Tufts University/Tufts Medical Center

Exposure Response Plan for the Laboratories Handling *Rickettsia typhi*

**Background Information**

*Rickettsia* is a genus of obligate intracellular bacteria that multiply within eukaryotic cells. Rickettsiae enter cells through phagocytosis, escape from the phagosome, and then replicate in the cytoplasm of the infected cells.

Rickettsiae are a diverse group of pathogens and the diseases they cause are related to their transmission vector. *Rickettsia* are divided into three groups; the spotted fever group, the typhus group and the scrub typhus group.

*R. typhi* is a member of the typhus group and is classically transmitted between rats through flea vectors. Human infection is caused by the accidental transmission of rat to flea to human. Rats are the primary host, though other vertebrates are known to harbor the bacteria. The minimum infectious dose of Rickettsiae is less than 10 organisms and can be transmitted by aerosol and parenteral routes. Natural transmission in humans is usually through the parenteral route (a combination of a bite or skin abrasions) with *Rickettsia* containing flea feces. The mortality rate of infection is less than 5%.

Viable *R. typhi* is not found in sputum or excreta of infected laboratory animals; however, blood from acutely infected animals and humans is infectious. Insecticides and rodenticides are often used to control the spread of *R. typhi*.

*Exposure Incidents*: Laboratory acquired infections with murine typhus in the research lab have been reported. There was an accidental parenteral inoculation and exposures to infectious aerosols.

*Reporting Exposure Incidents*: Report all exposures to the Principal Investigator or lab supervisor and seek immediate medical evaluation. If help is needed with injuries or clean up, at Tufts University contact the Tufts University Police at 6-6911 and at Tufts Medical Center contact Tufts MC Security at 6-5100. Whenever there is an accident involving *R. typhi*, the Biosafety Officer must be notified.

*Pre-exposure Health Screening*: 

Prior to beginning work with *R. typhi*, an Employee Health Professional will inform each person of the risks s/he takes and of the symptoms s/he may experience following exposure. Although infection usually results in a mild febrile illness, a temperature in the 102°F range and a headache must be reported.

*Before an Exposure Incident Occurs*: 

A vaccine is not available. Data specific to pregnant women are not available. The majority of infections have been in men.
After an Exposure Incident Occurs: Immediate Action by Route of Exposure

- **Needlestick, Laceration or Animal Bite:** Wash the area with soap and running water. Report all needlesticks.

- **Mucous membranes (eye, nose, mouth):** If contaminated material is splashed or sprayed contaminating the eyes, nose or mouth: Flush the eyes for 10-15 minutes. Rinse mouth out with clean water and do not swallow.

- **Inhalation:** If contaminated materials are aerosolized outside of primary containment and potentially inhaled, rinse mouth twice expelling the rinsate. Do not swallow.

After an exposure incident occurs: medical evaluation and follow-up:

Following immediate post exposure actions, contact the Tufts MC Employee Health Clinic (Boston), TCSVM Occupational Medical Clinic (Grafton) or the Mt. Auburn Occupational Health Services (Medford) and arrange for medical evaluation, diagnosis and treatment if needed. A blood sample may be requested. The incubation period ranges from 3-16 days. Prompt diagnosis and treatment minimize the risk of significant sequelae.

**Signs and Symptoms of *R. typhi* infection include the following:**

- Fever; sudden onset, generally $\geq 102^{\circ}F$
- Headache; sudden onset, usually frontal
- Muscle pain
- Nausea and vomiting

**Post-exposure:**

The healthcare provider will determine the course of treatment.

If an employee develops signs and symptoms associated with *R. typhi* in the absence of an exposure incident, the PI and Biosafety Officer shall be notified immediately. In the absence of a likely travel history, the infection will be considered laboratory acquired until proven otherwise.