

**ONTARIO TECH UNIVERSITY**



**Medical Laboratory Science Program  
BIOSAFETY/SAFETY MANUAL**

Revised: 2024

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 Ontario Tech University	
<b>Procedure Title:</b> Introduction	<b>Procedure Number:</b> MLScAF 1.0

The Medical Laboratory Science Program at the Ontario Tech University is committed to the safety of students, faculty and staff and to the safety of the learning environment. Safe work practices are the responsibility of the employer, the employee, and the student.

The Medical Laboratory Science Program Biosafety/Safety Manual has been prepared for the benefit of those who handle or work in proximity to potentially infectious biological agents. As this manual does not address the chemical and physical hazards commonly encountered in the laboratory, it is to be regarded as an addendum to the [Ontario Tech University Laboratory Safety Manual](#), the [Ontario Tech University Lab Hazardous Waste Manual](#), [Ontario Tech University Biosafety Manual](#), and the [Ontario Tech University Chemical Safety WHMIS Training Manual](#).

This manual is specific for the laboratories used by the Medical Laboratory Science Program and general biosafety procedures can be found in the [Ontario Tech University Biosafety Manual](#). The hazards presented by radiation are of physical rather than biological origin and thus are not covered in the Biosafety Manual.

### 1.1 Definition of Biohazard

A biohazard can be defined as any organism or material produced by such an organism, that is known or suspected to cause human or animal disease. Biohazardous/infectious material falls under Class D, Division 3 of the Workplace Hazardous Materials Information System (WHMIS), and includes:

- microorganisms such as viruses, fungi, parasites, and bacteria and their toxic metabolites
- mammalian blood and body fluids
- unfixed and fixed tissues and specimens from humans and non-human primates
- cell lines and other tissue cultures
- certain types of nucleic acids, such as DNA derived from pathogenic organisms, human oncogenes or transformed cell lines
- genetically altered organisms, including plants
- zoonotic agents

Exposure to biohazardous agents may occur via puncture wounds or as a result of absorption through the respiratory tract, digestive system, skin and mucous membranes. Such exposures may result while handling microorganisms, animals, cell cultures and tissues or diagnostic specimens. All materials handled in the Medical Laboratory Science program are to be considered a biohazard and are to be treated with Routine Practices.

## 1.2 Routine Practices

These are work practices required for the basic level of infection control and are recommended for the treatment and care of all patients and specimens. Routine Practices are based on the premise that all patients/samples are potentially infectious, and that the same safe standards of practice should be used routinely with all specimens to prevent exposure to blood, body fluids, secretions, excretions, mucous membranes, non-intact skin or soiled items and to prevent the spread of microorganisms. Routine Practices include:

- hygienic practices, such as handwashing after contact with a potential biohazard
- use of personal protective equipment, which may include gloves, gowns, plastic aprons, masks, eye shields or goggles
- appropriate handling and disposal of sharps and other contaminated or clinical waste
- appropriate reprocessing of reusable equipment and instruments
- use of aseptic technique
- use of environmental controls

The implementation of routine practices benefits patients as well as Health Care Workers (HCW). Their use minimizes the risk of cross-infection from HCW to patient, from patient to HCW, and from patient to patient, even in high-risk situations. They are recommended for the care and treatment of all patients and specimens, regardless of their perceived infectious status.

## 1.3 Containment

The term "containment" is used in describing measures used to provide a barrier between the infectious organism(s) being handled and the worker (and, ultimately, the community at large). Containment is achieved through the use of appropriate safety equipment, facility design and laboratory procedures and practices.

### 1.3.1 Containment Level: Facility Design and Work Practices

Careful consideration must be given to both facility design and work practices to ensure the protection of laboratory personnel, their colleagues and the community as a whole. Four containment levels are outlined in the Canadian Biosafety Standards and Guidelines. Of the four containment levels, the highest safety standards (Level 4) are reserved for the most hazardous pathogens (Risk Group 4) and the least stringent (Level 1) for those which have minimal impact on health (Risk Group 1).

The Medical Laboratory Science Program uses Laboratories that are designated as Risk Group Level 2 biosafety laboratories. Level 2 containment is appropriate for work with Risk Group 2 agents using the general practices list in section 8.4.

The Medical Laboratory Science Program holds a Biosafety Certificate from the Ontario Tech University which is renewed yearly through the Ontario Tech University Biosafety committee and Biosafety Officer.

 Ontario Tech University	
<b>Procedure Title:</b> MLSc Safety Committee	<b>Procedure Number:</b> MLScAF 2.0

## 2.1 Terms of Reference

The MLSc program Safety and Biosafety Committee exists as a subcommittee of the MLSc Program Committee with the specific intent of ensuring compliance with standards and guidelines identified by the Human Pathogens and Toxins Act, the Canadian Biosafety Standards and Guidelines, the Ontario Tech University Biosafety Committee and the Ontario Tech University Risk Management Office. The intent is to ensure that MLSc students and staff, undertaking work associated with the Medical Laboratory Science program, do so in a safe manner and in conformance with all relevant legislation and university guidelines.

### Duties and Functions of the Committee

1. To review, develop and monitor safety and biosafety standards for students and staff working in the Medical Laboratory Science laboratories.
2. To review, at the end of each semester, any incident reports involving safety or biosafety incidents and, if appropriate, recommend changes in procedures or policies that would help ensure that there are no repeats of similar incidents.
3. Report regularly to the MLSc Program Committee any information on this topic – for information only or for action.
4. Maintain representation on the Ontario Tech University Biosafety Committee to ensure continuity of information and process and bring forward to the MLSc Safety and Biosafety Committee actionable items.

### The Chair of the Committee

1. The Chair of the MLSc Safety and Biosafety Committee shall be a member of the MLSc faculty.
2. The Chair shall be responsible for reporting to the MLSc Program Committee on a regular basis.

### Committee Membership and Operating Procedures

1. The Committee shall consist of MLSc faculty members representing a breadth of disciplines within the MLSc Faculty.
2. The term of membership shall be for one year with renewable terms.
3. The Committee shall meet a minimum of once a semester.
4. The Committee shall maintain minutes of meetings with a copy to be appended to the appropriate MLSc Program Committee minutes and a copy forwarded to the Joint Health and Safety Committee and the Ontario Tech University Biosafety Committee.
5. An invitation to recruit new members to the committee will be made annually.



## **2.2 Medical Laboratory Science Biosafety/Safety Committee Membership**


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 Ontario Tech University	
<b>Procedure Title:</b> General Operational Practices	<b>Procedure Number:</b> MLScAF 3.0

The following general practices are required for the Medical Laboratory Science Program

- The safety manual must be available for all staff and students, and its requirements followed; it must be reviewed and updated yearly.
- Personnel must receive training on the potential hazards associated with the work involved and the necessary precautions to prevent exposure to infectious agents and release of contained material; personnel must show evidence that they understood the training provided; training must be documented and yearly retraining must occur.
- Eating, drinking, storing of food, personal belongings, and applying cosmetics is not permitted in the laboratory; wearing jewellery is not recommended in the laboratory.
- Oral pipetting of any substance is prohibited in any laboratory.
- Long hair is to be tied back or restrained so that it cannot come into contact with hands, specimens, containers or equipment.
- Access to laboratory and support areas is limited to authorized personnel. Visitors must sign in using the Visitor Log sheet.
- Doors to laboratories must be kept closed.
- Open wounds, cuts, scratches, and grazes must be covered with waterproof dressings.
- Laboratories are to be kept clean and tidy. Storage of materials that are not pertinent to the work must be removed; paperwork and report writing should be kept separate from biohazard work areas.
- Lab coats must be worn and properly fastened, including visitors, trainees, and others entering or working in the laboratory; suitable footwear with closed toes and low heel must be worn in all laboratory areas.
- Lab coats must not be worn outside of the laboratory and must not be stored in contact with street clothing.
- Contaminated disposable lab coats are to be discarded in the large biohazard waste containers.
- Safety glasses are to be worn where there is a known or potential risk of exposure to splashes. Careful consideration should be given to the identification of procedures requiring eye and face protection, and selection should be appropriate to the hazard.
- Examination gloves must be worn for all procedures that might involve direct skin contact with biohazardous material; gloves are to be removed when leaving the laboratory and disposed of in the large biohazard waste containers.
- Hands must be washed after gloves have been removed, before leaving the laboratory and at any time after handling materials known to be contaminated.

- The use of needles, syringes, and other sharp objects should be strictly limited; needles and syringes should be used only for phlebotomy and aspiration of fluids from bottles and IV bags. Needles should not be recapped, bent, sheared, or removed from the syringe or barrel; they should be promptly placed in a puncture-resistant sharps container for disposal.
- Work surfaces must be cleaned and decontaminated with a suitable disinfectant at the end of the day and after any spill of potentially biohazardous material.
- Contaminated materials and equipment leaving the laboratory must be appropriately decontaminated.
- Disinfectants effective against the agents in use must be available at all times within the areas where the biohazardous material is handled or stored.
- Leak-proof containers are to be used for the transport of infectious materials within facilities.
- Spills, accidents or exposures to infectious materials must be reported immediately to the laboratory instructor. Incidents will be recorded using the [UOIT incident reporting system](#).
- Aseptic techniques and good microbiological laboratory practices intended to avoid the release of infectious agents are to be employed at all times.
- Biosafety cabinets must be used for procedures that may produce infectious aerosols.
- Appropriate signage indicating the nature of the hazard being used (e.g., biohazard sign, containment level) must be posted outside each laboratory; if infectious agents used in the laboratory require special provisions for entry, the relevant information must be included on the sign; the contact information of the laboratory supervisor or other responsible person(s) must also be listed.

 Ontario Tech University	
<b>Procedure Title:</b> Laboratory Hygiene	<b>Procedure Number:</b> MLScAF 4.0

Good laboratory hygiene is designed to protect both the worker and the public.

- Entry to the laboratory should be restricted to laboratory staff and students only
- Eating, drinking, smoking or applying make-up is prohibited in the laboratory
- Contact with the mouth such as mouth-pipetting, licking labels and chewing objects is not allowed
- Hands must be washed with soap after handling potentially contaminated specimen containers, after any bacteriological procedure, after removing protective clothing and before leaving the laboratory. Disposable paper towels should be used for hand drying
- No cleaning, service or checking of equipment should be allowed unless a trained technical or professional person is present to ensure adequate safety precautions
- All surfaces and equipment within the laboratory should be regarded as potentially infectious and should be cleaned regularly by appropriate means. Floors should not be waxed but should be mopped regularly to limit dust formation

#### 4.1 Immunization

An important way in which infection control programs prevent infection is through immunization. Everyone working in a Containment Level 2 (CL2) laboratory is required to have an up to date immunization including but not limited to Hepatitis B virus (HBV), measles, mumps, rubella (MMR), diphtheria, and tetanus vaccinations. Screening for TB is also included; anyone with a positive TB test is required to receive chest x-ray evaluations to determine their status. All proof of immunization must be received before working in the CL2 laboratories.

#### 4.2 Dress Code

Appropriate apparel is essential for protection against infection. Personal clothing needs to be modest in style so that skin is covered by the lab coat (hoods should be tucked under lab coats).

- Restrain loose clothing ensuring that no articles dangle
  - Carefully pin loose clothing as not to get caught in moving equipment
  - If aerosols are possible a face shield may be worn, or work should be performed in a biosafety cabinet.
  - Spare clean clothing should be available in case of a chemical or biohazard spill. Instructors will speak to students at the beginning of the semester that may have special dress requirements- in order for them to have spare clothing on site.

