



TYPHUS, FLEA-BORNE (Murine Typhus, Endemic Typhus)

1. **Agent:** *Rickettsia typhi* or *R. felis*, a pleomorphic, obligate intracellular coccobacillus.
2. **Identification:**
 - a. **Symptoms:** Variable onset with non-specific symptoms including severe headache, chills, fever, myalgias. A macular rash may appear 3-5 days after onset. Gastrointestinal symptoms, such as nausea, vomiting, abdominal pain, and diarrhea, may also occur. Severe illness is rare. Most people recover completely, sometimes without treatment, with spontaneous recovery generally occurring within 2 weeks in untreated patients. However, untreated disease can result in severe illness and damage to one or more organs, including liver, kidneys, heart, lungs and brain. Rare fatalities have been reported.

Laboratory findings may include thrombocytopenia, mild leukocytosis or leukopenia, and abnormal liver function tests.

A milder course, seasonality, sporadic distribution, and the absence of lice help differentiate this disease from louse-borne typhus.
 - b. **Differential Diagnosis:** Influenza-like illness, viral exanthems, other Rickettsial diseases.
 - c. **Diagnosis:** Typhus fever group antibodies (IgG, IgM) by IFA; Cases are confirmed by positive PCR, serological evidence of a fourfold rise in IgG antibodies to *R. typhi* by IFA between paired serum specimens, or demonstration of typhus fever group antigen in a biopsy or autopsy specimen by immunohistochemical methods (IHC).
3. **Incubation:** 1-2 weeks, commonly 12 days.
4. **Reservoir:** Stray animals (such as cats) or wildlife (such as rats or opossums).
5. **Source:** Infected fleas (primarily rat flea: *Xenopsylla cheopis*, additionally cat flea: *Ctenocephalides felis* and mouse flea: *Leptopsyllia segnis*).
6. **Transmission:** Infected fleas defecate during feeding and contaminate the bite site and other breaks in the skin.
7. **Communicability:** Not person-to-person. Fleas are infective for life.
8. **Specific Treatment:** Tetracyclines, specifically doxycycline, are the treatment of choice for adults and children. Antibiotics are most effective when given soon after symptom onset. People treated early with doxycycline usually recover quickly.
9. **Immunity:** Generally lifelong, but reinfection can occur.

REPORTING PROCEDURES

1. Report any cases or suspected cases within 7 days to ACDC or Morbidity Unit (California Code of Regulations, Title 17, Section 2500).
2. **Report Form:**

[TYPHUS AND OTHER NON-SPOTTED FEVER RICKETTSIOSES CASE REPORT \(CDPH 8580\)](#)
3. **Epidemiologic Data:**
 - a. Occupation and outdoor hobbies.
 - b. History of flea bites, presence of animals, i.e., rats, cats, opossums, and fleas at work or home.
 - c. Travel to or residence in endemic areas. In California, the north central and some eastern sections of Los Angeles County, as well as Orange, Santa Barbara, San Bernardino and San Diego Counties are endemic areas.



CONTROL OF CASE & CONTACTS:

CASE:

1. **Isolation:** None.

CONTACTS: No restrictions.

PREVENTION-EDUCATION

Anyone who has contact with infected fleas is at risk for typhus and prevention is achieved by reducing exposure to fleas and animals that carry them. Use flea-control on pets. Do not feed or pet stray or wild animals. Do not leave pet food outdoors, do not provide food and water for wild animals. Maintain yard free of debris and trim overgrown plants and bushes. Keep trash in containers that are tightly covered to avoid attracting animals. Close off crawl spaces and openings under home where rats and stray animals can sleep, hide, or find food. Address any stray cat, rodent, or opossum issues on or near homes.

DIAGNOSTIC PROCEDURES

Clinical and epidemiologic history required to aid in the selection of laboratory tests. Typhus serology and PCR tests are available at PHL and CDPH Viral and Rickettsial Disease Lab.

1. **Serology:** Paired sera recommended.

At PHL:

Laboratory Form: [Test Request Form H-3021](#).

Test requested: Rickettsia IgM & IgG IFA.

Material: Serum or CSF.

Amount: 1 mL (minimum 0.25 mL)

Storage: Store refrigerated at 2 to 8°C. Transport on cold packs. If submission is to be delayed longer than 5 days, store at -20°C or colder and transport on dry ice.

Remarks: Collect first (acute) blood specimen within first 2 weeks of illness. Collect second (convalescent) blood approximately 2 weeks after the first and up to 10 weeks later. Send each specimen to

Public Health Laboratory as soon as it is collected.

At CDPH:

Laboratory Form: [VRDL General Purpose Submittal Form](#)

Test requested: Rickettsia IgM & IgG IFA.

Material: Serum or plasma.

Amount: 1 mL

Storage: Store refrigerated at 2 to 8°C. Transport on cold packs. If submission is to be delayed longer than 3 days, store at -70°C and transport on dry ice.

2. **PCR:** Can be performed on serum, plasma, whole blood, and eschar/scab/tissue specimens.

At PHL:

Laboratory Form: [Test Request Form H-3021](#)

Test Requested: Rickettsia PCR

Material: Whole blood preserved with purple top EDTA tube or acid citrate dextrose Solution A (ACD-A).

Amount: 4 ml.

Storage: Store samples at 4-8°C using double biohazard specimen bags in a secondary container. Specimen should be sent on cold packs.

At CDPH:

Laboratory Form: [VRDL General Purpose Submittal Form](#)

Test Requested: Rickettsia PCR

Material: Serum, Plasma, whole blood, or eschars/scabs/tissue

Amount: Serum/Plasma – 1 mL; Whole blood – 3-5 mL in serum separator tubes or in EDTA.



Storage: Store serum/plasma/whole blood refrigerated at 2 to 8°C. Transport on cold packs. If submission is to be delayed longer than 3 days, store at -70°C and transport on dry ice. DO NOT FREEZE WHOLE BLOOD.

Send eschar/scabs/tissue swab and lesion samples dry and at room temperature.

3. **Immunohistochemical:** Staining of skin biopsy and autopsy specimen.