An Update on Q Fever: Current Epidemiology

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Background

- Caused by *Coxiella burnetii*
  –"Query" Fever
  - Cattle, sheep, goats are primary reservoirs
    - Shed in birthing fluids, excreta, milk
- Humans infected via inhalation
- Nationally notifiable disease since 2000
- U.S. seroprevalence: 3.1%

Acute Q Fever

- 3 common manifestations
  - Flu-like, self limiting
  - Pneumonia (30-60%)
  - Hepatitis
- Death: 1-2%
- Treatment: Doxycycline
- Post-Q fever fatigue syndrome affecting 15-20%

Chronic Q Fever

- 1-5% of those infected

- High mortality in untreated cases (60%)

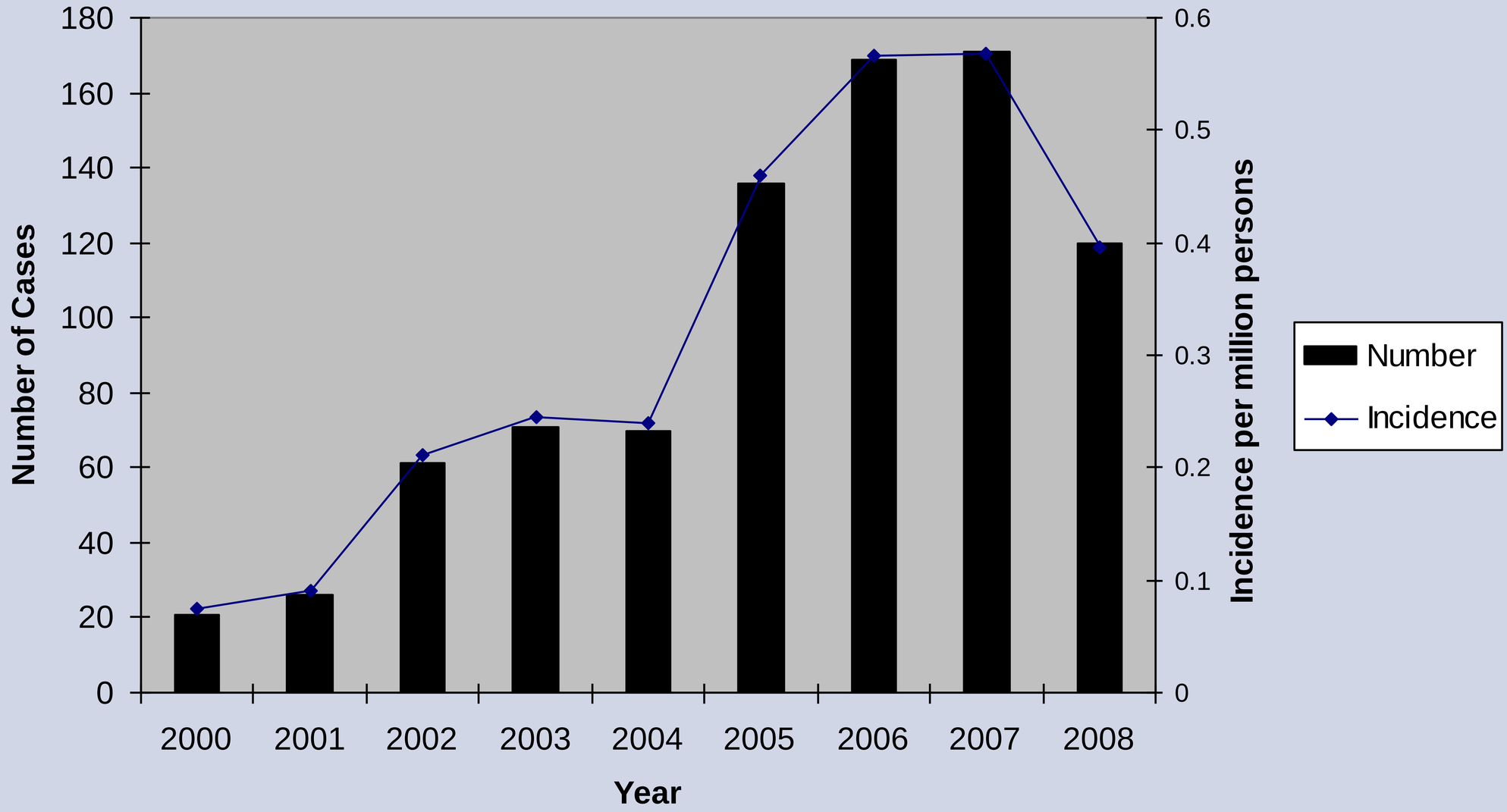
- High risk groups: pregnant women, immunocompromised, existing valvulopathy

- Endocarditis

Q Fever National Surveillance

- CDC case definition revised in 2008 by Council of State and Territorial Epidemiologists
  - Separate designations for acute and chronic infection
- Confirmed case by IFA
  - Clinically compatible illness w/4X rise in IgG Phase II by IFA
- Laboratory supportive case: IFA IgG Phase II antibody titer $\geq$ 1:128