- Shoes must be closed toe with heels not more than 1¼ inches in height.
- Jewellery needs to be kept to a minimum and removed if possible. Rings with claws are not recommended as soap, bacteria, powder, etc. can get trapped.
- Hair longer than shoulder length needs to be tied back so that it does not come in contact with the hands, specimens, containers or equipment. Hair ties may be available upon request.
- Hats are not permitted, unless for religious reasons.

### 4.3 Hand Hygiene

Hand hygiene is one of the most important means of preventing the spread of infection provided that it is achieved properly and when required. Hand hygiene is required every time gloves are removed. Artificial nails and nail polish are not recommended as chemicals can react with acrylics and cracks in surfaces make it difficult to decontaminate. Natural nails should preferably be less than ¼ inch in length. Rings should be removed when working in the laboratory.

#### 4.3.1 Hand Washing

Washing is required when hands are visibly soiled and when leaving the laboratory. A routine hand washing procedure requires the use of soap and water to mechanically remove soil and transient bacteria.

Procedure:

1. Stand back so that you do not touch the sink
2. Place hands under faucet so that the water starts to run (sensor at base of faucet)
3. Apply soap by placing hands under soap dispenser (sensor at base of dispenser)
4. Work up soap into a lather, scrubbing all surfaces including between the fingers and around the knuckles. Rub your hands together vigorously. This procedure should take one minute.
5. Rinse hands in a downward motion from the wrists to fingertips, removing soap and dislodged dirt and microorganisms.
6. Dry hands with a clean piece of paper towel, pat, starting from the wrists down.
7. Discard used paper towel in the regular garbage.

#### 4.3.2 Alcohol Based Antiseptic Hand Cleaners

Procedure:

1. Pump a dime-size amount of hand cleaner onto the hand.
2. Cover all surfaces of hands, including between the fingers and across knuckles.
3. Allow alcohol to evaporate to achieve proper antiseptics.

 Ontario Tech University	
<b>Procedure Title:</b> <b>Personal Protective Equipment (PPE)</b>	<b>Procedure Number:</b> <b>MLScAF 5.0</b>

PPE provides a barrier against infection; it includes protective clothing and other items worn by an individual to protect mucous membranes, airways, skin, and clothing.

## 5.1 Coats

### 5.1.1 Lab coat

Lab coats are worn to protect skin and prevent soiling of clothing. Disposable lab coats are required to be worn at all times and are stored in the laboratory. Lab coats must be done up at all times and are never worn outside of the lab. When visibly soiled or in disrepair they are discarded in the large biohazard containers and a new lab coat will be issued. Visitors will be required to wear lab coats when work is being done in the laboratory. Staff lab coats will be cleaned and disinfected when required on the premises.

### 5.1.2 Rubber Apron

A rubber apron is worn when using caustic chemicals. Always use the rubber apron when working in the fume hood. A face shield is worn as well.

## 5.2 Gloves

Gloves must be worn for all procedures that might involve direct skin contact with the hazardous material. Gloves should not be stored in student laboratory kits or in lab coat pockets as they may become compromised and no longer safe to use.

### 5.2.1 Gloves

Examination Gloves (latex free and powder free) are to be worn when working with biohazard material. These gloves are available in different sizes and provided in the laboratory. The correct glove size should fit securely with little excess at the fingertips. Gloves are to be removed when any contamination is suspected, when using non-biohazard equipment such as the telephone and upon leaving the laboratory. Hand hygiene is performed as soon as gloves are removed. Used gloves are considered biohazard and are disposed of in the large biohazard waste containers.

### **5.2.1.1 Proper Removal of Gloves**

- The wrist of one glove is grasped with the opposite gloved hand
- The glove is pulled inside out over and off the hand
- With the first glove held in the gloved hand, the fingers of the non-gloved hand are slipped under the wrist of the remaining glove without touching the exterior surfaces.
- The glove is then pulled inside out over the hand so that the first glove ends up inside the second glove, with no exterior glove surfaces exposed.
- Gloves are now discarded into the large biohazard containers

### **5.2.2 Chemical Resistant Gloves**

It is acceptable to wear two pairs of examination gloves while using chemicals. The outer pair of gloves is removed after the use of the chemical, leaving the inner pair on in order to clean up the area. The examination gloves are placed into the large biohazard containers in order to avoid confusion.

### **5.2.3 Insulated Gloves**

When entering the  $-80^{\circ}\text{C}$  freezer you must wear insulated gloves. These gloves are also available when using hot plates and water baths over  $60^{\circ}\text{C}$ , and ovens

## **5.3 Eye and Face Protection**

*Do not touch your face at any time while in the laboratory.*

Eye and face protection must be worn in the laboratory when there is a potential for contact with hazards such as splashes, or flying objects. The type of protection needed depends on the hazard.

### **5.3.1 Goggles and Safety Glasses**

Goggles and safety glasses are worn to protect the eyes from splashes and flying objects. They are to be worn when opening up vacutainers, Eppendorf tubes and other vials that may produce aerosols and/or splashes. It is recommended that they are worn during pipetting of any substances but must be worn when pipetting biohazard material. Safety goggles differ from safety glasses as they require ventilation to prevent fogging as they have a tighter fit around the eye.

### 5.3.2 Face Shields

Face shields are recommended when protection of the entire face is required. They are not to be worn alone but in conjunction with safety glasses or goggles. There are two types of face shields. Personal face shield or visor is worn on the head and covers the entire face. This device is used when pipetting chemicals or when you are required to move around. The Bench typeface shield is attached to the surface of the bench and can be adjusted for height. This device is used when working in a single place and is not placed on the person but in front of the face. This device is typically used when aliquoting body fluids.

### 5.3.3 Masks and Respirators

Masks are worn to protect against droplets generated by coughing or sneezing and fine dust that can be produced when weighing chemicals.

#### 5.3.3.1 Procedure for Putting on a Mask

1. Locate the top of the mask, it will have a metal strip along the top edge
2. Place loops over ears
3. Pull bottom of mask over chin
4. Pinch metal strip over the bridge of the nose to make a snug fit around nose and cheeks

A N95 respirator is used when there is a threat of air born transmission of disease. Each student must be fitted for size as it is important that they have a snug fit with no air leakage. Fitting will take place before the student starts hospital placement and can be done by either the hospital or the university. A chemical respirator is located in the reagent preparation room and is used when strong fumes are produced. Filters are located with the respirator and must be inserted before use and disposed of afterward.

### 5.4 Donning and Doffing

There is a correct order for putting on and removal of person protective equipment (PPE).


#### 5.4.1 Procedure for Donning (putting on):

1. Perform hand hygiene
2. Put on lab coat and if needed a gown
3. Put on mask or respirator if required
4. Put on eye protection
5. Put on gloves

#### 5.4.2 Procedure for Doffing (removal):

1. Remove gloves – dispose in biohazard waste
2. Remove gown or lab coat– dispose in biohazard waste
3. Perform hand hygiene
4. Remove eye protection
5. Remove mask
6. Perform hand hygiene



 Ontario Tech University	
<b>Procedure Title:</b> Protective Equipment	<b>Procedure Number:</b> MLScAF 6.0

## 6.1 Eye Wash Stations

Eye wash stations are located at the end of every bench and should be used whenever the eyes have been compromised. Eye wash stations are checked weekly by flushing for 15 minutes and checking the water temperature. The temperature should be between 15.5-35.0°C Maintenance is recorded on the eye wash station weekly inspection checklist. If a problem arises, place a ticket to the help desk. <http://healthandsafety.uoit.ca/procedures/index.php>

### 6.1.1 Procedure for the use of eye wash station:

1. Remove protective eye ware
2. Pull head of the wash station out over the sink
3. Press the silver lever down to activate water
4. Check temperature of water
5. Place eyes into the stream of water
6. Flush for a minimum of 15 minutes
7. Seek medical attention
8. Submit online [injury and incident report](#)

## 6.2 Safety Shower

The safety shower is located by the main exit. It is to be used when there is the potential for damage to the skin through contact with a hazardous material. The safety shower is maintained by the university and is checked every 6 months. Note there is no floor drain so environmental services must be contacted after use.

### 6.2.1 Procedure for the use of safety shower:

1. Immediately after exposure stand under shower
2. Pull cord
3. Stand under shower for at least 15 minutes
4. Remove all remaining students from the laboratory using the emergency exit
5. Remove contaminated clothing in order to remove caustic chemical
6. Seek medical attention
7. Submit online [injury and incident report](#)

## 6.3 Fume Hood

The fume hood is used to protect against exposure to hazardous chemicals. It is designed to contain

dilute and disperse gases, vapours and aerosols to the external environment. Nothing should be stored in the fume hoods. Medical Laboratory Science has two types of fume hoods, bench top styles are used for staining and large floor model fume hoods.

#### **6.3.1 Procedure for using a large floor model fume hood**

1. Place all equipment at least 6 inches back into the fume hood
2. Wear appropriate PPE including rubber apron and face shield
3. Ensure that the front glass panels overlap each other and have no gaps
4. Adjust the front sash for your height so that it is as low as possible but you are still able to work.
5. No electrical equipment is to be used in the fume hood when making up reagents
6. Ensure that the fume hood is working by observing the flow meter reading.

### **6.4 Biosafety Cabinet**

Biosafety Cabinets (BSCs) provide effective primary containment for work with human pathogens. BSCs are used for procedures with the potential to produce infectious aerosols and for high concentrations or large volumes of infectious material. We do not use our biosafety cabinets for work with toxic or volatile chemicals.

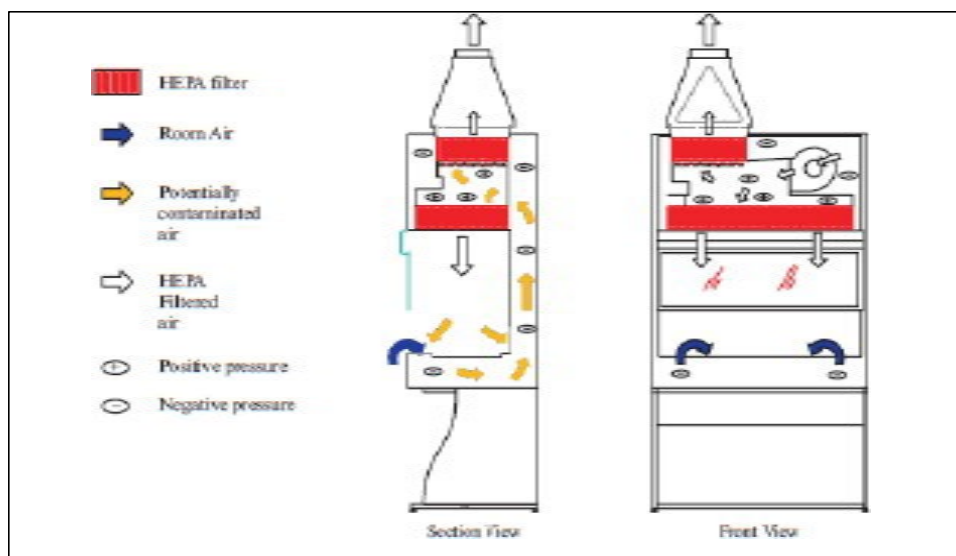
Medical Laboratory Science laboratories have three biosafety cabinets, Class II Type B1 and Class II Type A2. Certification, maintenance and service are done every year.

#### **6.4.1 Class II, Type A2 Cabinets**

- Protects worker
- Protects product
- Exhausts 30% HEPA-filtered air back into the laboratory and recirculates 70% in the cabinet.

Cabinet air may be re-circulated back into the laboratory or ducted out of the building by means of a "thimble" connection (i.e., a small opening in the cabinet exhaust filter housing) whereby the balance of the cabinet is not disturbed by fluctuations in the building exhaust system.

