A Neighborhood Outbreak of Q Fever Linked to A Goat Ranch in California

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ACKNOWLEDGMENT

Calaveras County
Rose Cardenas
Jeanie Douglas
Dean Kelaita
CA Dept of Health
Mike Ascher
Kris Carter
David Cottam
Michele Jay
Ben Sun
Duc Vugia
Cal-EIS Program
Tim Wilson
CDC
Jennifer McQuiston
Jeffrey D. Miller
Herbert Thompson
Private Physicians
George Rishwain
Edward Schneider

California Department of Health Services
CASE #1: CLINICAL HISTORY

- A 56-year-old woman is hospitalized in May 2001
  - Insidious febrile illness x 1 month
  - Fever up to 104°F
  - Gall bladder removal without resolution of symptoms
  - Left leg parasthesia and progressive weakness leading to paralysis (unable to walk independently for 1 month)
CASE #1: LAB RESULTS

WBC = 6,500
Platelets= 111,000
AST= 178
ALT= 149
Alk phos= 532
T. bili= 1.2
Chest (CT): interstitial lung infiltrates, r. axillary adenopathy
Liver Imaging (CT): hepatomegaly
CASE #1: Q FEVER SEROLOGY

<table>
<thead>
<tr>
<th></th>
<th>IFA</th>
<th>CF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I IgG</td>
<td>&lt;64</td>
<td>64</td>
</tr>
<tr>
<td>Phase II IgG</td>
<td>≥1024</td>
<td>≥1024</td>
</tr>
<tr>
<td>IgM</td>
<td>≥40</td>
<td>≥40</td>
</tr>
<tr>
<td></td>
<td>6/11</td>
<td>7/31</td>
</tr>
<tr>
<td></td>
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<td>7/31</td>
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<tr>
<td></td>
<td>10/12</td>
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</tbody>
</table>

IFA = indirect immunofluorescence test
CF = complement fixation test
CASE #1: EXPOSURE HISTORY

- During 6 months prior to illness onset, the patient reported:
  - No direct contact with domestic animals or wildlife
  - No consumption of raw dairy products
  - No tick or other arthropod bites
  - No travel history outside of Calaveras County
Patient is a resident of a rural town in the Sierra Nevada foothills, Calaveras County, California.
The Celebrated Jumping Frog of Calaveras County

By Mark Twain
CASE #1: EXPOSURE HISTORY

- Patient lives at the end of a dusty dirt road $\frac{1}{4}$ mile from a small herd of about 50 goats
- Goats recently kidded in Mar-Apr 2001
- Pasture fencing alongside dirt road (first property on the road)
- Goats present for ~1 year
CASE FINDING

- Interview with the patient revealed that her husband (Case #2) also had a mild febrile illness in May.
- Canvassing of the neighborhood by the local public health nurse revealed a 76 year old man (Case #3) with an intermittent febrile illness since April.
- Press release issued to local news and an alert to local health care providers; no additional cases identified.
### Q FEVER SEROLOGY

<table>
<thead>
<tr>
<th>IFA Test</th>
<th>CASE #2</th>
<th>CASE #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFA Phase I IgG</td>
<td>≥1024</td>
<td>1024</td>
</tr>
<tr>
<td>IFA Phase II IgG (CF)</td>
<td>≥1024</td>
<td>≥1024</td>
</tr>
<tr>
<td>IFA IgM</td>
<td>≥40</td>
<td>≥40</td>
</tr>
</tbody>
</table>

**IFAS = indirect immunofluorescence test**
TREATMENT AND FOLLOW-UP

- All 3 case-patients treated successfully with oral doxycycline
- *Case #1 continues to have residual weakness and pain in the left leg; her neurologist feels that the damage is permanent*
- Serologic monitoring of CF titers is being done by the CA Dept of Health Services every 4-6 months to detect chronic Q fever
ENVIRONMENTAL INVESTIGATION

- Owner of the goat ranch notified about the Q fever cases in the neighborhood
- No similar illness among family members or caretakers at the ranch
- Goats appear healthy; no history of reproductive problems
- Herd is noncommercial, mixed breeding, primarily kept as a hobby
- Placentas and other birthing products left in pasture or “thrown to the eagles”
A serosurvey of the goat herd revealed a high prevalence of antibodies to *C. burnetii*
ENVIRONMENTAL INVESTIGATION

Goat Serosurvey

42/46 (91%) seropositive by IFA testing

- 38/40 (95%) females
- 4/6 (67%) males
SUMMARY

- Cases most likely exposed to Q fever indirectly by inhalation of aerosolized contaminated dust particles spread downwind or while driving past the goat herd.

- Recommendations were given to the ranch owner to minimize environmental contamination during future birthing seasons.
SUMMARY

- This outbreak illustrates the potential for patients infected with Q fever to present without a history of direct contact with animal reservoirs.

- Thorough public health investigation is necessary to identify potential clusters and common sources; implications for bioterrorism surveillance.
SUMMARY

- Both rural and urban populations are at risk of exposure to Q fever in California, where “hobby” goat herds and petting farms are increasingly popular.