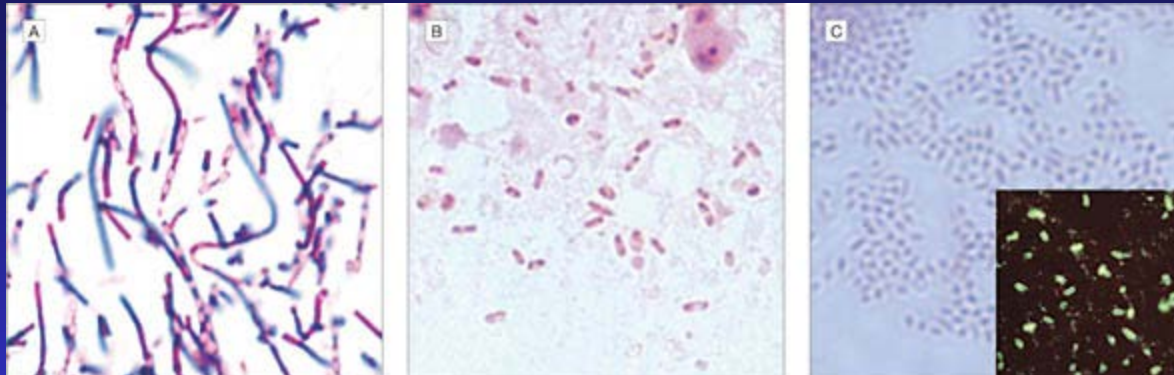


# Bioterrorist Agents: Tularemia



CDC, AFIP

# Diseases of Bioterrorist Potential

## Learning Objectives

- Describe CDC-defined Category A agents
- Describe infection control and prophylactic measures in the event of an outbreak

# *Francisella Tularensis*



- Causative agent of tularemia
- Non-motile, non-spore-forming gram negative cocco-bacillus found in diverse animal hosts
- Studied by U.S. and others as potential BW weapon
- Resistant to freezing temperatures, sensitive to heat and disinfectants



# *Francisella Tularensis*

## Epidemiology

- Humans infected by various modes:
  - Handling contaminated animal tissues or fluids
  - Bite of infected deer flies, mosquitoes, or ticks
  - Direct contact with or ingestion of contaminated water, food or soil
  - Inhalation of infective aerosols (most likely BT route)
- About 200 cases of tularemia/year in U.S.
  - Most in South-Central and Western states
  - Most in rural areas
  - Majority of cases in summer



# *Francisella Tularensis*

## Epidemiology

- Low infectious dose: 10-50 organisms produce disease
- Incubation period: probably 3-5 days following aerosol exposure (range 1-21 days)
- Case fatality rate
  - Treated: <1-3%
  - Untreated: 30-60% (pneumonic), 5% (ulceroglandular)
- Recovery followed by permanent immunity
- No person-to-person transmission

# Tularemia: Case Definition

- An illness characterized by several distinct forms, including the following
  - Ulceroglandular (cutaneous ulcer with regional lymphadenopathy)
  - Glandular (regional lymphadenopathy with no ulcer)
  - Oculoglandular (conjunctivitis with preauricular lymphadenopathy)
  - Oropharyngeal (stomatitis or pharyngitis or tonsillitis & cervical adenopath)

# Tularemia: Case definition, cont.

- An illness characterized by several distinct forms, including the following
  - Intestinal (intestinal pain, vomiting, diarrhea)
  - Pneumonic\* (primary pleuropulmonary disease)
  - Typhoidal (febrile illness w/o early localizing signs & symptoms)
- Clinical diagnosis supported by evidence or history of a tick or deerfly bite, exposure to tissues of a mammalian host of *F. tularensis* or exposure to potentially contaminated water.

# Tularemia: Case Definition, cont.

- Laboratory criteria for diagnosis
  - Presumptive:
    - Elevated serum antibody titer(s) to *F. tularensis* antigen (w/o documented 4-fold 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**
    - 4-fold or greater change in serum antibody titer to *F. tularensis* antigen



# Tularemia: Case Classification

- Probable: Clinically compatible with lab results indicative of a presumptive infection
- Confirmed: Clinically compatible with confirmatory lab results



# Ulceroglandular Tularemia

## Clinical Features

- 75-85% of naturally occurring cases
- General symptoms – high fever, malaise, muscle aches, headache, chills & rigors, sore throat
- Cutaneous papule appears at inoculation site concurrent with generalized symptoms
- Papule --> pustule --> tender indolent ulcer with or without eschar
- Tender regional lymphadenopathy

# Ulceroglandular Tularemia





# Pneumonic Tularemia

## Clinical Features

- Initial clinical picture: systemic illness with prominent signs of respiratory disease
- Abrupt onset fever, chills, headaches, muscle aches, non-productive cough, sore throat
- Nausea, vomiting, diarrhea in some cases
- Mortality 30% untreated; < 10% treated



# Tularemia

## Treatment & Prophylaxis

- Vaccine: live attenuated vaccine under FDA review – availability uncertain
- For known aerosol exposures, 14d oral antibiotics recommended
- If covert attack, observe for development of fever for 14 days and treat with antibiotics if febrile
- Post-exposure antibiotics – most effective when given w/in 24 hours of exposure

# Tularemia

## Infection Control

- Standard precautions
- No patient isolation necessary due to lack of human-to-human transmission
- Alert lab of suspicion for tularemia



# Tularemia

## Summary of Key Points

- In naturally occurring tularemia, infection virtually always occurs in a rural setting. Infection in an urban setting with no known risk factors or contact with infected animals suggests a possible deliberate source.
- Tularemia is not transmitted person to person.

# Tularemia

## Summary of Key Points

- The most likely presentations of tularemia in a BT attack are pneumonic and typhoidal disease, as opposed to cutaneous disease in naturally occurring cases.
- Tularemia can be treated and prevented with antibiotics.