

Surveillance for Selected Zoonotic Diseases

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Learning Objectives

1. Describe what makes a communicable disease “zoonotic”
2. Know the causative organism for tularemia, brucellosis, and Q-Fever
3. Know the major routes of transmission for tularemia, brucellosis, and Q-Fever
4. Locate guidance for Case Definition and Disease Investigation Steps for reportable diseases in NC

Zoonotic Disease and Public Health

- Animals can be sentinels for human disease
- Animals can be reservoirs for human disease
- Unknown background rates of potential zoonotic disease
- Reduce human risk by understanding human exposure
- People do strange things with animals...

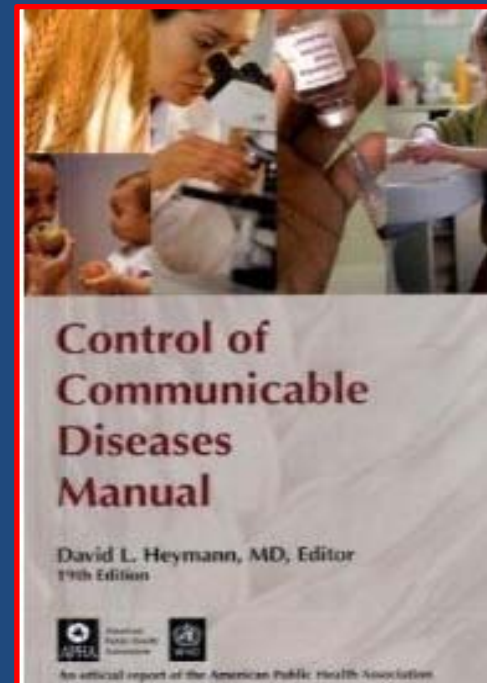
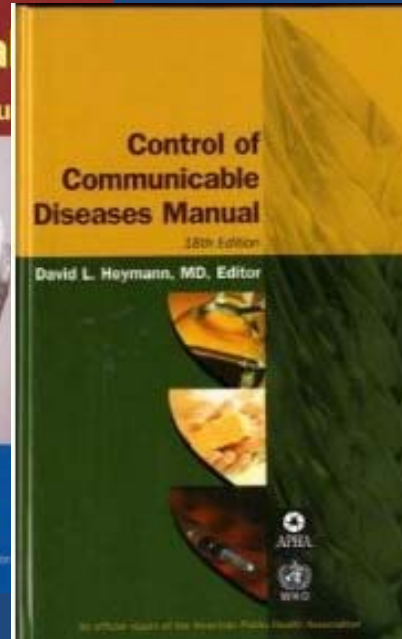
Know Your Sources of Information

2010 North Carolina Division of Public Health
Communicable Disease Manual

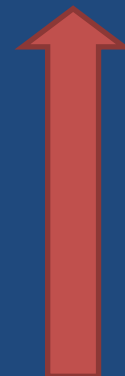
Public Health Management of Reportable
Diseases and Conditions

North Carolina Public Health

Working for a healthier and safer North Carolina -- Everywhere. Everyday. Everybody.



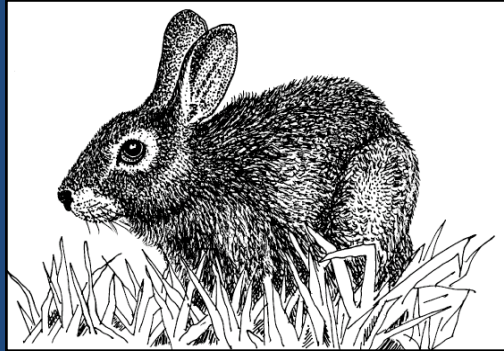
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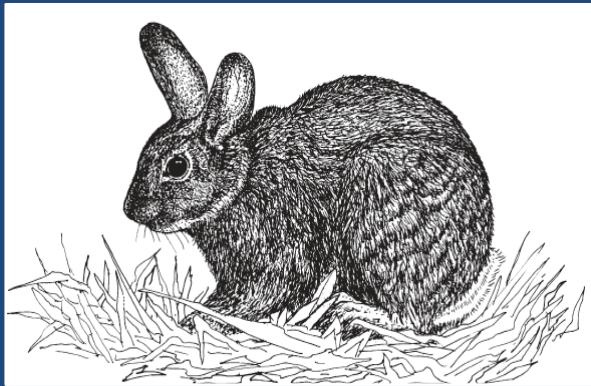
Tularemia

