Department of Health and Environment (KDHE)

- Environment
- Health Care Finance
- Laboratories
- **Public Health**



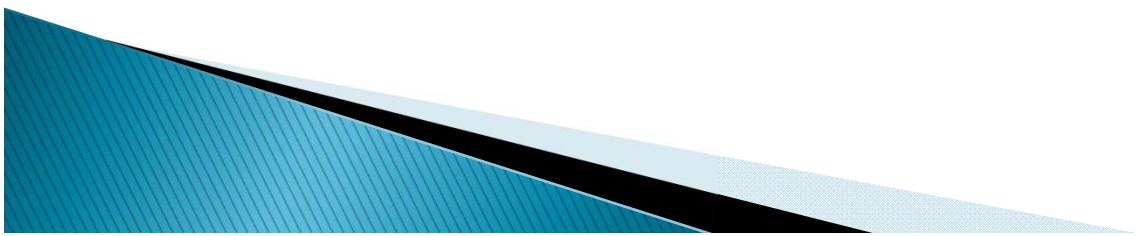
Bureau of Epidemiology and Public Health Informatics

- 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

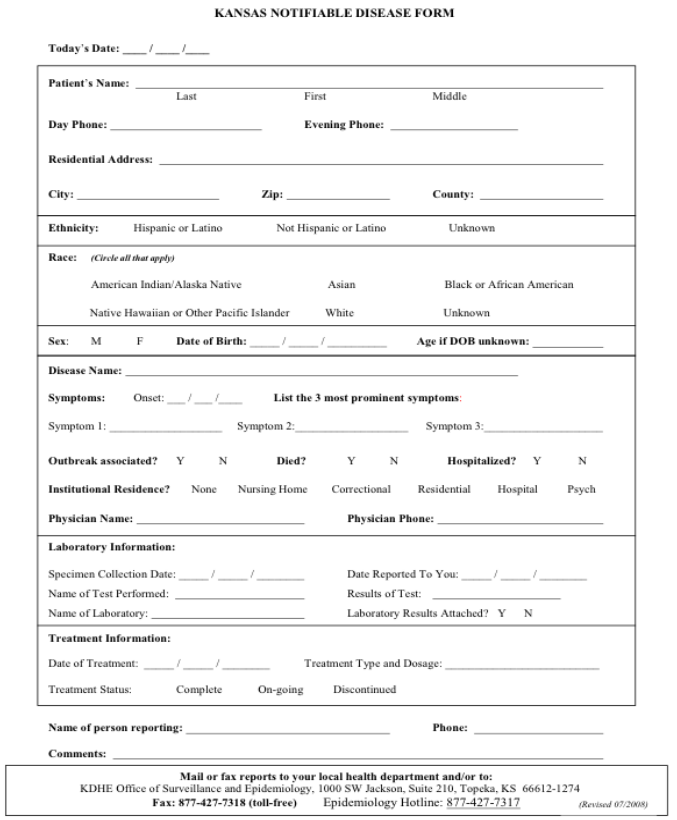


KDHE Epidemiology Rounds

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

Disease Reporting

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



KANSAS NOTIFIABLE DISEASE FORM

Today's Date: ____ / ____ /____

Patient's Name: _____
Last First Middle

Day Phone: _____ **Evening Phone:** _____

Residential Address: _____

City: _____ **Zip:** _____ **County:** _____

Ethnicity: Hispanic or Latino Not Hispanic or Latino Unknown

Race: *(Circle all that apply)*
American Indian/Alaska Native Asian Black or African American
Native Hawaiian or Other Pacific Islander White Unknown

Sex: M F **Date of Birth:** _____ / _____ / _____ **Age if DOB unknown:** _____

Disease Name: _____

Symptoms: Onset: ___ / ___ /____ **List the 3 most prominent symptoms:**

Symptom 1: _____ Symptom 2: _____ Symptom 3: _____

Outbreak associated? Y N **Died?** Y N **Hospitalized?** Y N

Institutional Residence? None Nursing Home Correctional Residential Hospital Psych

Physician Name: _____ **Physician Phone:** _____

Laboratory Information:

Specimen Collection Date: _____ / _____ / _____ Date Reported To You: _____ / _____ / _____
Name of Test Performed: _____ Results of Test: _____
Name of Laboratory: _____ Laboratory Results Attached? Y N

Treatment Information:

Date of Treatment: _____ / _____ / _____ Treatment Type and Dosage: _____

Treatment Status: Complete On-going Discontinued

Name of person reporting: _____ **Phone:** _____

Comments: _____

Mail or fax reports to your local health department and/or to:
KDHE Office of Surveillance and Epidemiology, 1000 SW Jackson, Suite 210, Topeka, KS 66612-1274
Fax: 877-427-7318 (toll-free) Epidemiology Hotline: 877-427-7317 *(Revised 07/2008)*

* Photo courtesy of KDHE

Disease Surveillance

Humans

- Electronic
- Accessible
- Annually Revised

Animals

- Paper based
- Moving Towards Electronic
- Complaint Based

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

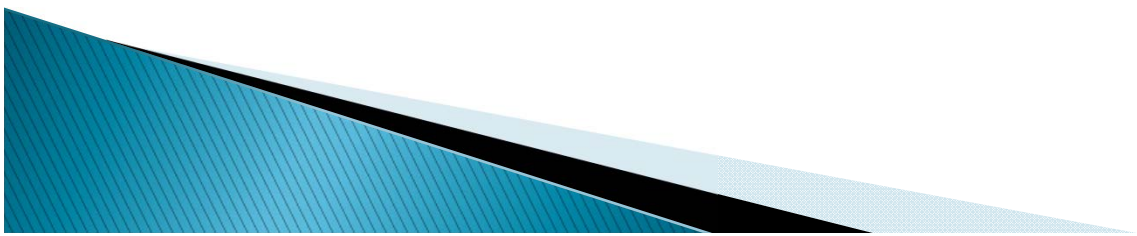
Species of *Brucella*

- *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

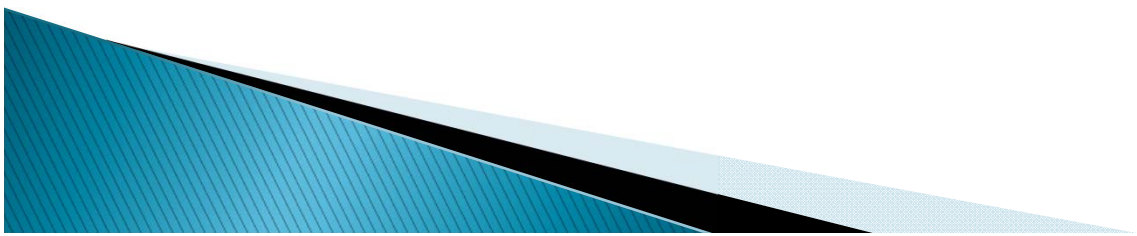
Brucella canis (Canine Brucellosis)

