



## RELAPSING FEVER (Louse-borne, Tick-borne)

### 1. Agent:

Louseborne - *Borrelia recurrentis*, a spirochete.

Tickborne - many *Borrelia* species, distinguished by area of first isolation and/or vector.

### 2. Identification:

a. **Symptoms:** Fever, headache, muscle, and joint aches. Fever is periodic lasting 2 to 9 days alternating with 2 to 4 day afebrile periods; the number of relapses varies from 1 to 10 or more. The duration of louse-borne illness averages 13 to 16 days; tick-borne disease is longer. Transitory petechial rash is common during initial febrile episode.

b. **Differential Diagnosis:** Febrile illnesses associated with transitory rash.

c. **Diagnosis:** Direct visualization procedures ie. Darkfield preparation of fresh blood or stained thick films demonstrating the borreliae. PCR can be performed on blood, cerebrospinal fluid samples, culture medium, or in tissue. Rare methods include cultures and animal inoculation. Serologic testing is not typically used to diagnose and best used to confirm a diagnosis after patient has been treated.

3. **Incubation:** 5-15 days, usually 8.

4. **Reservoir:** Louseborne: humans (Asia, Africa, and South America). Tick-borne: peridomestic rodents.

5. **Source:** Louse-borne: *Pediculus humanus* (body louse). Tick-borne: in California, *Ornithodoros hermsi*; present only at higher altitudes.

6. **Transmission:** Louse-borne: by crushing an infected louse over the bite wound or skin abrasion. Tick-borne: from the bite or coxal fluid of an infected tick.

7. **Communicability:** Not person-to-person. A louse becomes infective 4 to 5 days after ingesting the borreliae, and remains so for the rest of its life (20-40 days). Ticks may remain infective for years.

8. **Specific Treatment:** Penicillin and other beta-lactam antimicrobials. Tetracyclines.

9. **Immunity:** Unknown; repeated infections have been documented.

### REPORTING PROCEDURES

1. **Reportable.** Report any cases or suspected cases within one day to ACDC or Morbidity Unit (*California Code of Regulations*, Title 17, Section 2500).

### 2. Report Form:

**RELAPSING FEVER CASE REPORT (CDPH 8561)**

### 3. Epidemiologic Data:

a. A history of travel to, or visitors from endemic areas within incubation period. In southern California, tick-borne illness has been acquired in the San Bernardino and San Gabriel mountains above 5,000-ft. elevation.

b. Description of area where infection was probably acquired.

c. History and dates of insect and tick bites.

d. Exposure to rodents.

e. Ill contacts.

f. Louse-borne disease has not occurred in the United States for many years; it is associated with malnutrition, crowding and poor hygiene.



## CONTROL OF CASE, CONTACTS & CARRIERS

Immediate investigation required. ACDC will supervise investigation and control measures.

### CASE:

**Isolation:** None if no lice or ticks are present.

### CONTACTS:

Asymptomatic, louse-infested persons with similar history of exposure. Immediate quarantine for 9 days or until residual insecticide is applied to premises.

## PREVENTION-EDUCATION

1. Control rodents at higher elevations and rodent proof the structures.
2. Avoid contact with ticks and peridomestic rodents.
3. Use residual insecticides for tick and louse control.

## DIAGNOSTIC PROCEDURES

Serologic and PCR testing for TBRF is available at some commercial laboratories. Serologic testing is not standardized, and results may vary by laboratory. There is also potential cross-reactivity of TBRF with Lyme Disease agents due to the similarity of proteins between the causative organisms. Serology and PCR tests are available at CDC.

**Blood Smear:** Diagnosis is made by demonstration of borreliae in darkfield preparations of fresh blood or stained thick blood films, or by intraperitoneal inoculation of laboratory rats or mice with blood taken during a febrile episode.

**Serology:** Serology testing is available at CDC Bacterial Diagnostic and Reference Laboratory.

Laboratory Form: [CDC 50.34 Specimen Submission Form.](#)

Examination Requested: *Borrelia hermsii* (Tick-borne Relapsing Fever) Serology.

Material: Serum.

Amount: 0.5 mL.

Storage: Keep specimen at a refrigerated temperature (2-8°C) up to 14 days and frozen (-20°C or lower) for up to 60 days post-collection.

**PCR:** PCR testing is available at CDC Bacterial Diagnostic and Reference Laboratory.

Laboratory Form: [CDC 50.34 Specimen Submission Form.](#)

Examination Requested: *Borrelia* Molecular Detection-Relapsing Fever

Material: Whole blood: EDTA-treated (preferred), OR Serum OR Plasma. Cerebrospinal fluid requires prior approval from CDC.

Amount: 0.5 mL.

Storage: Keep specimen at a refrigerated temperature (2-8°C) up to 14 days and frozen (-20°C or lower) for up to 60 days post-collection.