- Maintain a minimum average face velocity of 0.5 m/s (100ft/min).
- Have ducts and plenums under negative pressure.
- Not to be used with flammable or toxic chemicals



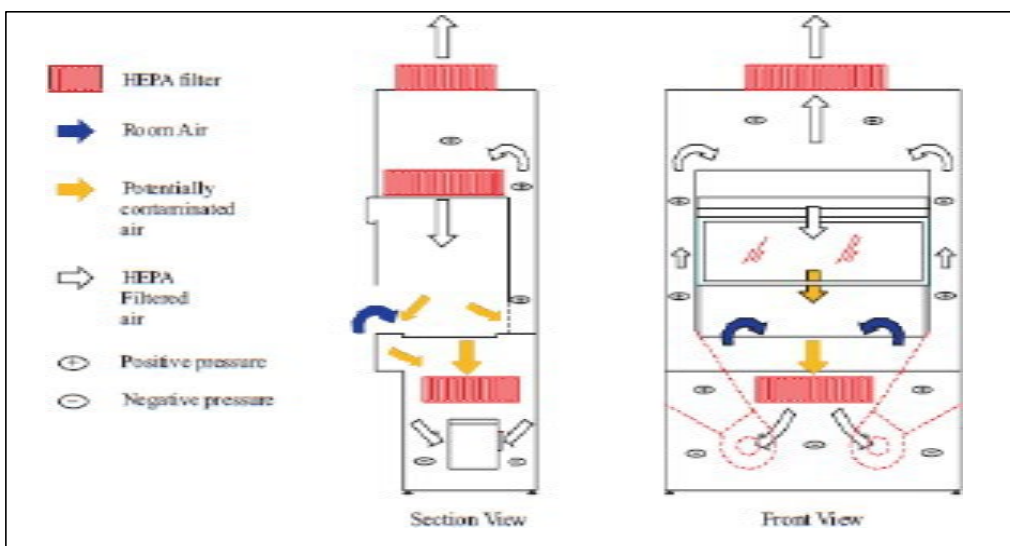
Class II Type A2 Biosafety Cabinet

<http://www.phac-aspc.gc.ca/publicat/lbg-ldmbl-04/>

#### 6.4.2 Class II, Type B1 Cabinets

- Protects worker
- Protects product
- Ducted to the outside
- Hard-ducted through a dedicated duct exhausted to the atmosphere after passage through a HEPA filter; contain negative pressure plena.
- Maintain a minimum average face velocity of 0.5 m/s (100ft/min).
- Recirculate 30% of the air within the cabinet and exhausts 70% HEPA-filtered air to the outside
- Is suitable for work with low levels of volatile toxic chemicals and trace amounts of radionuclides.

(The Medical Laboratory Science program does not use volatile or toxic chemicals in the Biosafety cabinets.)



Class II, Type B1 Biosafety Cabinet  
<http://www.phac-aspc.gc.ca/publicat/lbg-ldmbl-04/>

### 6.4.3 Use of the Biosafety Cabinet (BSC)

#### Start-up procedures when preparing for work in the BSC:

1. Ensure that the sash is in the appropriate position. Under arm is level with the bottom of the sash.
2. Turn on fluorescent light and cabinet blower, if off.
3. Check the air intake and exhaust grilles for obstructions.
4. If the cabinet is equipped with an alarm, test the alarm and switch it to the "on" position.
5. Confirm inward airflow by holding a tissue at the middle of the edge of the viewing panel and ensuring that it is drawn in.
6. Disinfect the interior surfaces with Conflikt®. Disinfectant is kept inside the BSC.
7. Assemble all materials required for the procedure and load them into the cabinet; do not obstruct the air grilles; the working surface may be lined with absorbent paper with plastic backing; segregate "clean" items from "contaminated" items.
8. Wait 5 minutes to purge airborne contaminants from the work area.

#### Follow these procedures for working in the cabinet:

1. Don protective clothing and gloves as appropriate.
2. Perform operations as far to the rear of the work area as possible.
3. Avoid movement of materials or excessive movement of hands and arms through the front access opening during use; when you do enter or exit the cabinet, do so from straight on; allow the cabinet to stabilize before resuming work.
4. Keep discarded contaminated material to the rear of the cabinet; waste will be placed in the large biohazard containers when full or at the completion of the task.

5. If there is a spill during use, surface decontaminate all objects in the cabinet; disinfect the working area of the cabinet while it is still in operation (do not turn the cabinet off).

Follow these procedures upon **completion of the work**:

1. Allow sufficient time for the air in the biological safety cabinet to pass through the filter before disrupting the air curtain by removing hands or unloading material from the cabinet.
2. Close or cover open containers.
3. Decontaminate the surface of all items before removal from the cabinet.
4. Disinfect the interior surfaces of the cabinet, including sides, back, lights, and interior of the glass with disinfectant effective against pathogens in use. If a corrosive disinfectant is used, the surface should be rinsed with water to prevent stainless steel surfaces from corroding.
5. Routinely remove the work surface and disinfect tray beneath.
6. Routinely wipe the surface of the lights within the biological safety cabinet with a suitable cleaner or disinfectant, such as ethanol.

## **6.5 Centrifuge**

All centrifuges must be sealed units, and safety buckets used if available. Always balance the tubes placed in the centrifuge. Never stop a centrifuge with your hands. If a tube breaks during centrifugation, stop the centrifugation and do not open the lid for 30 minutes. After 30 minutes, disinfect thoroughly.

## **6.6 Fire Pull Stations**

The pull station is located at the back of the laboratory by the emergency exit door. Pulling this alarm will set off the fire alarm system for the university and will alert the emergency response team (Fire Department).

## **6.7 Fire Extinguisher**

A type ABC fire extinguisher is located by the main exit. It is checked monthly by the university and documented on the extinguisher.

ABC fire extinguisher is used for combustibles, liquid fuels and electrical. The correct use of an extinguisher is by using PASS:

P-pull the pin

A-aim at the fire

S-squeeze the handle

S-sweep from side to side

## 6.8 First Aid Kit

Located by the exit area, the first aid kit contains basic first aid contents. The incident report is found online under the Health and Safety Ontario Tech University website. Documentation is filled out online. Blueline taxi tab charge coupons are available for use when transporting a student to an emergency aid facility.

Ontario Tech University does not have a protocol for the contents of a First Aid kit but defers to WSIB (Workplace Safety and Insurance Board) First Aid Regulations Reg. 1101. The poster entitled *In Case of Injury at Work* (Form 82) must be displayed at the first aid station as required by Section 1 of the Regulation and must contain:

- Current edition of a standard St. John Ambulance First Aid Manual;
- 1 card of safety pins
- Dressings consisting of:
  - 12 adhesive dressings individually wrapped,
  - 4 sterile gauze pads, 3 inches square,
  - 2 rolls of gauze bandage, 2 inches wide,
  - 2 field dressings, 4 inches square or 2 four-inch sterile bandage compresses, and
  - 1 triangular bandage.

## 6.9 Chemical Storage

All hazardous chemicals are segregated by reactivity classes. Acid, Base, and Flammables storage areas are located under the fume hoods. Caustics and non-volatile, non-reactive solids are stored on shelving units located in the reagent preparation room and have been categorized alphabetically.

## 6.10 Ordering

Prior to ordering a potentially hazardous reagent, a risk management assessment will be done by the instructor ordering the chemical. The instructor will have answered the following questions:

- What has changed in the laboratory that this reagent is now needed?
- Whenever a new chemical is introduced the question of whether the educational value outweighs the relative hazard level of using this chemical must be asked and is there no satisfactory substitute?

Prior to the ordering of a hazardous reagent the instructor must receive approval from the MLSc teaching faculty. The chemical will then be added to the chemical inventory and SDS available prior to the chemical entering the laboratory.

### **6.11 Chemical Inventory**

MLSc chemical inventory is performed yearly. All reagents are documented on the chemical inventory and a printed Safety Data Sheet will be available in the laboratory. The chemical inventory is supplied to the Ontario Tech University Health and Safety Officer on a yearly basis. The chemical inventory will state which instructor utilises the chemical (thereby primarily responsible for its safe storage and use), and where the chemical is stored in the laboratory. The storage cabinets, including flammable, acid and base cupboards are numbered and colour coded and chemicals stored in each location have a corresponding colour code. At the beginning of each laboratory, students will be made aware of each reagent hazard and the protocols surrounding its safe use.

### **6.12 Pipetting Safeguard**

Pipetting must be done by mechanical means and never by mouth. Pipette aspirator bulbs are available for graduated, volumetric and pasture pipettes. A bottle top dispenser can be used to deliver repetitive aliquots of reagents.

### **6.13 Eppendorf Tube Safeguards**

Students and staff are required to use absorbent pads while opening Eppendorf tubes. The absorbent pad is held close to the lid to prevent aerosols. Students and staff are also required to wear safety goggles when opening Eppendorf tubes.

 <b>Ontario Tech University</b>	
<b>Procedure Title:</b> <b>Environmental Controls Sterilization and Disinfection</b>	<b>Procedure Number:</b> <b>MLScAF 7.0</b>

Always maintain good housekeeping in the laboratory. This minimizes the potential for a laboratory accident. General housekeeping activities such as cleaning of floors, walls, etc. and removal of non-hazardous waste are performed by non-laboratory staff. Housekeeping staff are supervised while they are in the laboratory.

## 7.1 Chemical Disinfectants

Disinfection is a process that results in the destruction of specific pathogenic microorganisms. Chemical disinfectants are routinely used in laboratories to decontaminate bench surfaces, biological safety cabinets, and other laboratory equipment. They can also be used to decontaminate biological spills.

### 7.1.1 Work Surfaces

Decontaminate all work surfaces with Conflikt®, or other suitable disinfectants at the end of each lab session and when needed. Work surfaces include sinks, bench top, and stools.

Conflikt® Detergent Disinfectant is a pre-diluted, ready-to-use quaternary ammonium based disinfectant that exhibits antibacterial, antiviral, antifungal, mildewstat, and deodorizing capabilities (Appendix 14). It is specially formulated with surfactants for cleaning and sanitizing inanimate hard surfaces, glass, plastics, stainless steel, ceramics, laminates, etc.

### 7.1.2 Cleaning Surfaces with Conflikt®

1. Personal Protective equipment must be worn while cleaning surfaces
2. Spray all surfaces with Conflikt®.
3. Allow surfaces to remain wet for a minimum of 5 minutes.
4. Dry surfaces with paper towel
5. Dispose of paper towel in the large Biohazard container
6. If a biological spill has occurred, follow biological spill clean up on page 37.

Conflikt®, when used on environmental, inanimate, non-porous surfaces, exhibits effective virucidal activity against:

**(10 minutes):** Canine Parvovirus, Hepatitis A Virus (HAV), Poliovirus Type 1

**(5 minutes):** Hepatitis B Virus (HBV), Hepatitis C virus (HCV), Bovine Viral Diarrhea Virus (BVDV)



**(2 minutes):** Human Coronavirus, SARS-associated Coronavirus, Avian Influenza A (strains H3N2 and H9N2) Kills pandemic 2009 H1N1 Influenza A virus

**(3 minutes):** Paramyxovirus (Mumps), Rhinovirus type 39, Rotavirus

**(1 minute):** HIV-1 (associated with AIDS)

**(30 seconds):** Norovirus (Norwalk virus), Feline Calicivirus, Rabies virus

## **7.2 Liquid Biohazard Waste**

The liquid biohazard waste produced by the Medical Laboratory Science laboratories contains blood or serum and does not contain hazardous chemicals or radioactive material. Liquid biohazard waste that does contain such hazardous must be disposed of according to the Ontario Tech University Biosafety Manual. Liquid biohazard waste is rendered harmless with the use of 1% sodium hypochlorite.

