Tufts University/Tufts Medical Center

Exposure Response Plan for the Laboratories Handling *Salmonella typhi*

**Background Information**

*Salmonella typhi* is a gram negative rod that causes a protracted illness referred to as typhoid fever. Humans are the only natural reservoir. Infection is normally acquired through ingestion of food or water contaminated by feces and urine of infected persons and chronic carriers. The disease is rare in the US and developed nations.

The infectious dose cited varies in the literature from as low as 100 organisms to 100,000 organisms. Reduced gastric acidity lowers the infectious dose. Mode of transmission in the laboratory is usually hand-to-mouth transfer from contaminated surfaces. Over 250 lab acquired infections (LAIs) with 20 deaths have been reported. A number of LAIs in 1980 were traced to poor practices with a clinical laboratory proficiency testing sample. Another grouping occurred in 1997 due to contamination of hand wash faucets. Person-to-person transmission has been documented. Approximately 2-5% of infected persons become asymptomatic carriers.

*Exposure Incident:* Laboratory acquired infections are largely due to accidental ingestion of bacteria.

*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, members of the University will contact the Police at 6-6911 and members of the Medical Center will contact Security at 6-5100. Whenever there is an accident involving *S. typhi*, the Biosafety Officer must be notified. Untreated infections have a mortality rate approaching 20% while proper treatment reduces the rate to less than 1%.

**Pre-exposure Health Screening:**

Prior to beginning work with or around *S. typhi*, the PI or an Employee Health Professional will inform each person of the risks s/he takes and of the symptoms s/he may experience following exposure.

*Before an Exposure Incident Occurs:*
Discuss vaccination with the Occupational Health Provider as the vaccine may not be the best prevention. Typhoid vaccines and boosters are available but lose effectiveness after several years. Developed immunity can be overwhelmed by a large dose of bacteria. Use of antibiotics while working with *S. typhi* will not prevent illness.

*After an Exposure Incident Occurs: Immediate Action by Route of Exposure*

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

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

Following immediate post exposure actions, contact the TMC 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.

During this appointment, the exposed individual will be informed of the signs and symptoms of typhoid fever, and will be instructed to watch for the development of these signs and symptoms. The incubation period is dependent on the size of the infecting dose. No particular signs and symptoms are associated with the initial disease. Some people will remain asymptomatic. After 7-14 days one may see:

**Signs and Symptoms:**
- Gradual onset of fever, which will remain high for the duration of the illness
- Abdominal pain
- Headache
- Constipation (possible early sign)

**Post-exposure:**

The healthcare provider will determine the course of treatment. People are generally asked not to prepare food and not to provide direct care to infants, the elderly and the immunocompromised. A series of stool cultures may be done to ensure that the infection is not chronic and a carrier state has not developed.

Massachusetts Department of Public Health classifies suspected or confirmed typhoid fever as immediately reportable diseases.

If an employee develops signs and symptoms associated with typhoid fever in the absence of an exposure incident, the PI and Biosafety Officer shall be notified immediately. Infection will be considered laboratory-acquired until proven otherwise.