- Reportable disease of people and animals
- You may hear about this from...
 - Human health care provider
 - Veterinarian
 - Paper or Electronic Lab Report
- Notify your Health Director prior to investigating
 - Tularemia is a Category A bioterrorism agent

What is Tularemia?



Appalachian
Cottontail
Rabbit



Marsh Rabbit



Cottontail Rabbit

How are people exposed?



Image from
Burlington Free Press

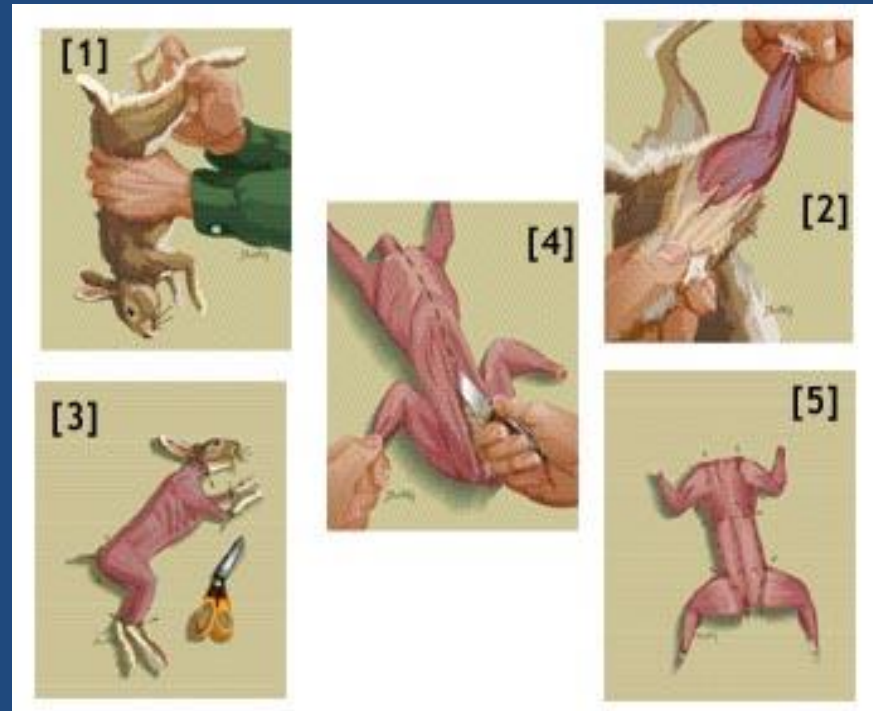


Image from Outdoor Life Magazine

Transmission of Tularemia to People

The Cat's Role



Photo courtesy of:
American Society for Surgery of the
Hand

NC Tularemia Cases

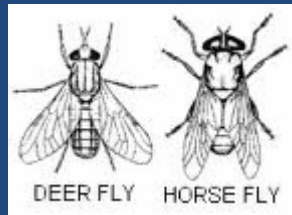


Ulcer caused by tularemia infection

Photo from CDC Public Health Image Library (#2037)

- Most cases associated with
 - field dressing rabbits
 - bites
- Other routes of transmission possible
 - Arthropod bite
 - Inhalation
 - Consumption of undercooked meat