- Etiology
- Transmission
- Clinical signs



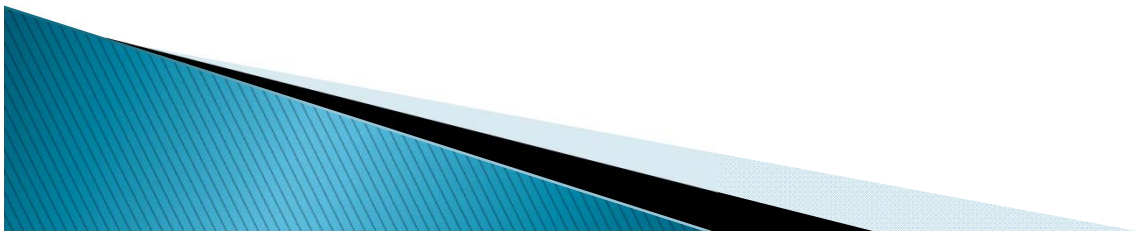
Etiology

- 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

Canines

- Infertility
- Sudden Abortion
- Vaginal Discharge
- Epididymitis

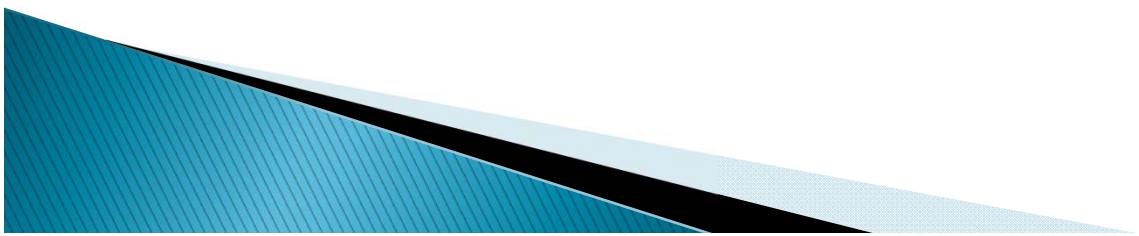
Humans

- Fever
- Chills
- Lethargy

* Photo courtesy of Center for Food Security & Public Health

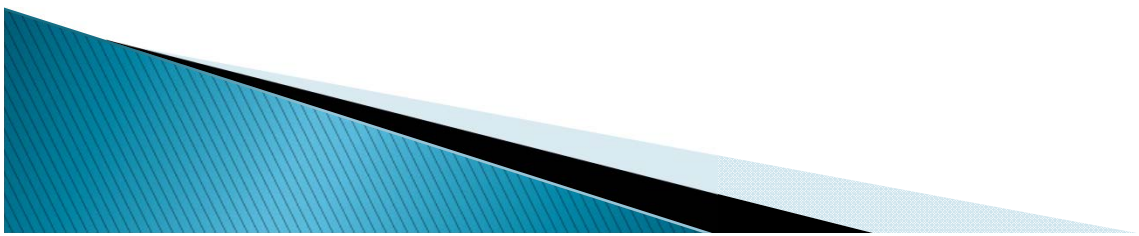
Testing Procedures in Canines

	Test	Price
K-State Diagnostic Lab	Card Agglutination*	$25.00 per sample
	Blood	$2.50 per sample
Missouri Diagnostic Lab	Tissue Culture	$8.00 per sample
	Card Agglutination	$5.00 per sample
	Tube Agglutination Test	1-10 samples $5.00



