Tufts University/Tufts Medical Center

Exposure Response Plan for the Laboratories Handling Enterohemorrhagic *E. coli* (EHEC)

**Background Information**

*Escherichia coli* is a gram negative rod that typically colonizes the gastrointestinal tract of human infants within hours of birth. Other warm blooded animals also have *E. coli* in their intestines.

EHEC was first recognized as a cause of human disease in 1982 during an outbreak of hemorrhagic colitis. The key virulence factor is Shiga toxin (Stx) which is also known as verocytotoxin (VT). Synonyms for the organism include Shiga toxin producing *E. coli* (STEC) and verotoxin producing *E. coli* (VTEC). In the US infections are frequently due to serotype O157:H7. Shiga toxin does not cause disease in humans unless exposed by intravenous injection of by exposure to STEC.

The infectious dose is unknown but appears low with estimates of 10-100 organisms in various references. Bacteria have been transmitted by direct contact with farm and zoo animals, through contaminated food as well as person-to-person. Laboratory associated infections are likely due to hand contamination and subsequent ingestion. Although many infected will have self-limiting diarrhea, severe diarrhea can result in temporary or permanent renal failure. Some people with renal failure die.

*Exposure Incident:* In addition to laboratory acquired infections resulting from ingestion of bacteria from contaminated hands, accidental percutaneous exposure and inhalation of aerosols are other likely routes of exposure. Airborne transmission has been implicated in animal rearing environments.

*Reporting Exposure Incidents:* Report all exposures to the Principal Investigator/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 *E. coli*, the Biosafety Officer must be notified.

**Pre-exposure Health Screening:**

Prior to beginning work with or around EHEC, 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. Report of antibiotic sensitivities, if available, will be retained.

**Before an Exposure Incident Occurs:**
A FDA approved vaccine for EHEC is not available although a phase III clinical trial was needed for O157:H7 after safety studies in adults and children 2-5 years old. Limited
veterinary vaccines are available. Bioniche from Canada reduces the number of organisms shed in the manure.

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

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

**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 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 disease related to EHEC, and will be instructed to watch for the development of these signs and symptoms. The incubation period is 2-8 days with a median of 3-4 days. Some people will remain asymptomatic.

**Signs and Symptoms:**
- Bloody or non-bloody diarrhea
- Cramps and abdominal pain
- Low grade fever
- Hemolytic anemia, thrombocytopenia, renal injury (HUS - hemolytic uremic syndrome)

**Post-exposure prophylaxis:**

The healthcare provider will determine the course of treatment as enteric disease can be self-limiting. When treatment is initiated, it generally starts with electrolyte fluid replacement. Antibiotic therapy is reserved for severe cases of enteric disease and extraintestinal infections.

Massachusetts Department of Public Health classifies infections caused by shiga-toxin producing *E. coli* as reportable diseases. Any clinical laboratory identifying an infection caused by shiga-toxin producing *E. coli* may be reported to the Massachusetts Department of Public Health in accordance with disease-reporting regulations. *E. coli* O157:H7 infection is also reported on the national level.
If an employee develops signs and symptoms associated with *E. coli* exposure in the absence of an exposure incident, the PI and Biosafety Officer shall be notified immediately. Infection will not be considered laboratory-acquired until proven otherwise.