Classic Tularemia Exposures



- Tularemia, Lawn Mowers, and Rabbits' Nests

JOURNAL OF CLINICAL
MICROBIOLOGY

August 2005

- Tularemia Transmitted by Insect Bites

Wyoming, 2001--2003

MMWR Feb. 25, 2005

Forms of Tularemia Infection

1. Ulceroglandular – Handling
2. Glandular – Handling
3. Oculoglandular – Direct contamination of eye
4. Oropharyngeal – Contaminated food/water & inhalation
5. Pneumonic – Inhaling; secondary infection
6. Typhoidal – Unspecified (systemic)
7. Septic – Unspecified (systemic)

Case Definition- Tularemia

Case classification

- Probable: a clinically compatible case with laboratory results indicative of presumptive infection
- Confirmed: a clinically compatible case with confirmatory laboratory results

Case Definition – Tularemia

Lab Criteria

– *Presumptive*

- Elevated serum antibody titer(s) to *F. tularensis* antigen (*without documented fourfold or greater change*) in a patient with no history of tularemia vaccination **OR**
- Detection of *F. tularensis* in a clinical specimen by *fluorescent assay*

– *Confirmatory*

- Isolation of *F. tularensis* in a clinical specimen **OR**
- Fourfold or greater change in serum antibody titer to *F. tularensis* antigen

Case Investigation - Tularemia

- Collect clinical and lab information
- Apply case definition
- Determine source of exposure
 - If source is suspected to be Bioterrorism in origin, notify authorities

Tularemia Prevention

- Teach prevention to those at greatest risk for exposure (e.g., hikers, campers, and hunters)
- Protective clothing, repellents containing DEET, and permethrin on clothing
- Hunters and others who handle potentially infected animals should wear gloves
- Game meat should always be cooked thoroughly
- Grassy areas should be surveyed before mowing and any dead animals removed

Abandoning cats is cruel to cats and harmful to wildlife.
Never abandon cats outdoors.
Use your local animal shelter.



For more information visit www.abcbirds.org



Tularemia / Animal Bite Prevention

- Reduce ED visits
- Minimize pain/suffering
- Reduce exposures to Rabies and Tetanus

Educate the public to take proper care of their pets!

Q Fever

- Reportable disease of people and animals
- You may hear about this from...
 - Human health care provider
 - Veterinarian
 - Paper or Electronic Lab Report
- Notify your Health Director prior to investigating
 - Q Fever is a Category B bioterrorism agent

Check the Online CD Manual

The Disease Investigation Steps are listed in the CD Manual.

Check with your Regional Nurse Consultant or On-Call Epidemiologist for assistance with case investigation.

LOCAL HEALTH DEPARTMENT DISEASE INVESTIGATION STEPS		
NC REPORTABLE DISEASE/CONDITION	NC DISEASE CODE	INFECTIOUS AGENT (S)
Q FEVER	32	<i>Coxiella burnetii</i>
PREPARING FOR INVESTIGATION		
KNOW THE DISEASE/CONDITION	<ul style="list-style-type: none"> Read about Q Fever in the CD Manual. See the case definition for Q Fever in the CD Manual. Study APHA <i>Control of Communicable Diseases Manual</i>, 19th ed., pp 494 - 498. Print and review reporting forms: <ul style="list-style-type: none"> <i>Part 1: Confidential Disease Report (DHHS 2124)</i> <i>Part 2: Q Fever (DHHS/EPI #32)</i> 	
BIOTERRORISM POTENTIAL CATEGORY B	<i>C burnetii</i> is a potential bioterrorism agent. Investigate first as a naturally occurring event; if bioterrorism is suspected, notify local law enforcement and state public health officials.	
CONDUCTING INVESTIGATION		
COLLECT CLINICAL INFORMATION	<ul style="list-style-type: none"> If patient hospitalized for this disease, obtain medical record (admission note, progress note, chest x-ray(s), other lab report(s), and discharge summary). Obtain healthcare provider clinical notes from date(s) of service for this disease/condition. Look for evidence in the medical record that supports clinical findings described in the case definition. Inquire if the patient had a clinically compatible illness and if the patient's history is positive for any of the following risk factors associated with Q Fever cases diagnosed in NC and other eastern states: <ul style="list-style-type: none"> recent immigration from, travel to, or military deployment to a Q Fever-endemic country consumption of unpasteurized milk, cheese, or other dairy products work in a slaughterhouse, farm environment, veterinary practice or laboratory handling of livestock, especially sheep, goats or cattle involvement or exposure to birth products of livestock or pets recent tick exposure 	

What is Q Fever?