Testing Procedures in Humans

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

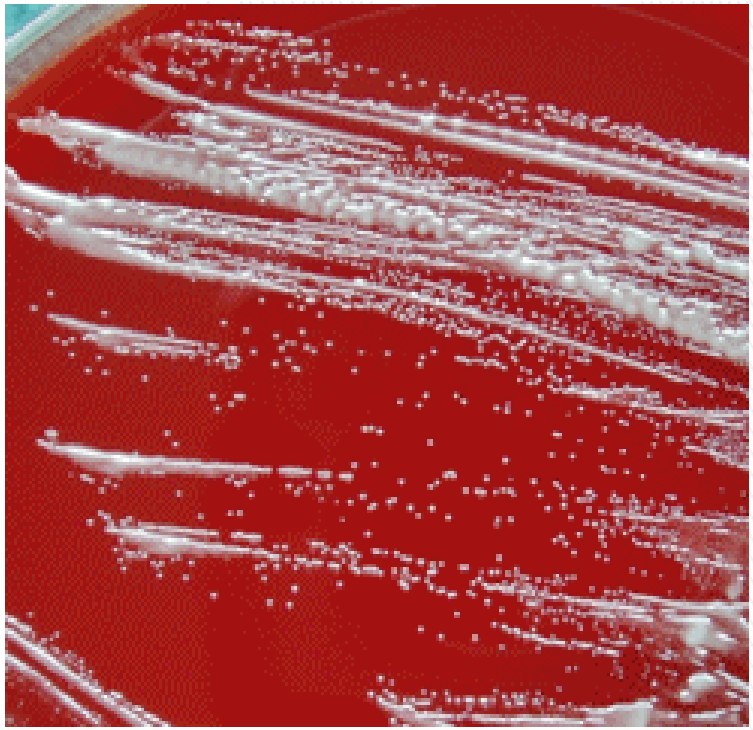


Colony Morphology

B. abortus

* Photo courtesy of Encyclopedia of Life

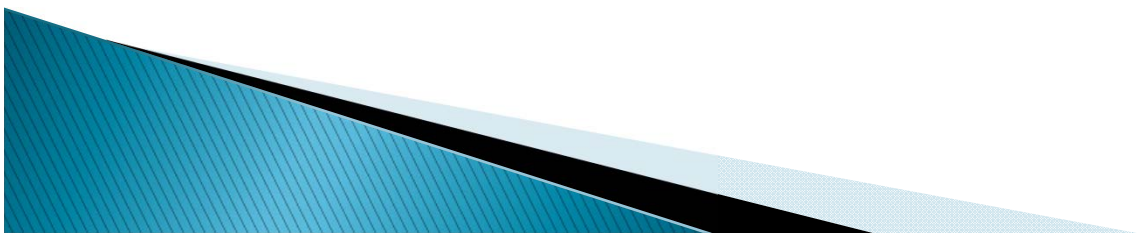
B. canis



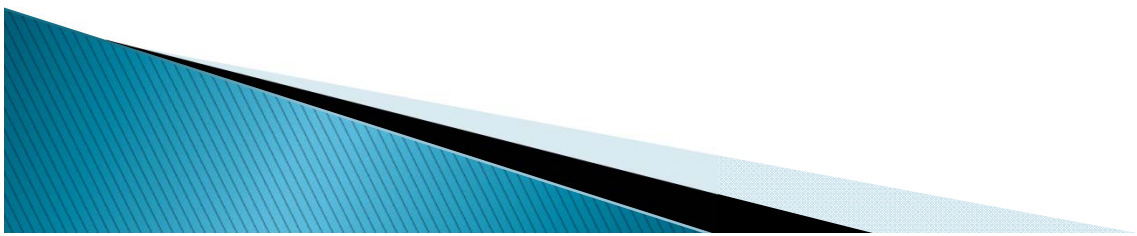
* Photo courtesy of National Institute of Infectious Diseases

Treatments in Canines

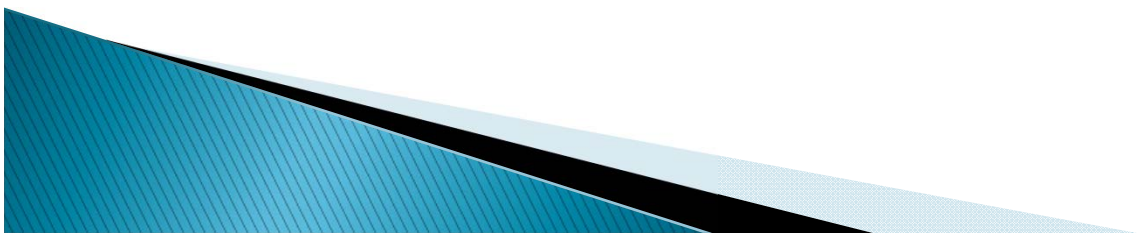
- Isolation
- Antibiotics
- Euthanasia (Recommended)



Objectives



- Create Disease Investigative Guideline (D.I.G.) (*B. canis*)
- Develop Disease Reporting Template (*B. canis*)
- Produce Joint Reportable Disease Guide