U.S. Q Fever Cases and Incidence 2000-2008



Challenges in Detection

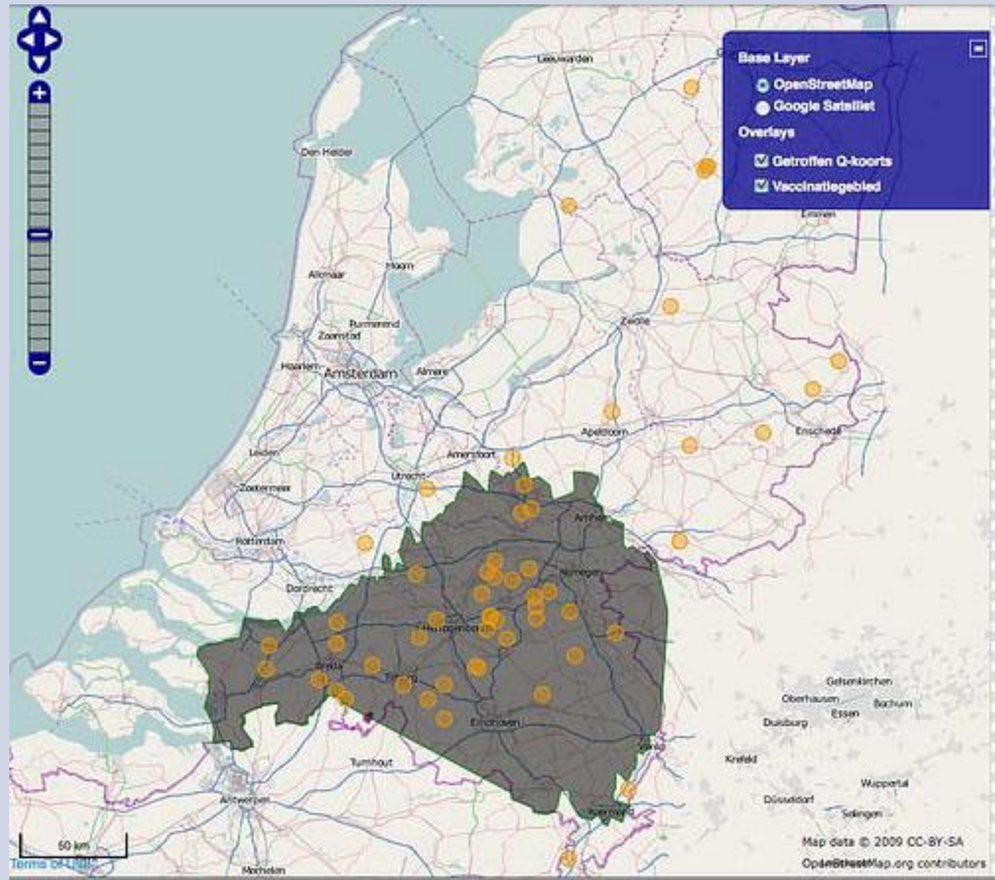
- Q fever typically thought of as an occupational disease
- Organism may travel for up to 11 miles on wind currents
- CDC surveillance data:
  - -76% of acute Q fever cases are NOT in high risk occupations
  - - 62% of acute Q fever cases do NOT report contact with livestock

Netherlands Q Fever Outbreak

- Largest Q fever outbreak ever reported with over 3,000 cases since 2007

- Previous baseline of Q fever cases was 17/year

- Pneumonia is the most common presentation for illness (inpatient and outpatient)



Unique Clone of *Coxiella burnettii* causing severe Q fever, French Guiana

- 37 cases/100,000 in 1996
- 150 cases /100,000 in 2005
- 24% of all community acquired pneumonia
- Severe disease, endocarditis,
- Higher rates of organism recovery than in France
- Source unknown
- Unique genotype – MST 17
  - Related to genotype that contains QpH1 plasmid causes severe clinical disease in animal models

Mahamat et al. Emerging Infectious Diseases. 2013, 29(7) 1102-1104

Coxiella in Alaska

- Reportable to SOE and OSV since 2007
  - One confirmed human case (imported) none locally acquired
  - No reported clinical cases domestic livestock
  - Antibodies detected in terrestrial wildlife (Caribou 25%)
  - Detected in marine mammals-Northern Fur Seals St Paul 2010
    - 5/146 (3%) placentas positive by immunohistochemical staining
    - 109/146 (75%) positive by PCR
- Are residents infected?
- Is there clinical disease?

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Coxiella in Alaska

- Test banked sera from residents of St Paul/St George 1980-2000 for antibodies to *C. burnettii* by EIA and IFA
  - Results:
    - 621 persons with sera 1980-2000
    - 76% were from St Paul
    - Age <1 to 91
    - 72 positive (12%) (≥1/64) (US National rate 3.7%)

Coxiella in Alaska

- Next Steps:
  - Establish active surveillance (with serology and treatment) of febrile cases seeking medical care
  - Conduct a contemporary study of seroprevalence
  - Conduct a “occupational” risk study
  - Test fur seal population for *Coxiella burnettii (*other infectious agents)