Domestic Goat; *Capra hircus*



Domestic Sheep; *Ovis aries*

Photos from University of Michigan Animal Diversity Web

Transmission from Animal to Man

The organism replicates to very high levels in the placenta and is then shed in the reproductive tract fluids, exposing people attending the parturition.



Image from
Local Food Ann Arbor

Disease Presentation in Man

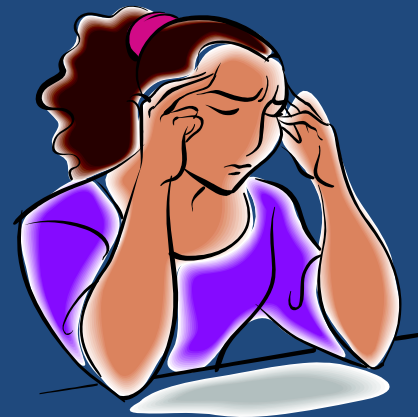
- Ranges from asymptomatic or severe in humans
- Characterized by fevers, chills, severe headache, malaise, and severe sweats
- Chronic Q fever occurs months to years after acute infection and manifests primarily as endocarditis involving abnormal cardiac valves

Case Definition Criteria

Q Fever

Clinical evidence

Acute fever and one or more of the following:
rigors, severe retro bulbar headache, acute
hepatitis, pneumonia, or elevated liver
enzyme levels



Case Definition Criteria – Q Fever

Lab Criteria

- **Laboratory confirmed:**
 - Fourfold change in IgG-specific antibody titer to *C. burnetii* phase II antigen by indirect IFA between paired serum samples, **or**
 - Detection of *C. burnetii* DNA in a clinical specimen via PCR assay, **or**
 - Demonstration of *C. burnetii* in a clinical specimen by IHC, **or**
 - Isolation of *C. burnetii* from a clinical specimen by culture.
- **Laboratory supportive:**
 - Has a single IFA IgG titer of $\geq 1:128$ to phase II antigen
 - Has serologic evidence of elevated IgG or IgM antibody reactive with *C. burnetii* antigen by ELISA, dot-ELISA, or latex agglutination.

Investigation of Q Fever Case

Determine source of exposure

- Travel?
- Occupation?
- Food?

Implement control measures if common source identified



Brucellosis

- Reportable disease of people and animals
- You may hear about this from...
 - Human health care provider
 - Veterinarian
 - Paper or Electronic Lab Report
- Notify your Health Director prior to investigating
 - Brucella is a Category B bioterrorism agent