## **7.3 Disinfection of Small Equipment**

It is necessary to disinfect small equipment when it becomes contaminated or for removal from the laboratory. Follow the procedure for cleaning surfaces with Conflikt®.

## **7.4 Disinfection of Glass Pipettes**

Reusable glass pipettes are washed in the laboratory. Pipettes are placed with tips facing up into pipette wash container that is filled with one scoop of detergent and deionized water. The water level must be high enough to cover the tips of the pipettes. Wear safety glasses when placing pipettes into the container as any contents remaining in the pipette may splash. The tip should be immersed in the deionized water first, rinsing the tip of the pipette and diluting out any contents. Placing pipettes with the tip down do not allow for correct washing and draining and will result in dirty pipettes. When the pipette container is full the pipettes are removed to an automatic pipette washer. A detergent tablet Alcotab is added to the bottom of the washer and hooked up to tap water. Washing is carried out for 30 minutes and then rinsed with deionized water for another 30 minutes.

## **7.5 Disinfection of Glassware**

Glassware is placed in wash buckets in the reagent preparation room. The wash bucket contains one scoop Alconox and tap water. The glassware is left to soak for 12 hours before being washed by hand or in a dishwasher.

### **7.5.1 Hand Washing Glassware**

The sink is filled with one scoop Alconox and warm tap water, wearing rubber gloves wash each item then rinse with deionized water and set aside to dry.

### **7.5.2 Dishwasher**

Use with laboratory glassware only, personal items are not allowed. One scoop of detergent is added to the detergent holder. Program the dishwasher for the type of load and run.

## 7.6 Heat Sterilization

Sterilization is a process that results in the destruction of all forms of microbial life. Heat kills microorganisms by irreversibly denaturing their enzymes and structural components. The time required to kill an organism depends on its heat resistance and conditions of sterilization. Spores are the most heat-resistant microbial forms, so they are used to test autoclave performance. Thermal death proceeds more rapidly in saturated steam than in dry heat because the temperature at which denaturation of proteins occurs is inversely proportional to the amount of moisture present.

### 7.6.1 Autoclave

The autoclave is located on the 4<sup>th</sup> floor UB building and is maintained by the Faculty of Science. It is used only to sterilize consumable supplies. All biohazardous waste is removed by commercial biohazard waster management company.

### 7.6.2 Incinerators

A micro incinerator is a device used in microbiology laboratories to sterilize instruments. This sterilization instrument consists of a ceramic tube surrounded with metal and with a hollow portion at the center. When plugged in and turned on, the micro incinerator can reach temperatures of 800°C, more than sufficient to incinerate any organic material on an inoculation loop. In a microbiology laboratory, contamination of sterile materials must be avoided and this can be difficult since bacteria and fungal spores are present throughout the surrounding environment. Avoiding contamination requires the use of aseptic technique as well as being constantly mindful of each action performed in the microbiology laboratory.

#### 7.6.2.1 Procedure for the use of an incinerator

**Warning: do not bring any flammable items close to the incinerator (i.e. lab coat)**

1. Turn on incinerator
2. Warm up approximately 10 minutes
3. Insert loop into the opening, at least halfway into the sterilizing element to avoid aerosolizing any residual contaminants. Take care not to scrape the element walls as this may reduce the efficiency of the heating unit
4. Sterilize for 7-10 sec or until loop appears red hot
5. **Cool** before use

### 7.6.3 Hot Air Oven

Hot air ovens can be used to sterilize or decontaminate glassware, instruments, and anhydrous materials. Dry heat is recommended for the sterilization of closed containers and anhydrous material over steam autoclaving. The moisture component of saturated steam at 121°C to 132°C results in the rapid destruction of microbes, and will not penetrate anhydrous materials and closed containers. The contact time required to sterilize an object in a hot air oven takes into account the lag time required to reach the appropriate temperature. The hot air oven located in the regent room is not used for sterilization, but for drying pipettes and melting wax. Insulated gloves must be used when removing items from the oven.

 <b>Ontario Tech University</b>	
<b>Procedure Title:</b> <b>Waste Management</b>	<b>Procedure Number:</b> <b>MLScAF 8.0</b>

Waste disposal requires well-defined procedures to prevent exposure to hazardous materials. Improper disposal of sharps and needles, glass and biohazardous waste puts the waste handlers at risk and jeopardizes the University's access to municipal waste transfer facilities.

**Materials contaminated with hazardous biological agents must be collected in the appropriate containers labeled as "biohazardous waste".** Nonbiohazardous waste is collected through Ontario Tech University Facilities Management.

### 1.1 Regular Waste

Regular waste is defined as waste that has not been contaminated such as paper towels used for drying hands, plastic bags, and packing material.

### 1.2 Recycle Waste

Place paper, cardboard, and plastics that are not contaminated into the blue recycle bin, available in the laboratory. Large clean cardboard boxes can go outside the laboratory if broken down.

### 1.3 Glass Waste

The white cardboard box is used for clean glass that has been broken or damaged. Large glassware that has been chipped or cracked and is clean will go into this container. When full the container is sealed and placed beside the regular waste for pick up.

### 1.4 Biohazard Waste

Biological waste includes:

- liquids such as used cell culturing media, supernatant, blood or blood fractions (serum), etc., which contain viable biological agents;
- materials considered pathological, including any part of the human body, tissues and bodily fluids, but excluding fluids such as urine, extracted teeth, hair, nail clippings and the like that are not infectious;
- non-sharp, solid laboratory waste (empty plastic cell culture flasks and petri dishes, bench sheets, empty plastic tubes, gloves, wrappers, absorbent tissues, disposable plastic pipettes etc.) which may be, or is known to be, contaminated with viable biological agents;
- all sharp and pointed items used in medical care, diagnosis, and research, such as plastic

pipette tips, phlebotomy needles, and disposable loops.

- Laboratory glassware, which is known or suspected to be contaminated with hazardous biological agents such as glass test tubes.

#### **1.4.1 Large Biohazard Waste Containers**

Biohazardous waste containers are rigid cardboard boxes. They must be labelled with either the words "Biohazardous Waste," or with a biohazard symbol and the word "Biohazard". The labels must be placed on the sides of the container. The labels must be visible from two sides of the container. Biohazardous waste containers must be lined with yellow biohazardous waste bags before adding the waste. The labels on the container must be visible once a biohazardous waste bag is added.

The large Biohazard Waste containers are used for all dry Biohazard Waste and are disposed of through an external company. The large biohazard containers are provided by the external company.

##### **1.4.1.1 Preparation of Biohazard Waste Containers for Pickup**

Biohazard bags are sealed with a zip tie. The top of the boxes are closed and taped shut with packing tape. The biohazard waste is picked up once a week on a predetermined day. Stericycle® provides a manifest which is signed by a staff member. Documentation of removal is provided within one week. All paperwork is kept within the faculty of Medical Laboratory Science and a manifest copy is sent to the Ministry of Environment; Environmental Monitoring and Reporting.

#### **1.4.2 Large Plastic Biohazard Waste Containers**

The large plastic biohazard waste container that is a plastic 20L pail and labelled biohazard is used for contaminated objects, which if broken, would puncture the skin. Place all contaminated test tubes, vacutainers, vials and large broken glass pipettes in this container. A lid is provided and should remain on the pail. When full the pail's lid is secured onto the bucket then removed by Stericycle®.

#### **1.4.3 Biohazard Sharps Containers**

Sharps containers are provided at every workstation. They are puncture resistant containers and should only be filled  $\frac{3}{4}$  full. Overfilling can result in a needle bouncing back and a potential needle stick injury can occur. All contaminated objects that could pierce the skin must be placed in this container including plastic pipette tips, needles, blades, glass pasture pipettes, and broken contaminated glass. Secure the lid of full sharps containers and placed in the large Biohazard waste container. Do not shake sharps containers.

#### 1.4.4 Bench-Top Biohazard Waste Containers

Bench Top biohazard waste containers are provided at each workstation and labelled with a Biohazard warning. They are used to collect dry biohazard waste that would be unsafe to carry to the large biohazard container. The small bench top biohazard containers are lined with clear bags and can be kept uncovered. At the end of each laboratory session, the bench top biohazard container will be taken to the large biohazard container, the bag will be removed and disposed of. The bag will be replaced and the container returned to the workstation.

#### 1.4.5 Liquid Biohazard Waste

Certain liquid medical/biohazardous wastes that have been disinfected, such as diluted blood, can be discharged to the sanitary sewer system. To disinfect the waste, add 100mL of 1% household bleach to every litre of liquid waste. Let the mixture stand for a minimum of 20 minutes before disposing down the drain.

#### 1.4.6 Pick-up and Disposal of Untreated Biological Laboratory Waste

The university has a contract with a commercial firm, which is licensed to remove, and transport biologically contaminated laboratory waste to a designated disposal site. The current company is Stericycle® 1-866-783-7422. If Stericycle® is unavailable, Detox®, the MLSc disposal backup company, should be contacted at 905-623-1367.

<b>Types of Contaminated Waste</b>	<b>Container</b>
Dry biohazard waste: Contaminated paper, bench sheet, gloves, dry V350 reagents, used disposable lab coats, Petri dishes, swabs, <b>All contaminated waste that is not liquid, glass or sharps</b>	Large Biohazard waste container
Contaminated glass including all contaminated test tubes, vial, vacutainers,	Large yellow plastic 20L Biohazard waste container
Contaminated Sharps, including plastic pipette tips, needles, metal lids on vials, syringes, ampoules, and microtone blades.	Sharps container
Full sharps containers	Large Biohazard waste container
Bench-Top Biohazard containers bags	Large Biohazard waste container
Small amounts of dry biohazard waste including Kimwipes, disposable plastic cuvettes, plastic disposable loops, swabs and sticks, and plastic transfer pipettes	Bench-Top Biohazard container
Liquid Biohazard Waste	Disinfect and dispose of down the drain
Large Biohazard waste container	Removed by external company

## 1.5 Chemical Waste

A licensed chemical waste contractor as required collects chemical wastes for disposal. The generator is responsible for contacting their local waste coordinator to identify the need for a waste pickup and for bringing the waste to the central collection location at a specified date and time. At that time, the waste will be inspected and, if appropriately packaged and labeled, accepted for disposal.

**Any waste not appropriately packaged and labeled will not be accepted for disposal and the generator will be required to return it to their laboratory.**

Chemical wastes must be kept in the generating laboratory or other designated storage area in a safe location between scheduled pickups. If the material is generated which requires special handling or immediate disposal contact the local Waste Coordinator.

### 1.5.1 Definition

Generally, waste is defined as any surplus, unneeded or unwanted material. It is usually the laboratory worker or supervisor who decides whether to declare a given laboratory material a waste.

Note that if a chemical is not a waste, then the WHMIS requirements apply. Once the material has been declared a waste, then the waste labeling and storage requirements outlined in this manual apply.

Chemical waste includes solids, liquids or gases containing or contaminated with any of the following:

- Flammable or combustible liquids (organic solvents)
- Corrosives (strong acids and bases)
- Reactives (oxidizers, cyanides, sulphides, explosives, unstable materials, water reactive materials)
- Toxic materials (mutagens, carcinogens, acutely toxic materials)
- Polychlorinated biphenyls (>50 ppm concentration)
- Leachate toxic materials (heavy metals, pesticides)
- Non-returnable gas cylinders

### 1.5.2 Packaging

- Wastes must be stored in containers that are compatible with the material stored. For example, corrosive materials should be stored in glass or plastic containers, not metal ones. Hydrofluoric acid must not be stored in glass containers.
- Do not completely fill containers of liquid waste. Leave between 20-25 % of air space to allow for vapour expansion and to reduce the potential for spills when moving containers.

