American Association of Zoo Veterinarians Infectious Disease Committee Manual 2013

**RICKETTSIOSIS**

| Animal Group(s) Affected | Transmission | Clinical Signs | Severity | Treatment | Prevention and Control | Zoonotic
|--------------------------|--------------|----------------|----------|-----------|------------------------|----------
| Mammals                  | Vector-borne, primarily ticks but some species are transmitted by fleas | Non-specific | Non-clinical or mild to severe including death | Doxycycline | Avoid contact with ticks and other ectoparasites. No vaccine available. | Many species are zoonotic.

**Fact Sheet compiled by:** Michael J. Yabsley  
**Sheet completed on:** 1 August 2013  
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**Susceptible animal groups:** For those *Rickettsia* species that are tick-borne, ticks serve as the definitive and reservoir hosts for these bacteria, but numerous vertebrate hosts are important as they serve as blood-meals for ectoparasites and some can serve as amplifying hosts for *Rickettsia* spp. Antibodies to *Rickettsia* spp. have been reported in a wide range of wildlife and domestic animal species.

**Causative organism:** The four main *Rickettsia* species that are known to cause disease in people and/or animals in the United States are:

- *Rickettsia rickettsii*, the causative agent of Rocky Mountain Spotted Fever, is transmitted by ticks (primarily *Dermacentor* spp. and rarely by *Amblyomma americanum*). Recent report involving dogs and people in Arizona (USA) supports transmission by *Rhipicephalus sanguineus*.
- *Rickettsia parkeri*, (Parkeri Rickettsiosis), is transmitted by ticks (primarily *Amblyomma maculatum* and rarely *A. americanum*) and frequently causes an eschar.
- *Rickettsia typhi* (endemic or murine typhus) is transmitted by *Xenopsylla cheopis* usually infesting rats.
- *Rickettsia felis*, (commonly referred to as cat flea typhus) which is transmitted by *Ctenocephalides felis*, is endemic to all continents except Antarctica.

Other species of *Rickettsia* have been detected in the US but most are considered endosymbionts of ticks (i.e., these species aren’t known to induce disease in vertebrate hosts). However, in recent years, some of these endosymbionts (e.g., ’*Rickettsia amblyomnii’*) have been associated with mild disease in people. Outside of the US, numerous of *Rickettsia* species exist, many of which are zoonotic.

**Zoonotic potential:** Many species, but not all, are zoonotic.

**Distribution:** *Rickettsia* spp. have been reported world-wide. *R. rickettsii*, *R. felis* and *R. parkeri* are distributed throughout the Americas and *R. typhi* and *R. felis* are widely distributed throughout the world.

**Incubation period:** Typically 3-14 days.

**Clinical signs:**

**People:** Wide range of symptoms from asymptomatic to severe potentially fatal disease. Mild or asymptomatic cases rarely diagnosed. Some individuals develop a fever, muscle pain, headache, and rash (due to damage of vascular endothelial cells), but, importantly, a rash is not always observed with rickettsioses. Multi-organ disease results in high mortality rate if not treated. Infections with *R. parkeri* tend to be less severe than *R. rickettsii* and often present with an eschar at the site of tick attachment. Neurologic signs may develop in people infected with *R. typhi* or *R. felis*.

**Canines:** Canines are susceptible to *R. rickettsii* and can develop severe disease rapidly, although most infections are asymptomatic or mild. Dogs can develop similar clinical signs as people. The most common clinical signs include fever, lethargy, anorexia, ataxia, rash, swollen lymph nodes, and localized edema.

**Other animals:** Most other animals only have short-term infections with no associated disease. These animals as
well as others that don’t become ill develop antibodies that can be detected by serologic testing.

**Clinical pathological, gross, and histopathological findings:** Thrombocytopenia is common. Leukopenia followed by a leukocytosis and mild anemia may develop. Petechiae and ecchymoses are common due to damage to endothelial cells.

**Diagnosis:** These diseases can be difficult to diagnose but diagnosis is based on clinical signs, exposure to ectoparasites (ticks/fleas), and supporting data from laboratory findings, serology, and/or molecular assays. Ideally, acute and convalescent serum samples are tested for antibodies. Molecular testing of petechial skin biopsies (or blood, although this sample is less rewarding) can be used. Fluorescent antibody (FA) or molecular testing of tissues can be used to diagnoses cases post-mortem. Because clinical signs may develop quickly, lack of a serologic response doesn’t preclude infection. PCR testing has not been widely used to document active infection in wildlife species.

**Material required for laboratory analysis:** Serum, EDTA blood for PCR, skin biopsy, and/or tissue samples.

**Relevant diagnostic laboratories:**

**Humans:** Many state diagnostic labs have testing capabilities.

**Animals:**
North Carolina State University
College of Veterinary Medicine
Vector Borne Disease Diagnostic Laboratory
1060 William Moore Drive
Room 462A
Raleigh, NC 27607
919-513-8279
http://www.cvm.ncsu.edu/vhc/csds/ticklab.html (serology and PCR)

Antech Diagnostics
Corporate Headquarters:
17672-B Cowan Avenue
Irvine, CA 92614
ANTECH West 1-800-745-4725
ANTECH East 1-800-872-1001
ANTECH Canada 1-800-341-3440
ANTECH Test Express 1-888-397-8378
(serology)

Zoologix Inc.
9811 Owensmouth Avenue
Suite 4
Chatsworth, CA 91311-3800
Phone: 818-717-8880
Fax: 818-717-8881
Email: info@zoologix.com
(This PCR does not differentiate among *Rickettsia* spp.)

**Treatment:** The most common treatment is doxycycline, usually 10 - 20 mg/kg every 12 hours for 7 days. A lower dose (5 mg/kg every 12 hours) can also be given for 14 days. Chloramphenicol can also be used.
**Prevention and control:** Because *Rickettsia* spp. are vector-borne, limiting exposure to vectors is necessary to prevent transmission. Transmission doesn’t occur from animal to animal, but can occur through blood inoculation of wounds. Habitat modification to limit ticks in areas where animal frequent. Some birds are known hosts for certain tick species, and while they may not be competent hosts of the rickettsial pathogens, they can aid in distribution of vectors.

**Suggested disinfectant for housing facilities:** *Rickettsia* spp. are not viable outside of the host. Prevent vector exposure. Application of acaricides and removal of leaf litter can decrease tick abundance.

**Notification:** CDC Reportable Disease for human cases in US

**Measures required under the Animal Disease Surveillance Plan:** None

**Measures required for introducing animals to infected animal:** These bacteria are vector-borne so direct contact between animals is not a risk factor for infection. However, ectoparasite prevention should be implemented.

**Conditions for restoring disease-free status after an outbreak:** n/a

**Experts who may be consulted:**

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**References:**


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