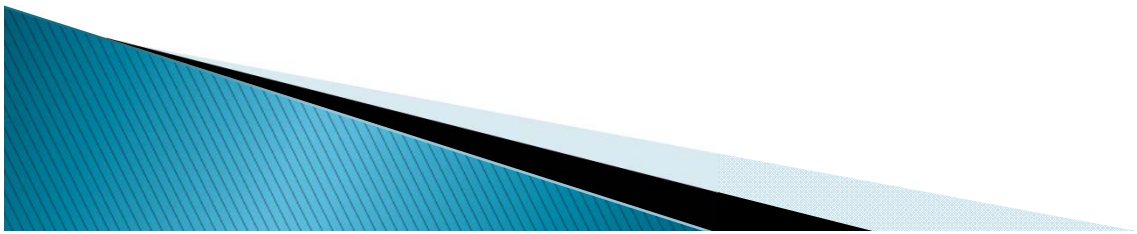


Methods

- 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

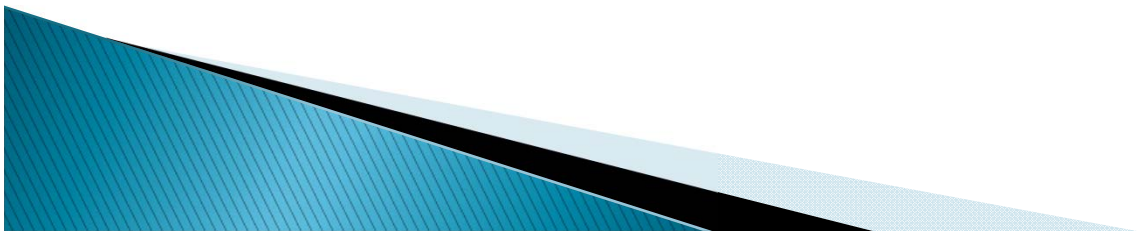
- Complied descriptive factors of *B. canis*



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*



Positive cases for dogs

Case	Year	Female	Male	Tested	True +	Neutered/Spayed	Euthanized
1	2007	19	5	4	4	5	0
2	2008	145	50	16	1	0	1
3	2009	60	15	75	3	2	1
4	2012	106	42	6	1	1	?
5	2012	40	7	31	13	0	13
Total		370	119	132	22	8	14

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

Disease Name	Fact Sheet	Investigation Guideline	Initial Assessment	Report Forms
Amebiasis	Amebiasis Fact Sheet	Amebiasis Investigation Guideline (Revised 4/09)	-	-
Anthrax	Anthrax Fact Sheet	Anthrax Investigation Guideline (Revised 2/12)	Anthrax Worksheet	-
Arboviral Diseases (WEE, EEE, WNV, SLE, CE)	Arboviral Diseases Fact Sheet	Arboviral Diseases Investigation Guideline (Revised 9/11)	-	-
Botulism	Botulism Fact Sheet	Botulism Investigation Guideline (Revised 9/11)	Botulism Worksheet	-
Brucellosis	Brucellosis Fact Sheet	Brucellosis Investigation Guideline (Revised 7/12)	-	-
Campylobacter	Campylobacter Fact Sheet	Campylobacter Investigation Guideline (Revised 6/12)	-	Campylobacter Report Form
Chancroid	-	Under Revision	-	KS Notifiable Disease
Chlamydia	-	Under Revision	-	KS Notifiable Disease
Cholera	Cholera Fact Sheet	Cholera Investigation Guideline (Revised 2/12)	-	-
Cryptosporidiosis	Cryptosporidiosis Fact Sheet	Cryptosporidiosis Investigation Guideline (Revised 6/12)	-	Cryptosporidiosis Report Form
Cyclosporiasis	Cyclosporiasis Fact Sheet	Cyclosporiasis Investigation Guideline (Revised 1/10)	-	-
Top of page				
Dengue Disease	Dengue Disease Fact Sheet	Dengue Disease Investigation Guideline (New 1/10)	-	-
Diphtheria	Diphtheria Fact Sheet	Diphtheria Investigation Guideline (Revised 2/12	-	-
Escherichia coli 0157	Escherichia coli 0157 Fact Sheet	Escherichia coli 0157 Investigation Guidelines (Revised 6/12)	-	STEC Report Form

* Photo courtesy of KDHE

Canine Brucellosis (D.I.G.)

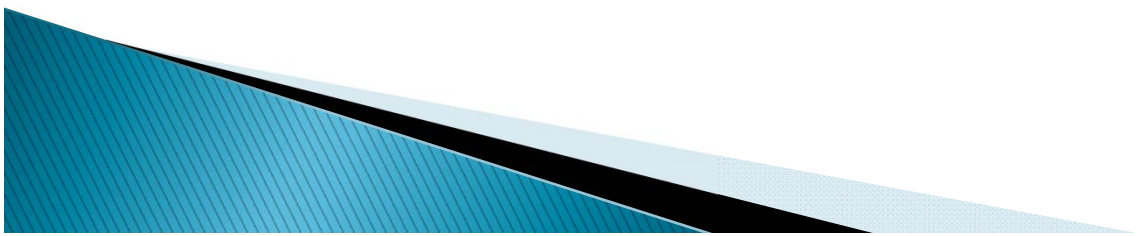
- **CASE DEFINITION**
- **Clinical Description for Surveillance:**
- An illness characterized by infertility or sudden abortion in canines. Other signs include one or more of the following: prolonged mucus discharge from the vagina, still births, epididymitis, unwillingness to mate, decreased ejaculate, 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