- Compatible wastes can be accumulated within a common container, however, care must be taken to ensure that the chemicals are compatible.
- **Never mix incompatible chemicals together in a single container. This has the potential to cause heat generation, gas evolution or other reaction and a subsequent explosion.**
- Flammable and combustible solvents shall be segregated and packaged separately into two categories:
  - Halogenated solvents
  - Non-halogenated solventsThe two should not be mixed as there is a premium cost for disposal of halogenated solvents.
- Solvent safety cans should be used to collect and temporarily store large volumes (>10-20 L) of flammable organic waste solvents. The generating laboratory is responsible for providing these containers and they will be returned to the laboratory when the material is bulked at the time of waste collection.

### 1.5.3 Labeling

Attach a Chemical Waste Label directly to each waste container. These labels are available from Ontario Tech University Chemical Stores or from the Waste Coordinators. All information requested on the label must be provided. Chemical generic names of the chemicals must be listed. No abbreviations, acronyms or trademark names are to be used. Vague categories such as “solvent waste” are not acceptable. See below for an example of the chemical waste label.

Ontario Tech University <input type="checkbox"/>	
<b>CHEMICAL WASTE</b>	
Name of Generator	ID#
Building and Room Number	Phone #
Major Chemical Constituents	Approximate %
<b>NO SHARPS, BIOHAZARDS OR RADIOACTIVES</b>	
Check the appropriate boxes	
<input type="checkbox"/> Halogenated Solvents	<input type="checkbox"/> Acid
<input type="checkbox"/> Non-halogenated Solvents	<input type="checkbox"/> Alkali
<input type="checkbox"/> Unstable/Explosive	<input type="checkbox"/> Aqueous Inorganic
<input type="checkbox"/> Air/Water Reactive	<input type="checkbox"/> Organic Peroxide
<input type="checkbox"/> Other (specify)	
<b>WASTE WILL NOT BE ACCEPTED IF THIS LABEL IS INCOMPLETE</b>	

Chemical Waste Label

### 1.5.4 Storage

In addition to the general storage requirements, these specific requirements for chemicals must be followed:

- Chemical waste is to be stored in a safe, out-of-the-way location in the generator's laboratory or other designated area between scheduled collection days.
- Flammable solvents should be stored in a flammable storage cabinet. If circumstances require that they be stored in a fume hood, they should be limited to small amounts and be kept in a location such that they do not interfere with work in the fume hood or obstruct the airflow and decrease the fume hood efficiency.



- Flammable chemicals should never be stored in refrigerators, unless they are special flammable storage refrigerators.
- Waste should be segregated according to compatibility groups such as acids, bases, flammables, oxidizers and water reactives.
- Dispose of aging containers promptly. Some chemicals are time sensitive and may degrade into very hazardous by-products. e.g. ethers may degrade to form explosive organic peroxides. Where safety considerations would indicate not waiting until the scheduled collection day, contact the local Waste Coordinator.

### 1.5.5 Chemical Compatibility

When preparing chemical waste for disposal it is the generator's responsibility to ensure that incompatible chemicals are not mixed in the same container. The first step in determining chemical incompatibilities is to review the Safety Data Sheet where compatibilities will be listed in the section on reactivity.

Some general examples are:

- Acid-reactive compounds (e.g. cyanides, sulphides) which liberate gaseous products when acidified should not be mixed with any inorganic acid (e.g. sulphuric or hydrochloric acid).
- Organic acids (e.g. glacial acetic acid) should be segregated from inorganic acids. Generally, inorganic acids are oxidizing agents while some organic acids may be either reducing agents or combustible.
- Water reactive materials (e.g. sodium, potassium) should be kept well away from any water sources.
- Oxidizers (i.e. any inorganic compound that assists fire such as hydrogen peroxide, lead nitrate) should never be mixed with organic materials (e.g. organic bases such as pyridine, aniline, amines, flammable solvents such as toluene, acetone) or reducing agents (e.g. water-reactive chemicals such as sodium).
- Perchloric acid, although an inorganic acid, is a powerful oxidizing agent and should be considered a powerful oxidizer in its concentrated form.

### 1.5.6 Collection Schedules

Collection and disposal will be arranged by the Waste Coordinators as required. There will normally be at least two scheduled collections per year, at the end of the fall term in December and the end of the spring term in May.

Special pickups may be arranged by contacting the local Waste Coordinator.

 Ontario Tech University	
<b>Procedure Title:</b> Emergency Procedures	<b>Procedure Number:</b> MLScAF 9.0

## 9.1 Biological Spill

The efficient and effective control of a biological spill requires that all staff and students are trained and practiced in the established response techniques. Evacuation of the lab is required if the spill produces an aerosol. Re-entry of the area should not happen for at least 30 minutes in order for aerosols to disperse and settle. Hand hygiene must be performed at the end of any spill clean up.

### 9.1.1 Large Biological Spill

1. Hold breath and move away from the spill.
2. Inform others in the area, and move out of the room for 10-30 minutes to allow aerosols to disperse and settle.
3. Follow procedures for small spills.

### 9.1.2 Small Biological Spill

1. Don personal protective equipment (PPE).
2. Cover the spill with a paper towel to avoid splashing.
3. Gently pour disinfectant onto the paper towels, working in a circular motion, from the outside to the center.
4. Wait for 30 minutes.
5. Remove the towels with forceps.
6. Repeat steps 1-4.

### 9.1.3 Centrifuge

1. First, turn off the centrifuge.
2. Don PPE.
3. Inform others in the vicinity and do not open the centrifuge for 30 minutes to allow aerosols to disperse or settle.
4. Sealed safety buckets are to be opened in the biological safety cabinet.
5. Slowly open centrifuge lid, remove all broken tubes, buckets, rotors etc. to a basin filled with Conflikt® and allow to soak for 10 minutes.
6. Wipe down the bowl of the centrifuge twice with disinfectant and rinse with water and dry.
7. Place broken tubes in a sharps container.
8. Rinse centrifuge parts in tap water and place back in a centrifuge.

9. Unbroken capped specimens that have been disinfected can be processed.
10. Wipe down the bowl of the centrifuge twice with Conflikt® and paper towels, and rinse with water; dry.

#### **9.1.4 Small Equipment.**

Spills inside small equipment are to be treated as either a small or large biological spill. This includes incubators, fridges, fume hood, and instruments.

#### **9.1.5 Biosafety Cabinet Spill**

1. **Leave fan on**
2. Follow procedure for small spills.
3. If spilled material goes through perforated work surfaces or grilles to catch tray beneath, pour Conflikt® to dilute spill tenfold.
4. Let stand, drain tray through drain cock into a plastic bucket and clean.

##### **9.1.5.1 In Case of Equipment Failure (Fan Failure or Loss of Electrical Power):**

1. Immediately cease all work and close all open containers within the hood.
2. Close the sash fully.
3. Remove gloves and thoroughly wash hands.
4. Wait at least 30 minutes for any aerosols to settle.
5. Use a suitable chemical disinfectant and cautiously wipe down the exterior of all items before removing them from the hood.
6. Do not use cabinet until the problem is resolved.

## **9.2 Chemical Spill**

Chemical spills are divided into different groups based on the size and type of the spill. A small spill is less than 500mL, a large spill greater than 500mL. The type of spill is volatile, acid, caustic or formaldehyde.

### **9.2.1 Large Chemical Spill:**

Refer to the [UOIT General Laboratory Safety Manual](#)

In the event of a large chemical spill of volatile toxic, corrosive or flammable chemical:

1. Turn off hotplates and other ignition sources if flammable materials are involved but only if you can do so safely.
2. Evacuate the laboratory and prevent re-entry
3. Take the MSDS sheet and name of the chemical
4. Call Campus Security at 905-721-8668 Ext. 2400.
5. Provide the following information about the spilled material to the operator.  
Location  
Street Address

Building/Department

Room Number

Injuries

Chemical Name

Quantity

Hazards

6. Do not hang up until the operator releases you.
7. Contact the Hazardous Materials Spill Reporting (24 hours) at 1-800-268-6060 if the spill is a reportable as defined by the Ontario Ministry of the Environment. Provide information such as the MSDS.
8. Wait for emergency response personnel outside the main entrance of the building.
9. Inform Laboratory Supervisor or Department Head.

### 9.2.2 Small Chemical Spill

Small spills involve small quantities of known materials which present minimal hazards. A minor spill will generally meet the following criteria.

- The quantity of material spilled is small (no more than a 500 mL)
- The spill will not spread extensively beyond the local area of the spill
- There is no respiratory hazard
- The spill will not endanger people or property
- The spill will not endanger the environment

In general, such spills can safely be dealt with by laboratory personnel without outside assistance using the precautions and instructions on the MSDS using spill cleanup kits and protective clothing readily at hand.

The types of spill cleanup kits available are Volatile, Acid, Caustic and PIG (PIG is used for formaldehyde spills).

### 9.2.3 Spill Cleanup Kit

1. Turn off hotplates and other ignition sources if flammable materials are involved but only if you can do so safely.
2. Evacuate the laboratory and prevent re-entry.
3. Be sure fume hood and other local exhausts are operating.
4. Select the appropriate eye, skin, and respiratory protective equipment required for safe re-entry into spill area.
5. Refer to MSDS for choosing the correct spill kit.
6. Determine the method and materials required to clean up the spill.
7. Contain the spill by building a dike with the powder or pillows found in the Spill Control Kit. Start slowly and work from the perimeter inwards toward the spill. Create a barrier so that the chemical does not run under cabinets or into drains.
8. Cover the spill with neutralizer if applicable.

9. Continue until the entire spill has been absorbed or neutralized. Note neutralizers contain a pH indicator that is useful when determining whether neutralization is complete.
10. Using the scoops and scrapers in the spill kit collect the spill and place in the plastic bags provided. Place all contaminated items including scoops and gloves in the plastic bag when finished.
11. Wash the spill area.
12. Package all contaminated materials in the safety kit or plastic bucket for removal. Attach the provided label indicating the type of waste and submit for waste disposal.
13. Request a replacement spill cleanup kit.