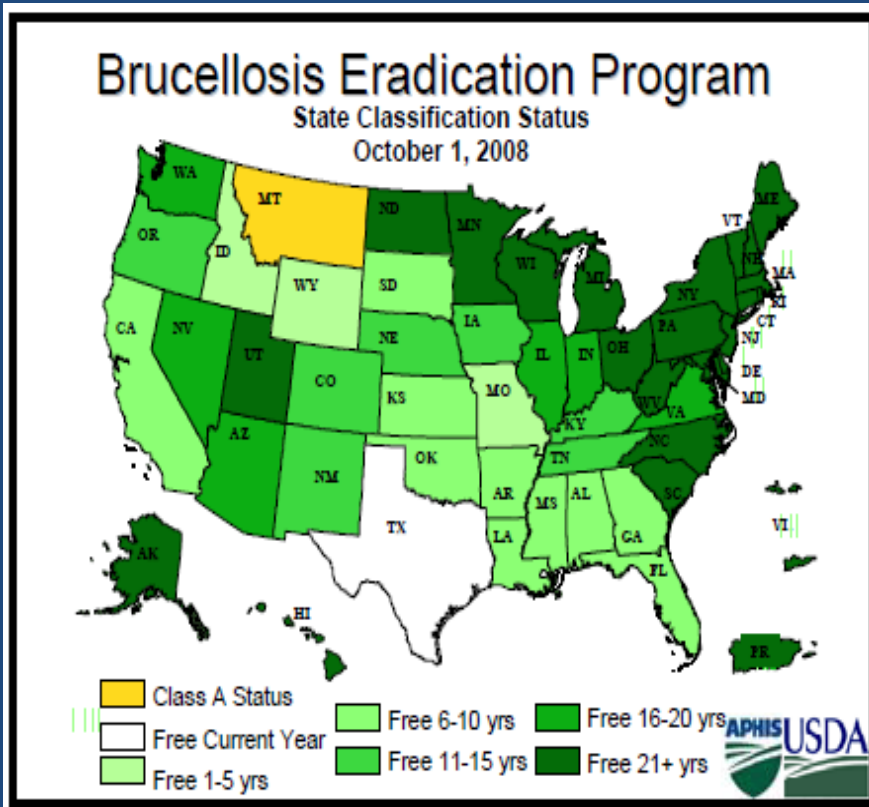
What is Brucellosis?



Brucellosis by species

Brucella Species	Animal Species Affected	NC Notes
<i>B. abortus</i>	Cattle	Eliminated in commercial herds
<i>B. suis</i>	Swine	Eliminated in commercial herds
<i>B. melitensis</i>	Goats	Not present in US goat herd
<i>B. canis</i>	Dogs	Found in dogs, low pathogenicity in people

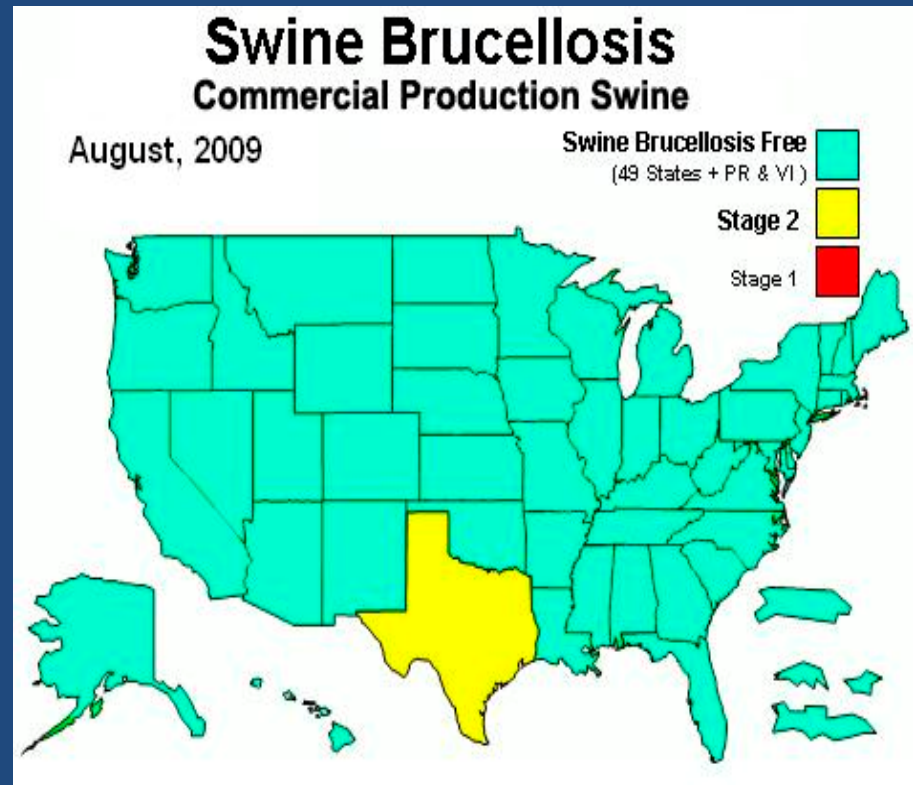
Cooperative State Federal Brucellosis Eradication Program