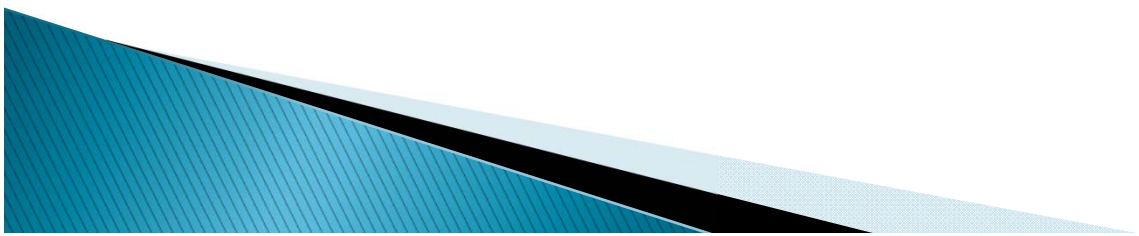
Canine Brucellosis D.I.G.

- **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

Canine Brucellosis Fact Sheet

What is *canine brucellosis*?
Canine brucellosis is a variant of *Brucella canis* which is a gram negative coccobacilli/short rod bacterium. 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 mucus 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 these 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 fevers, joint pain, and fatigue.

How soon after exposure does clinical appear?
Clinical signs can appear anywhere from 5-60 days after exposure to the bacteria; most people start 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 (RAST) is the most common method because of the fast time for results. More tests should be conducted to verify RAST. RSAT 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. Veterinarians 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 relapses can occur later in life. Doctors can prescribe effective antibiotics for treatment in humans. Usually, doxycycline and rifampin are used in combination for 6 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 clincal 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.cfsph.iastate.edu/DiseaseInfo/disease.php?name=brucella-canis&lang=en

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.

Version 03/2013

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

Acknowledgements

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- K-State MPH Staff

Questions?

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References

- Kansas Department of Agriculture. Division of Animal Health. May 2013. Available at http://www.agriculture.ks.gov/divisions-programs/division-of-animal-health (Accessed June 13, 2013)
- Kansas Department of Health and Environment. 2013. Available at http://www.kdheks.gov/bephi/index.html (Accessed June 13, 2013)
- Help for my Life. June 2013. Available at http://helpformylife.org/tag/cattle/ (Accessed June 26, 2013)
- Texas Department of State Health Services. March 2011. Available at http://www.dshs.state.tx.us/region8/zoonosis.shtm (Accessed June 26, 2013)
- The Center for Food Security & Public Health. 2013. Available at http://www.cfsph.iastate.edu/DiseaseInfo/disease-images.php?name=brucella-canis (Accessed June 26, 2013)
- Encyclopedia of Life. 2009. Available at http://eol.org/data_objects/3602330 (Accessed June 26, 2013)
- National Institute of Infectious Disease. July 2012. Available at http://www.nih.go.jp/niid/en/iasren/865-iasr/2433-tpc389.html (Accessed June 26, 2013)
- Creature Comforts Pet Hotel. 2002. Available at http://www.ccph.org.uk/kennel.aspx (Accessed June 29, 2013)
- Human TB Testing. 2013. Available at http://ehs.uc.edu/lams/data/primates/9018/18_026.html (Accessed June 26,2013)
- Department for Environment, Food & Rural Affairs. March 2013. Available at http://www.defra.gov.uk/animal-diseases/a-z/bovine-tb/animal-keepers/testing/ (Accessed June 26, 2013)
- The Hunting Dog. 2011. (Accessed June 26, 2013) Available at http://www.the-hunting-dog.com/

Thank You