	
<b>Procedure Title:</b> <b>Controlling Equipment Related Hazards</b>	<b>Procedure Number:</b> <b>MLScAF 10.0</b>

**Equipment that may create a hazard. Local Risk is found in Section 13.**

EQUIPMENT	HAZARD	HOW TO ELIMINATE OR REDUCE THE HAZARD
Needles-phlebotomy	Accidental inoculation	<ul style="list-style-type: none"> <li>• Student training</li> <li>• Student phlebotomy practice is always supervised</li> <li>• No recapping or clipping needles</li> <li>• Use of needle-locking type of syringes to prevent separation of needle and syringe, or use of disposable types where the needle is an integral part of the syringe unit</li> <li>• Use good laboratory techniques</li> <li>• Use of plastic tubes</li> <li>• Use of PPE and sharp containers</li> <li>• Medical surveillance plan</li> </ul>
Microtome	Lacerations, Accidental inoculation	<ul style="list-style-type: none"> <li>• Student training</li> <li>• Use of microtome is highly supervised</li> <li>• Handle blades very carefully when installing or removing</li> <li>• Lock the Hand wheel when not cutting. Ensure the main lock is in use before inserting and removing blade</li> <li>• Always position sample first then put in blade</li> <li>• Ensure the blade guard is in place when not cutting</li> <li>• Use forceps to retrieve ribbons from the knife edge</li> <li>• Never leave microtome unattended unless blade is removed</li> <li>• When finished cutting, ALWAYS remove the blade and dispose of it appropriately in the sharps container</li> <li>• Use of PPE</li> </ul>
Scalpels	Lacerations, Accidental inoculation	<ul style="list-style-type: none"> <li>• Student training and supervision</li> <li>• Use of disposable non-reusable scalpels is highly supervised</li> <li>• Dispose in sharps container</li> <li>• Never leave unattended</li> </ul>

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Centrifuges	Aerosols, splashing and tube breakage	<ul style="list-style-type: none"> <li>• Use sealable buckets (safety cups) or sealed rotors</li> <li>• Student training and supervision</li> <li>• Use of PPE</li> <li>• The use of centrifuge is supervised</li> </ul>
Culture stirrers shakers, agitators	Aerosols, splashing and spillage	<ul style="list-style-type: none"> <li>• Operate in a biological safety cabinet or specially designed primary containment</li> <li>• Use heavy-duty screw-capped culture flasks, fitted with filter-protected outlets, if necessary, and well secured</li> <li>• Student training and supervision</li> <li>• Use of PPE</li> </ul>
Water baths	Growth of micro-organisms	<ul style="list-style-type: none"> <li>• Ensure regular cleaning and disinfection.</li> <li>• Do not use sodium azide for preventing growth of organisms</li> <li>• Unplug water bath before filling or emptying</li> <li>• Lab technician responsible for the proper maintenance and cleaning</li> </ul>
Incinerator	Accidental burns	<ul style="list-style-type: none"> <li>• Student training and supervision</li> <li>• Use of PPE</li> <li>• Keep all flammables away</li> <li>• Never leave a loop in the incinerator</li> <li>• Do not touch while in use</li> </ul>
Microbiology Loops	Aerosol, accidental burns and bacterial contamination	<ul style="list-style-type: none"> <li>• Student training and supervision</li> <li>• Use of PPE</li> <li>• Loops must be properly sterilized after each use. (See proper use of incinerator 7.6.2)</li> <li>• Loops are never left in the incinerator unattended</li> <li>• Loops must be properly cooled before using to prevent aerosols</li> <li>• Never walk around the laboratory with contaminated loops</li> </ul>

 Ontario Tech University	
<b>Procedure Title:</b> Transportation of Laboratory Specimens	<b>Procedure Number:</b> MLScAF 11.0

### 11.1 Interdepartmental

The manner in which a task is performed can minimize the likelihood of exposure to biohazardous materials in the laboratory. Many laboratory practices are designed to prevent transmission of infectious material. Safe transport of laboratory specimens within the laboratory or to other areas can minimize the potential for accidental spills and exposures.

- All specimens for interdepartmental transfer must be placed in a sealed plastic bag and then in a closed leak-proof secondary container. The purpose is to contain any leaks or spills that may result from accidental breakage or failure of the primary container during transport.
- A sealable hard-shelled plastic secondary container fitted with racks or foam inserts is suitable when transporting bulk laboratory samples throughout the facility. It is important that these containers be regularly decontaminated using Conflikt®.
- An individual sample such as a culture plate or tube may be safely transported using a sealed biohazard bag placed in a secondary container. The bags are suitable for a single use only and must be discarded as biohazardous waste.

### 11.2 External Transportation of Dangerous Goods

Transportation of infectious substances to, from or within Canada is regulated by the Transportation of Dangerous Goods Regulations (TDGR), Transport Canada, and by the International Air Transport Association, Dangerous Goods Regulations (IATA DGR). There are nine classes of dangerous goods as listed in the Dangerous Goods Regulations. Laboratory specimens are classified in “Class 6.2, Infectious substances.”

In Canada, surface transport of dangerous goods is regulated by the TDGR.

Air transport of dangerous goods (within Canada) is regulated by both the TDGR and the IATA DGR.

It is the intent of these regulations to protect the public, carriers, acceptance staff and the environment from accidental exposure to or direct contact with the infectious material by ensuring that packages arrive at their destination fully intact with the contents confined to the inside of the package.

Always consult the most recent edition of the applicable Dangerous Goods Regulations prior to shipping dangerous goods.



### **11.3 Transportation of Dangerous Goods Training**

The Canadian TDGR and the IATA DGR specify that no person shall handle, offer for transport or transport dangerous goods unless he/she is trained or is performing the duties under the direct supervision of a trained person. Only a trained person with a valid Transportation of Dangerous Goods certificate can sign the shipping forms (F-SD-S-011 and F-SD-S-015) and by signing assumes responsibility for regulatory compliance.

It is the responsibility of the employer to provide training to all employees involved in the transportation of dangerous goods as specified by the applicable regulations.

The shipper is specifically responsible for the following aspects of the transportation of dangerous goods:

- Classification and identification
- Packing, marking and labeling
- Accurately completing all necessary documentation
- Ensuring that all of the applicable transport requirements are met prior to shipping dangerous goods.

Ontario Tech University provides training to all staff involved in the transportation of Dangerous Goods. The training program is in compliance with the Canadian TDGR and the IATA DGR.

### **11.4 Members Currently Certified in Transportation of Dangerous Goods**

#### **Recertification is required every 3 years**

Jennifer Flintoff  
Laboratory Technician  
Medical Laboratory Science Program  
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905-721-8668 ext. 3694  
Expiry June 2027

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Associate Teaching Professor  
Laboratory Coordinator  
Medical Laboratory Science Program, Ontario Tech University  
905-721-8668 ext. 2889  
Expiry June 2026

 Ontario Tech University	
<b>Procedure Title:</b> <b>Biosecurity Plan for MLSc Program</b>	<b>Procedure Number:</b> <b>MLScAF 12.0</b>

### 12.1 Purpose

The Public Health Agency of Canada has published biosafety guidelines “Canadian Biosafety Standards and Guidelines” which require all facilities that handle infectious agents to have a Biosafety program and a Biosecurity plan in place. The Medical Laboratory Science (MLSc) Program Biosecurity plan has been implemented to prevent the theft, misuse or intentional release of pathogens. The main components of the biosecurity plan include physical protection, personnel suitability/reliability, pathogen accountability, and incident and emergency response.

### 12.2 Designation of a Responsible Official

In the MLSc program laboratories, the laboratory instructors and the Ontario Tech University biosafety officer are responsible for the development, training and implementation of safety, security and emergency response plans relating to biohazardous materials. In the event of any theft, loss or release of biohazardous material, the University’s biosafety officer will be contacted as soon as possible by the laboratory staff.

### 12.3 Identification of Biohazardous Materials with a Biosecurity Risk

The senior laboratory instructor is responsible for classifying the risk assessment of agents used in the respective laboratory exercises. The risk assessment is done by utilizing the Canadian Biosafety Standards and Guidelines published by the Public Health Agency of Canada (PHAC). These risk assessment guidelines are also found in the Ontario Tech University Biosafety Manual. The completed risk assessment is submitted to the Biosafety Committee for approval. There is also a mechanism to refer agents to the PHAC and ask for aid in assigning a risk group. Further guidance can also be found by contacting the Centers for Disease Control and Prevention/National Institute of Health Biosafety in Microbiological Laboratories.

While in laboratories, students will work with only Risk Level 1 and 2 potential human pathogens. Students will have sufficient biosafety training and practice. Factors such as weaponization risk, a consequence of release and level of threat will be considered when assessing the biosecurity risk of a biohazardous material. Student manipulation of these certain bacteria, for example, *Shigella*, would be highly supervised and limited.

## 12.4 Physical Protection

Different strategies have been implemented in the Medical Laboratory Science laboratories to ensure the security of laboratories containing biohazardous materials. These strategies are listed below:

- The laboratory door shall remain closed and locked at all times
- Preparation and storage rooms have secondary locks
- Incubators have locking devices
- The freezer is locked when not in use
- Students have limited access to preparation areas and storage rooms
- Students access refrigerator content only while under supervision
- Outdoor coats/backpacks are not allowed within the laboratory proper
- Lab kit contents and lab coats are not allowed to leave the laboratory
- All equipment is disinfected prior to removal from the laboratory
- A separate log book is maintained for each of the following:
  - when biohazard waste is disposed
  - when stock microbiology material is removed from the -80°C freezer and subcultured or destroyed
  - when the student laboratory benches are disinfected
  - all visitors to the laboratory
  - decontamination of equipment

## 12.5 Personnel Suitability & Reliability

Personnel access to both MLSc program laboratories is restricted to authorized individuals (specifically identified MLSc faculty and staff). Students working in these laboratories are under the direct supervision of an MLSc laboratory instructor responsible for the laboratory exercises/techniques being performed. Maintenance and janitorial staff only enter these laboratories under direct supervision by authorized individuals. Biosafety and biosecurity training are mandatory for all students, faculty, and staff working in laboratories that contain biohazardous materials. Hazardous materials awareness training is required for all maintenance and janitorial staff accessing laboratories on campus. Visitors must be escorted by an authorized individual such as a laboratory instructor or the laboratory technician.

## 12.6 Biohazard Accountability

An inventory of all biohazardous materials will be maintained from acquisition to disposal. The electronic inventory will include the type, quantity, and location of the material and is updated on a regular basis and the documentation is maintained for a year. A hard copy version of the biological inventory will also be kept in the laboratory. An annual MLSc biological inventory check is performed each year during the summer. All biological agents are counted and documented on the biological inventory and a printed Pathogen Safety Data Sheet will be available in the laboratory. The biological inventory is supplied to the Biosafety Officer on a yearly basis.

All biohazardous materials will be clearly labeled. All individuals who have access to the material will be identified. Loss, theft, or misuse of a biohazardous material will be reported immediately to the Biosafety Officer.

### 12.7 Incident and Emergency Response

All individuals working with biohazardous materials will report all security incidents to the Biosafety Officer and Campus Security as soon as possible. Security incidents include, but are not limited to, breach of containment, unauthorized removal of pathogens, and unauthorized personnel in restricted areas. Please refer to the Ontario Tech University Biosafety Manual for information on biohazard spill response procedures and other emergency procedures (e.g., earthquake, fire).

### 12.8 Management of Exposure to Blood and Body Fluids

- Immediately on exposure, the student must report to the laboratory instructor.
- If a needlestick or sharp injury or exposure to blood or other biohazard material occurs, immediately follow these steps:
  - Wash needlesticks and cuts with soap and water
  - Flush splashes to the nose, mouth, or skin with water
  - Irrigate eyes with clean water, saline, or sterile irrigants
  - Immediately seek medical treatment
- It is the laboratory instructor's first responsibility to attend to the student. **At an appropriate time**, the laboratory instructor **MUST** complete an Ontario Tech University Accident/Injury report. This is to be done electronically. This form can be found at <https://uoit.ca/current-students/campus-services/safety-security/index.php>. Copies are to be sent to the Manager of Insurance and Risk Management and a copy kept in the Medical Laboratory Science Program.
- It is the responsibility of the laboratory instructor to arrange transportation and to accompany the student to one of the following emergency departments:

#### **Lakeridge Health Oshawa**

1 Hospital Court  
Oshawa, ON  
Tel: 905-576-8711 x 3214/4560  
Fax: 905-721-4749

#### **Lakeridge Health Ajax**

580 Harwood Avenue  
Ajax, ON  
Tel: 905-683-2320 x 1210  
Fax: 905-428-8277

- Transportation should be via Blueline Taxi Services. Blueline can be contacted at 905-440-2000, state that this is an emergency and that the taxi is to proceed to the Main Entrance of Durham College, off Commencement Drive and wait. Blueline Taxi Services chits can be found in the laboratory first aid kits.
- Because the maximum benefit of immunoprophylaxis is achieved the sooner it is initiated, (preferably 1 or 2 hours post exposure).
- If an alternate instructor is not immediately available to replace the laboratory instructor attending the student, the Faculty of Health Sciences reception desk, at extension 3166, is to be called to help arrange for another instructor or staff member to come to the laboratory to remain with the second instructor and students. If an alternate instructor or staff member cannot be found and it is not considered safe to continue the laboratory session with only one instructor, the students are to be excused from the laboratory.
- Call Security, extension 2400, so that they are aware that a taxi is arriving to take the student and staff member to the hospital. Then proceed to the Durham College main entrance.

