Outbreak of Pneumonic Plague, Colorado, 2014

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What is Plague?
- *Yersinia pestis*
- Nonmotile, gram-negative bacillus
- Colonies are small
- Often misdiagnosed by automated systems

Routes of Transmission
- Flea bite
  - Majority of cases exposed this route
  - Infected fleas - dead rodents
- Direct contact with blood/tissue
  - Ground Squirrels
  - Domestic Cats
- Droplet inhalation
  - Wildlife
  - Human-to-Human

Forms of Disease
1. Bubonic
   - Fever, headache, chills
   - Swollen, tender, and painful lymph nodes (bubo)
2. Septicemic
   - Fever, chills, weakness, abd pain, shock
   - Tissues may turn black and die
3. Pneumonic
   - Fever, headache, weakness,
   - Rapidly developing pneumonia,
     - SOB, chest pain, cough, and bloody mucous

Other less typical forms are possible

Investigation Objectives
- Identify sources of exposure
- Identify persons at risk of infection
- Identify additional cases
- Prevention and control measures
- Environmental assessment

Summer 2014

Wednesday, July 8
Epi notified of PCR + *Yersinia Pestis*

June 25 July July 8
Tuesday, July 8
Epi notified of PCR + Yersinia Pestis

June 29-30
Patient A
Admitted with pneumonia

July 6
Patient A
Transferred

Patient A
Admitted with Pneumonia

June 28
Patient A
Fever and Cough

Tuesday, July 8
Epi notified of PCR + Yersinia Pestis

June 24-26
Patient D
Contact with deceased dog

June 29
Patient D
Close contact w A

July 5
Patient D
Fever and Cough

July 6
Patient D
Serum Collected

25 27 29 July 3 6 8 10 ... Testing

6 Days

10 Days

June 25
Dog
Euthanized

June 26
Dog necropsy

June 24
Dog sick → DVM

Patient A
Admitted with Pneumonia

July 6
Patient A
Transferred

Patient B
Exposed to Dog

July 5
Patient B
CXR (pneumonia)

June 30
Patient B
Fever and Cough

July 10
Patient B
Serum Collected

Patient C
Exposed to Dog

July 4
Patient C
Fever and Cough

July 9
Patient C
CXR, Serum Collected

Animal Exposure
Hospital Exposure
Veterinary Clinic Staff Exposure
Veterinary Clinic Client Exposure
Personal Contact Exposure
Animal Diagnostic Lab

Slide Provided by Tri-County Health Department, Colorado
Delayed Diagnosis

• Mis-diagnosis
  – Automated lab systems
• Plague was not suspected initially
  – Uncommon route of exposure (family dog)
  – Unusual history that lead to confirmation of misdiagnosis

Additional 2014 Plague Cases

5. August 1st—Bubonic
  Automated system ID *Pseudomonas luteola*

6. August 26th—Septicemic
  Automated system ID *Yersinia pestis*  
  Automated system ID *Yersinia pestis*

7. October 28th—Bubonic → Septicemic
  Automated system was not used

8. December 26th—Bubonic
  Automated system ID *Yersinia pseudotuberculosis*

Thank You!
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Plague Resources

• https://www.colorado.gov/pacific/sites/default/files/DC_CO_Zoon-Plague-Recs-for-Management. Infection with metastatic to the plague至少w...