USDA Uniform
Methods and Rules
set minimum
standards for states
to achieve
eradication in cattle

Cooperative State Federal Brucellosis Eradication Program

Similar program
established in early
1990's for swine

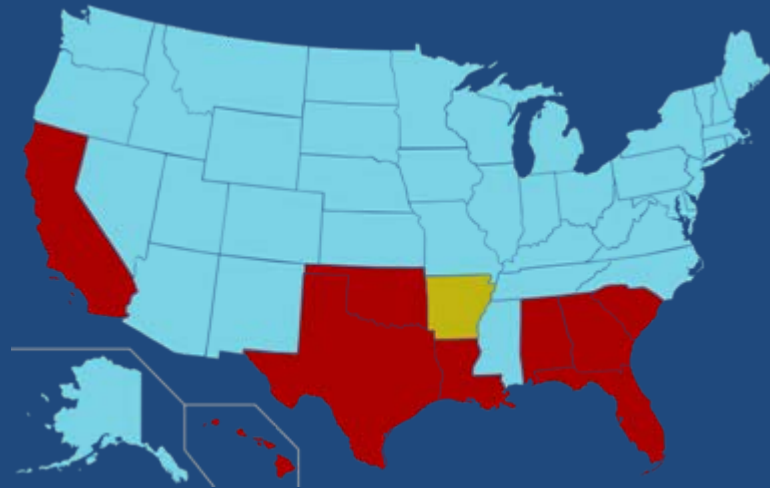


Eradicated, yet cases still occur in NC ... Why?

- People travel
- People like to consume unpasteurized dairy...
- Animals are imported from foreign countries
- Many countries
 - Have not controlled brucella in their livestock
 - This keeps their citizens and animal herds at risk



Brucellosis is present in Feral Swine



Feral Swine are present in NC and recent evidence has shown infection in our feral swine population. This places hunters and commercial herds at risk of exposure; both must be protected.

Acquisition of Brucellosis in People

Risk factors associated with NC brucellosis cases

- Hispanic ethnicity
- recent immigration from, travel to, or military deployment to a brucellosis-endemic country
- consumption of unpasteurized milk, cheese or other dairy product
- work in a slaughterhouse, veterinary practice or laboratory
- killing, skinning, consuming game animals such as buffalo, elk, feral hogs, wild boar, etc

Recognizing Illness in People

- History of Exposure
- Clinical signs
 - Asymptomatic
 - Acute febrile illness
 - Nonspecific flu-like symptoms
 - Night sweats
 - Splenomegaly, hepatomegaly, coughing, pleuritic chest pain
 - GI disturbance
- Laboratory evidence of infection

Case Definition – Brucellosis

Lab Criteria

Definitive:

- Culture and identification of *Brucella* spp. from clinical specimens
- Evidence of a 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:

- *Brucella* total antibody titer of greater than or equal to 160 by standard tube agglutination test (SAT) or *Brucella* microagglutination test (BMAT) in one or more serum specimens obtained after onset of symptoms
- Detection of *Brucella* DNA in a clinical specimen by PCR assay

Implement Control Measures

- If a common source of exposure is identified, prevent further exposure
- Educate public about case prevention
- Unpasteurized dairy is bad for public health
 - Consuming only pasteurized products to prevent Brucellosis and Q fever will also prevent other illnesses...

Bringing it all Back Home

- Zoonotic Diseases are relatively rare
- Compare 2003-2007 average # cases/year (NC)
 - Chlamydia trachomatis: 30,096
 - Gonorrhea: 15,866
 - Salmonellosis: 1,667
 - RMSF: 602
 - Brucellosis: 2
 - Tularemia: 1
 - Q Fever: 4

We know that you have many other demands on your time.

You may forget the details about these diseases.

Please call DPH with any questions and we can help with your investigation.