	
Local Risk Assessment	Procedure Number: MLScAF 13.0

Step 1: Hazard Identification	Step 2: Risk Identification and Assessment	Step 3: Develop and Implement Risk Mitigation	Step 4: Review Risk Assessment
<p>Student manipulate CL2 organisms to learn how to identify and perform susceptibility testing</p>	<p>CL2 organisms could be accidentally ingested or aerosolized during testing</p> <p>Likelihood of occurrence <b>Low</b></p> <p>Consequence of occurrence <b>Low</b></p>	<ul style="list-style-type: none"> <li>All personnel items are stored outside of the CL2 lab</li> <li>Students wear lab coat, safety glasses and gloves at all times while in the laboratory</li> <li>Students are always supervised in the lab 12:1 ratio</li> <li>Students are not allowed to work alone</li> <li>Safety briefing conducted at the start of every laboratory session</li> <li>SOP and lab workbook manual provided to the students</li> <li>University and MLSc Biohazard manuals available in the labs</li> <li>Virtual lab is available everywhere and anywhere for students to view procedures prior to entering the laboratory</li> <li>All manipulations are demonstrated to by the instructors prior to</li> </ul>	<ul style="list-style-type: none"> <li>MLSc Biosafety/Safety committee meeting</li> <li>Review and recommendations for any safety incidences</li> <li>There has been NO instances of ingestion or infections in the MLSc program</li> <li>Annual update of SOPs, safety manuals and workbooks.</li> <li>Review of Incident and Emergency response policies</li> <li>The use of incident and near misses reporting forms</li> </ul>

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		<p>the students beginning the laboratory session</p> <ul style="list-style-type: none"><li>• Pathogen with low infectivity dose (Shigella, Vibrio, E.coli O157:H7) are not manipulated by the students</li><li>• <i>Neisseria meningitis</i> is not manipulated by the students. Demonstrated only in BSC</li><li>• Students first learn and practice the techniques using CL1 organisms</li><li>• Plastic tubes and caps are used to mix organisms</li><li>• Organisms are in a solid growth- which decreases the likelihood of aerosolization</li><li>• Liquid cultures are kept to a very small amount &lt;1 mL</li><li>• Incinerators are used instead of a Bunsen burner, this decreases the chance of aerosolization</li><li>• There are designated clean and dirty areas</li><li>• Safety is taught in every MLSc course</li><li>• Signage on the door and through the laboratory</li><li>• Routine Lab inspections conducted by PHAC, Health and Safety and Biosafety officer</li></ul>	
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		<ul style="list-style-type: none"> <li>• Immunization requirements</li> <li>• Medical surveillance protocols</li> <li>• Emergency response protocols</li> </ul>	
<p>Lab Technician prepares subcultures for the laboratory sessions</p>	<p>CL2 organism could be accidentally ingested or aerosolized during testing</p> <p>Likelihood of occurrence <b>Low</b></p> <p>Consequence of occurrence <b>Low</b></p>	<ul style="list-style-type: none"> <li>• Lab technician is supported by a set of weekly instructions</li> <li>• MLTs are available for consultation</li> <li>• Plastic tubes and caps are used to mix organisms</li> <li>• Organisms are in a solid growth- less likelihood of aerosolization</li> <li>• Liquid cultures are kept to a very small amount &lt;1 mL</li> <li>• Incinerators are used instead of a Bunsen burner, decreases the chance of aerosolization</li> <li>• Subculturing from beads is performed in biosafety cabinet</li> </ul>	<ul style="list-style-type: none"> <li>• MLSc Biosafety/Safety committee meeting</li> <li>• Review and recommendations for any safety incidences</li> <li>• There has been NO instances of ingestion or infections</li> <li>• Annual update of SOPs, safety manuals and lab tech instructions</li> <li>• Incident and Emergency response policies</li> <li>• The use of incident and near misses reporting forms</li> </ul>



## APPENDICES

### Appendix 1

#### References

American National Standards Institute, ANSI standard ANSI Z358.1-2009, retrieved from:  
<http://gesafety.com/downloads/ANSIGuide.pdf>

Canadian Biosafety Standards and Guidelines, retrieved from:  
<http://canadianbiosafetystandards.collaboration.gc.ca/cbsg-nldcb/assets/pdf/cbsg-nldcb-eng.pdf>

Shematek, Wood (2006). Laboratory Safety, CSMLS guidelines sixth edition.

Transport Canada (1992) Transportation of Dangerous Goods Act, retrieved from  
<http://www.tc.gc.ca/eng/acts-regulations/acts-1992c34.htm>

Ontario Tech University Laboratory Safety Manual for General Laboratory operations and WHMIS  
retrieved from  
<http://healthandsafety.uoit.ca/manuals/index.php>

Ontario Tech University Biosafety Manual retrieved from  
<http://healthandsafety.uoit.ca/manuals/index.php>

**APPENDIX 2**

**WASTE COLLECTION INVENTORY FORM**

**PART 1 – TO BE COMPLETED BY THE WASTE GENERATOR**

Name: \_\_\_\_\_

Faculty: \_\_\_\_\_

Location (Building and room #): \_\_\_\_\_

Telephone: \_\_\_\_\_

Date: \_\_\_\_\_

Waste Category (see list below)	Type of Container	Number of Containers	Physical State	List of Contents

**List of Waste Categories**

Halogenated Solvents  
Non-halogenated Solvents  
Aqueous Inorganic

PCB  
Air/Water Reactive  
Unstable/Explosive

Acid  
Alkali  
Other (list chemicals)

**Originator's Signature:**  
\_\_\_\_\_  
Signature verifies that the above information is complete and accurate.

**PART 2 – TO BE COMPLETED BY THE WASTE COORDINATOR**

Disposal Date: \_\_\_\_\_

Waste Manifest Reference #: \_\_\_\_\_

Waste Coordinator Signature: \_\_\_\_\_



**APPENDIX 4**

**Medical Laboratory Science Program  
 Visitor Sign in Log for UB 3095, 3085 and 3075**

To maintain a safe and healthy environment for contractors, maintenance personnel and visitors please review the following information regarding the MLSc laboratory health awareness. Any questions should be directed to the instructors or laboratory staff.

<b>CL2 Laboratory Safety Practices</b>
<ul style="list-style-type: none"> <li>• Appropriate clothing should be worn while working with equipment</li> <li>• No loose items of clothing</li> <li>• Footwear should be closed heel and toe</li> <li>• Long hair should be tied back</li> <li>• No personal items should be stored in the technical/biohazard areas</li> <li>• Specific personal protective equipment (PPE) is required when handling biohazard</li> <li>• Laboratory lab coats are mandatory in the technical/biohazard areas</li> <li>• No food or drink allowed in the laboratories</li> <li>• <b>Perform hand hygiene prior to leaving the laboratory</b></li> </ul>
<b>Chemical Safety Practices</b>
<ul style="list-style-type: none"> <li>• Specific personal protective equipment (PPE) is required if handling chemicals</li> <li>• Emergency eyewash and emergency showers are located throughout the laboratory should be identified prior to conducting work processes</li> <li>• <b>In case of a spill:</b> Do not attempt to clean up a spill of any hazardous material. <b>Notify instructors immediately so emergency clean up procedures can be followed</b></li> </ul>
<b>Fire Safety</b>
<ul style="list-style-type: none"> <li>• Identify locations of fire pull stations and fire extinguishers upon entering the laboratory</li> <li>• In the event of smoke notify instructors immediately</li> <li>• Utilize the <b>REACT response</b> immediately</li> <li>• <b>R-</b> Remove people from danger</li> <li>• <b>E-</b> Enclose all doors</li> <li>• <b>A-</b> Activate the Fire alarm pull station</li> <li>• <b>C-</b> Call 2400- campus security, give the specific location of the fire</li> <li>• <b>T-</b> try to fight the fire with appropriate extinguisher if it can be done safely</li> </ul>

I have read and am aware of the potential hazard I may encounter in the laboratories. I will comply with safety directions and perform hand hygiene upon exiting the laboratories.

Print Name	Signature
1.	
2.	
3.	
4.	


Date \_\_\_\_\_ Reason for visit/Organization \_\_\_\_\_ Time in \_\_\_\_\_ Time out \_\_\_\_\_







APPENDIX 8

	<b>AUTHORIZATION TO ACQUIRE BIOHAZARDOUS MATERIAL</b>
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This form must be completed prior to acquiring any biohazardous material from any source, either by purchase from a commercial supplier or transfer from another institution. The form must be reviewed and signed by the Biosafety Officer before placing an order or bringing the material on campus. The person acquiring the material must be the holder of a valid Biosafety Certificate for the proper containment level issued by the UOIT Biosafety Committee.

This form must be completed for each separate request to acquire material, irrespective of whether the material is listed on a current Biosafety Certificate or has been previously ordered. A separate form should be submitted for each agent requested.

If the material requested is not listed on the Biosafety Certificate, then a separate form "Request to Amend Biosafety Certificate" must be completed in addition to this "Authorization to Acquire Biohazardous Material" form.

BIOSAFETY CERTIFICATE HOLDER INFORMATION	
Name of Biosafety Certificate Holder:	_____
Biosafety Certificate Number:	_____ Biohazard Containment Level: _____
Room in which Material will be Stored/Used:	_____

MATERIAL INFORMATION	
Agent Common Name:	_____
Scientific Name/Species:	_____
Risk Group:	_____
Is the agent listed in one of the Schedules to Appendix 3 of the UOIT Biosafety Manual?	
<input type="checkbox"/> Yes	<input type="checkbox"/> No      If Yes, which Schedule: _____
ATCC Number (if applicable):	_____
Is this material currently approved for use under your current Biosafety Certificate? (If no, please complete the "Request to Amend Biosafety Certificate Form")	
<input type="checkbox"/> Yes	<input type="checkbox"/> No



Is this material currently approved for use under your current Biosafety Certificate?  
(If no, please complete the "Request to Amend Biosafety Certificate Form")

Yes       No

Type of Material:

Bacterium       Virus       Fungus       Toxin       Parasite

Human tissues or cells       Animal Tissues or Cells

Recombinant DNA/RNA       Other (specify) \_\_\_\_\_

Form of Material: \_\_\_\_\_

Quantity: \_\_\_\_\_

#### SUPPLIER INFORMATION

Name of Supplier (Commercial company or institution; if an institution, provide name of contact person within that institution):  
\_\_\_\_\_

#### CERTIFICATE HOLDER ACKNOWLEDGEMENT

In signing this, I agree that the information provided in this form is complete and accurate, and that I will adhere to all UOIT policies and procedures outlined in the UOIT Biosafety Manual with respect to the acquisition, use, storage and handling of materials/agents.

