



## Laboratory Acquired Infections

### Overview

The most common routes of laboratory acquired infection (LAI) are inhalation (particularly by aerosols), percutaneous inoculation (needle stick injuries, broken glass injury, and/or animal bites or scratches), direct contact between contaminated surfaces (gloves, hands), and mucous membranes as well as through ingestion – for example by smoking, eating, or accidental aspiration through a pipette.

**Most LAI is preventable by safe practice and mindfulness.**

### High risk pathogens and risks

Pathogen	Risk situation	Usual symptoms
HIV	Exposure to blood or blood products- needlestick, splash to eye or mouth	Febrile illness with headache, myalgia and joint pains (many other possible symptoms) several weeks after exposure but often no symptoms. Longer term (years later), onset of immunosuppression and wide variety of serious infections are possible including pneumococcal and pneumocystis pneumonia.
<i>Mycobacterium tuberculosis</i>	Inhalation of infected aerosol created during specimen processing	Subclinical (asymptomatic) infection Development of cough over several weeks. Blood in sputum, fevers, weight loss. Disseminated infection possible. Immunocompromised person (e.g. is at greater risk of acquisition and development of disease)
COVID-19	Exposure to infected bioaerosol during specimen processing	Acute respiratory illness that can be fatal
Viral hepatitis	Exposure to blood or blood products - needlestick, splash to eye or mouth	Infection without symptoms possible Acute hepatitis of varying severity - can be fatal; onset several weeks after exposure
<i>Burkholderia pseudomallei</i> (melioidosis) <i>Neisseria meningitidis</i> <i>Brucella</i> species	Inhalation of infected aerosol created during specimen processing, especially from positive blood culture Sniffing of plates	Rapid onset of systemic (septicaemic) infection that can be fatal  <i>Most infections were acquired through workers being unaware of contaminated cultures from clinical cases</i>
<i>Salmonella</i> / <i>Shigella</i> spp.	Handling of samples and manipulation of cultures	Gastroenteritis, Dysentery, Bloodstream infection

### Prevention of LAI

#### Personal protective equipment and safe practices:

- Eating, drinking, smoking, applying cosmetics or storing food for human consumption in laboratories is strictly prohibited.
- Always wear appropriate PPE including protective eye wear ( G\_10\_Info\_3\_A Laboratory Biosafety)
- Keep potentially contaminated hands away from the mouth, eyes, and non-intact skin.

- Wash your hands frequently, even after wearing gloves, vigorously with soap and water for a full 30 seconds. The physical removal of organisms from the skin is just as important as using a disinfectant.
- Always manipulate blood culture bottles and sputum samples in the biosafety cabinet.
- Maintain a tidy lab. Work surfaces and equipment must be decontaminated immediately after using biohazardous materials.

*NB. It is also possible to acquire a respiratory infection from another staff member – during the COVID-19 pandemic, it is important for all staff to wear a mask to provide source control (prevent asymptomatic person from producing infected aerosol) and protection.*

#### **Immunisation:**

Ensure that you have completed vaccination for Hepatitis B, COVID-19 and Tetanus.

If you are a hepatitis B carrier (i.e. your serum HBsAg is positive) then you will not respond to vaccination - seek advice from the medical microbiologist regarding need for and access of ongoing Hepatitis B treatment.

#### **What to do if you think that LAI possible or if you have an exposure**

- In the event of a blood or body fluid contaminated needlestick injury or splash to the eye, mouth or nose, encourage a needle injury to bleed and wash/irrigate the site with copious clean water for 5 minutes
- Report all exposure events or illness to the lab. manager or your head of department as soon as possible via telephone if relevant – do NOT return to work if you suspect that you have developed a respiratory infection
- For potential blood borne virus exposure, also contact the hospital clinician who is responsible for advice on post-exposure prophylaxis for HIV.
- If necessary obtain further medical review/testing/treatment/immunisation (e.g. tetanus booster)

#### **References**

- G\_10\_Info\_3\_A Laboratory Biosafety
- G\_10\_EX\_001\_A WHO Laboratory Biosafety Manual 4th Edition 2020 (abridged)
- G\_90\_SOP\_8\_A Use and Maintenance of Class I and Class II Biological Safety Cabinets

### **Avoiding mucosal or needle exposures**

- **Personal protective equipment**
  - use eye protection always
  - use gloves to avoid direct exposure to skin
- **Care with sharps**
  - NEVER re-sheath a needle before disposal
  - have a puncture-resistant disposal bin available next to where you are doing the procedure
  - take personal responsibility for disposal of the sharp or contaminated material after a procedure
- **Have your mind on the job when using a needle or performing any procedure**

