Tufts University/Tufts Medical Center

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

**Background Information**

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

Nonpathogenic strains are frequently used as a host organism for work with recombinant DNA. The NIH Guidelines for Research Involving Recombinant DNA Molecules references K-12 strains where K is a capsular antigen.

Pathogenic strains are divided into those causing intestinal infections and those causing extraintestinal infections (ExPEC).

The ExPEC group causes urinary tract infections (UPEC), neonatal meningitis (MNEC) and sometimes septicemia. They are not further addressed in this plan.

The intestinal pathogens are classified into six categories. EHEC is covered under a separate plan.

**EHEC** – *Enterohemorrhagic* *E. coli*; (Shiga toxin producing *E. coli*); main North American serotype is O157:H7; low infectious dose; see separate plan

**EPEC** – *Enteropathogenic* *E. coli*; potentially fatal infant diarrhea although the infectious dose for adults by ingestion is $10^8$-$10^{10}$; incubation period 12-72 hours

**ETEC** - *Enterotoxigenic* *E. coli*; traveler’s diarrhea – watery diarrhea that can be mild to severe, produces heat labile (LT) enterotoxin and a heat stable one (ST); infectious dose is $10^8$-$10^{10}$ organisms by ingestion; incubation period is 24-72 hours

**EIEC** – *Enteroinvasive* *E. coli*; low infectious dose; watery diarrhea ranges from self-limiting to hypotension with bacterial toxin in the bloodstream; characterized by invasion of the epithelial cells of the colon; incubation period is 12-72 hours; can be associated with food poisoning

**EAEC** – *Enterocaggregative* *E. coli*; persistent diarrhea of adults and children

**DAEC** – *Diffusely adherent* *E. coli*

*Exposure Incident:* Laboratory acquired infections of enteric pathogens have resulted from ingestion of bacteria from contaminated hands. Accidental percutaneous exposure and inhalation of aerosols are other prominent routes of exposure.

*Reporting Exposure Incidents:* Report all accidents and 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 pathogenic *E. coli*, 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. The pathogenicity of strains planned for laboratory use will be identified. Records of antibiotic sensitivities, if available, will be retained.

**Before an Exposure Incident Occurs:**

A FDA approved vaccine for pathogenic *E. coli* is not available. Limited veterinary vaccines are available.

**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 the strain of E. coli used in the work area, and will be instructed to watch for the development of these signs and symptoms. Incubation periods vary from hours to days. Diarrhea must be reported when working with enteric pathogens.

**Signs and Symptoms:**
- Diarrhea, which may range from mild and water to severe and bloody
- Abdominal cramping, pain or tenderness

**Post-exposure prophylaxis:**

The healthcare provider will determine the course of treatment as enteric disease can be self-limiting.
If an employee develops signs and symptoms associated with *E. coli* infection in the absence of a known exposure incident, the PI and Biosafety Officer shall be notified immediately. Infection will not be considered laboratory-acquired until proven otherwise as there are a large number of agents that cause similar signs and symptoms.