Exposure Response Plan for the Laboratory Handling of *Haemophilus influenzae*

**Background Information**

Bacteria of the genus *Haemophilus* are fastidious, small, gram negative bacilli and coccobacilli. *Haemophilus influenzae* (*H. influenzae, H. flu*) are classified into two groups; typeable (have a capsule) and non-typeable (no capsule). To date there are six groups of typeable *H. flu*; a-f. Type b (Hib) has historically been the most common cause of bacterial meningitis in young children aged 3 months to 6 years.

Between 30-80% of healthy adults are colonized with this organism in the respiratory tract. Colonization is considered to be “dynamic” – this means that strains are being acquired and cleared frequently. Non-typeable *H. flu* is a common cause of sinusitis, COPD exacerbation, and is an important cause of community-acquired pneumonia, especially in the elderly, those with COPD and those with AIDS.

Adults can become infected when a colonizing organism breaches host defenses or if the organism is accidentally introduced in a manner where host defenses are breached.

Exposure Incident: Laboratory acquired infections (LAIs) have been caused by inhalation, autoinoculation and ingestion.

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 *H flu*, the Biosafety Officer must be notified.

Pre-exposure Health Screening:

All employees will receive training on the risks of working with *H. flu* and symptoms of exposure by the PI or Occupational Health Professional prior to beginning work with or around this agent. If a worker is using Hib s/he should be seen by Occupational Health prior to use of the agents to discuss risks/benefits of vaccination and be vaccinated if necessary. Immunocompromised adults should inform Occ Health of their immune status as vaccine is most helpful in this group. Disease before age 2 does not confer immunity.

Before an Exposure Incident Occurs:

The first Hib vaccine was licensed in the US in 1985. It was not very effective in children 18 months and younger. The first improved conjugate vaccine was licensed in 1987. Since the introduction of the Hib vaccine, the incidence of all infections due to encapsulated and non-typeable strains combined have decreased. Hib is not highly
contagious and is not communicable 48 hours after initiation of effective antibiotic therapy.

**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 (nose, mouth):* If contaminated material is splashed or sprayed: Rinse with clean water. Do not swallow. *(eyes)* Flush for 15 minutes, preferably using an eyewash.

*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 medical evaluation, the exposed individual may be educated on the signs or symptoms of Hib invasive disease and instructed to watch for the development of these signs and symptoms.

There are typically no preventative measures employed when working with non-typeable *H. flu* although the HCP may consider chemoprophylaxis when aerosol is inhaled. The exposed person may become colonized.

Hib is typically identified through culture with isolates serotyped. Latex particle agglutination is more sensitive than culture but cannot provide antibiotic sensitivities.

**Signs and Symptoms of *H. flu* vary**

Severity is often related to whether the bacteria are encapsulated or non-encapsulated.

Non-encapsulated strains may cause:

- sinusitis
- pneumonia,
- acute exacerbation of COPD
- otitis media – ear infection

Encapsulated strains may cause:

- meningitis
- septic arthritis
- pneumonia
- conjunctivitis
- cellulitis
- epiglottitis – acute infection of the upper airway that may lead to airway obstruction in hours

Beta-lactamase-negative, ampicillin resistant (BLNAR) *H. flu* is an emerging pathogen. Prevalence of such strains is low in the US and there is no significant difference in the clinical presentation of pneumonia.

**Post-exposure prophylaxis:**

Chemoprophylaxis is generally considered in people at risk for invasive Hib disease. In adults, this may include people with malignant neoplasms, COPD and smokers. Chemoprophylaxis is generally not recommended in pregnant women.

If any individual working with or around *H. influenzae* develops signs or symptoms suggestive of exposure to *H. influenzae*, they must inform their PI and Biosafety Officer immediately. Signs and symptoms usually develop within days of exposure. The individual is communicable for 24-48 hours after starting antibiotics. The individual must be evaluated at TMC Employee Health (Boston), must notify the TCSVM Occupational Health Nurse who will refer the individual to an Infectious Disease specialist (Grafton), or a physician at Mt. Auburn Hospital Occupational Health Group (Medford).

Massachusetts Department of Public Health classifies invasive Hib as a reportable disease. Reporting is required of Healthcare Providers.

If an employee develops signs and symptoms associated with invasive Hib disease in the absence of an exposure incident, the PI and Biosafety Officer shall be notified immediately. It is not reasonable to assume the infection is laboratory-acquired until proven otherwise.