Certificate Holder Signature: \_\_\_\_\_

Date: \_\_\_\_\_

#### FOR OFFICE USE ONLY

Laboratory Registration       PHAC       CFIA

Agent Listed on PHAC Schedule:       No       Yes      Schedule: \_\_\_\_\_

Compliance Officer Signature: \_\_\_\_\_

**BIOSAFETY OFFICER APPROVAL**

**Biosafety Officer Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

APPENDIX 9

	<b>REQUEST TO AMEND BIOSAFETY CERTIFICATE</b>
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This form must be completed when requesting an amendment to an existing Biosafety Certificate. Specifically when there is any proposed change to:

- location or addition of rooms
- addition of new agents not listed on the current certificate
- change in containment level
- changes in personnel
- any change which potentially conflicts with the conditions listed on the Biosafety Certificate
- cessation of work with an agent/disposal of an agent
- offsite changes

BIOSAFETY CERTIFICATE HOLDER INFORMATION	
Name of Biosafety Certificate Holder: _____	
Biosafety Certificate Number: _____	Biohazard Containment Level: _____
Location-Onsite and Offsite (Building and Room Number): _____	

NATURE OF CHANGE REQUESTED	
<input type="checkbox"/> Change in Location (Building and Room Number): From: _____ To: _____	
<input type="checkbox"/> Addition of a Room (Building and Room Number): _____	
<input type="checkbox"/> Addition of new Agent(s) (Complete Section on Material Information)	
<input type="checkbox"/> Change in Containment Level: From: _____ To: _____	
<input type="checkbox"/> Changes in Personnel (Complete Section on Personnel Changes):	
<input type="checkbox"/> Cessation of work/disposal of an agent (Complete Section on Reason for Change):	
<input type="checkbox"/> Other (Specify, and Complete Section on Reason for Change): _____	



<b>PERSONNEL CHANGES</b>
<b>Names to be Deleted:</b>

Names to be Added	Position/Role	WHMIS/GHS Training Passed	Biosafety Training Passed	Radiation Safety Training Passed

<b>CERTIFICATE HOLDER ACKNOWLEDGEMENT</b>
<p><b>In signing this, I agree that the information provided in this form is complete and accurate, and that I will adhere to all UOIT policies and procedures outlined in the UOIT Biosafety Manual with respect to the acquisition, use, storage and handling of materials/agents.</b></p> <p><b>Certificate Holder Signature:</b> _____</p> <p><b>Date:</b> _____</p>

<b>FOR OFFICE USE ONLY</b>
<p>Laboratory Registration    <input type="checkbox"/> PHAC    <input type="checkbox"/> CFIA   <input type="checkbox"/> Not Applicable</p> <p>Agent Listed on PHAC Schedule:    <input type="checkbox"/> No   <input type="checkbox"/> Yes   Schedule: _____   <input type="checkbox"/> N/A</p> <p>Compliance Officer Signature: _____</p>
<b>BIOSAFETY OFFICER APPROVAL</b>
<p>Biosafety Officer Signature: _____</p> <p>Date: _____</p>

APPENDIX 10

WORKPLACE INSPECTION CHECKLIST FOR LABORATORY ENVIRONMENTS

Standard OHS Workplace Inspection Checklist



Review Date:

Lab Location/Room #:

Lab Manager:

Inspection Team Members:

**Note:** Inspection team members to retrieve previous JHSC safety inspections and confirm if corrective actions have been implemented since last inspection.

**Electronic Distribution of Copies:** Health & Safety Officer, Area Supervisor, Human Resources, OCIS Director  
**Laboratory Safety Policies/Procedures/Records**

Item #

The lab has information readily available for the following:

1	Y	N	N/A	a. Chemical Emergencies and Spill Procedures in a Lab Safety Manual.
2	Y	N	N/A	b. Radiation Spills
3	Y	N	N/A	c. Biohazard Emergency and Spill Procedures in a Biosafety Manual or available electronically.
4	Y	N	N/A	Lab has Fire/Safety Emergency Plan placards.
5	Y	N	N/A	An emergency phone contact list is posted on the door of the lab and near phone.
6	Y	N	N/A	Hazard specific signs are posted on equipment and on door, if applicable.
7	Y	N	N/A	No eating/drinking signs are posted on door.
8	Y	N	N/A	Standard Operating Procedures (SOP) or manuals on lab specific procedures have been written and include up-to-date safety information and are readily available.
9	Y	N	N/A	Refrigerators containing hazardous materials must have proper signage.
10	Y	N	N/A	Do occupants understand that they need to evacuate if Stage 2 of the alarm sounds or if an area Fire Warden directs them to evacuate? (Fire Wardens have an orange vest or an orange arm band or an orange vest.)
11	Y	N	N/A	Employees aware of Accident Injury Form procedures.

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12	Y	N	N/A	Compressed gas cylinders are properly used and secured with appropriate restraints to walls or benches.
13	Y	N	N/A	Appropriate spill kit(s) is available and accessible. Person responsible for restocking can be identified.
14	Y	N	N/A	General exhaust ventilation is apparent, functioning and unobstructed.
15	Y	N	N/A	There is at least 18" of clearance around and below ceiling sprinklers.
16	Y	N	N/A	Floors, bench tops and fume hood counter tops are free of hazardous material residues.
17	Y	N	N/A	Laboratory floors and bench tops are uncluttered.
18	Y	N	N/A	Laboratory aisles have clearance (1 metre) and are free of obstructions that may inhibit or block safe exiting.
19	Y	N	N/A	Laboratory fume hoods used for conducting experiments are free from stored materials.
20	Y	N	N/A	Fume hoods, autoclaves and/or biosafety cabinets have valid identification stickers and annual Preventative Maintenance Certificates where applicable, (no greater than 12 months from last inspection).
21	Y	N	N/A	There is easy access to electrical panels and they are clear of combustible materials (1 metre) and panels having locking mechanisms.
22	Y	N	N/A	Equipment is plugged into permanently wired outlets or to a single multi-plug power bar, equipped with a reset button, connected to a permanently wired outlet.
23	Y	N	N/A	Power bars are CSA and ULc approved, have a reset button and are not daisy chained with extension cords or other power bars.
24	Y	N	N/A	Electrical equipment or power bars with frayed or damaged plugs are not being used and do not appear to have not been tampered with (ground pins are present).
25	Y	N	N/A	Extension cords if present are being used on a temporary basis only.
26	Y	N	N/A	A representative sample of common electrical equipment has Electrical Safety Authority of Ontario or ULc approval.
27	Y	N	N/A	Piping (tubing), valves, and fittings used in experimental equipment are compatible with the hazardous materials for which they are used, and checked periodically for integrity.
28	Y	N	N/A	Belts, pulleys, and other exposed moving equipment parts are properly guarded.
29	Y	N	N/A	Vacuum equipment is provided with a filter or trap (filter or trap between process and apparatus).
30	Y	N	N/A	Pressurized vessels or a similar high-pressure system has been pressure tested and is equipped with an over pressure device (i.e. autoclave).
31	Y	N	N/A	Semi-annual shower inspections conducted by Facilities and tag initialed.
32	Y	N	N/A	Safety shower is within 25m with no more than one door in the travel path.



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33	Y	N	N/A	An eye wash station is within 25m with no more than one door in the travel path.
34	Y	N	N/A	Weekly eye wash check records are available in lab and are up to date, semi-annual inspections initiated by Facilities Management and tag with verification details is attached.
35	Y	N	N/A	Explosion shields are used for vessels under pressure or vacuum.
36	Y	N	N/A	Biosafety and radiation permits are posted when applicable.
37	Y	N	N/A	Tag on fire extinguisher indicates monthly and annual inspections.
38	Y	N	N/A	Fire extinguishers available and accessible near exit doors.
39	Y	N	N/A	MSDS not older than 3 years for all WHMIS/GHS controlled substances i.e. chemicals, cleaners etc. This has been validated by randomly checking 2 MSDS at minimum.
40	Y	N	N/A	Lighting fixtures are functional.
41	Y	N	N/A	Doors are not propped open
42	Y	N	N/A	All ceiling tiles are present, not stained, in good condition and have sprinkler collars in place.

**Hazardous Waste**

43	Y	N	N/A	All hazardous waste streams are properly identified.
44	Y	N	N/A	Glass and process waste is segregated and disposed of separately from general waste.
45	Y	N	N/A	Sharps are placed in properly labeled sharps containers at point of generation, autoclaved and verified prior to disposal where biohazards exist.
46	Y	N	N/A	Waste is properly stored prior to disposal.

**Personal Protective Equipment (PPE)**

47	Y	N	N/A	Laboratory personnel use personal protective equipment suitable for the hazard(s) encountered.
48	Y	N	N/A	Safety glasses with side shields, goggles and face shields are used as required for a process.
49	Y	N	N/A	All laboratory personnel receive instruction on proper PPE selection.

**Fire Code Non-Compliance Notice(s) Completed:**

**Yes or No**

If "yes" please indicate the room/lab number and occupant/manager name below:


**Additional Comments:**

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APPENDIX 11



# BIOLOGICAL SAFETY INSPECTION CHECKLIST

## Section A: Contact Information (Permit Holder)

Permit Holder: \_\_\_\_\_ Contact Person: \_\_\_\_\_ Contact Extension #: \_\_\_\_\_  
 Department: \_\_\_\_\_ Location(s) of Inspection: \_\_\_\_\_ Date/Time: \_\_\_\_\_

<b>Section B: Containment Entry/Exit</b>		<b>Canadian Biosafety Standards Reference / Containment Level 1 Guideline (bold):</b>	
Y I N	<b>1</b> A. Lab separated from public and admin areas by door? B. Lab Entrance Door Lockable?		<b>3.1.1 / 3.3.1</b>
Y I N	<b>2</b> Containment zone doors kept closed?		<b>4.5.1</b>
Y I N	<b>3</b> A. Door Placard with biohazard symbol on Door? B. Signs are consistent with the hazards within? C. Name and telephone of contact person stated? D. Entry requirements stated?		<b>3.3.2 / 4.5.8</b>
Y I N	<b>4</b> Storage space provided for Personal Protective Equipment (PPE) at the containment zone point(s) of entry?		<b>3.3.9</b>
Y I N	<b>5</b> Access is limited to authorized personnel and authorized visitors? (ie log-in sheet)		<b>4.5.2</b>
Y I N	<b>6</b> Current Approved University Biohazard permit is posted in the laboratory?		<b>4.1.2</b>
<b>Section C: Lab Design and Work Practices</b>			
Y I N	<b>7</b> A. Windows do not open? B. If openable: includes locks and pest control? C. Sealed shut?		<b>3.2.1</b>
Y I N	<b>8</b> Doors, frames, casework, bench-tops, stools, and chairs non-absorbent? (Wood surfaces sealed?)		<b>3.4.1</b>
Y I N	<b>9</b> A. The wear and tear of surfaces and interior coatings is acceptable? B. Any significant scratch, stain, moisture, chemicals, heat, decontamination, high pressure washing, damage?		<b>3.4.1</b>
Y I N	<b>10</b> Benchtops and other work surfaces do not have open seams, to allow cleaning and decontamination		<b>3.4.2</b>
Y I N	<b>11</b> Backsplashes that are installed tight to a wall are sealed at the wall-bench junction, to allow cleaning and decontamination.		<b>2.1.7</b>
Y I N	<b>12</b> Dedicated paper/computer work stations segregated from laboratory and biological work stations within the containment zone?		<b>3.1.2 / 4.6.8</b>
Y I N	<b>13</b> A. Handwashing sinks near exit with soap available? B. If not, hand sanitizers? C. Authorized personnel remove gloves and wash hands when exiting containment zone or after handling infectious material?		<b>3.6.4 / 4.5.15</b>
Y I N	<b>14</b> A. Floors slip-resistant in accordance with function? B. Tiles are not broken or no cracked seams present?		<b>3.4.5</b>
Y I N	<b>15</b> A. Biohazardous material is clearly identified and labeled where stored (e.g. freezers, incubators)? B. Appropriate warning & hazard signs are posted?		<b>4.8.8</b>
Y I N	<b>16</b> A. Biological materials stored outside the containment zone are kept in labeled locked storage equipment? B. Leak proof containers needed?		<b>4.6.20</b>
Y I N	<b>17</b> A. Containment zone (including floors) is kept clean and tidy? (Free from obstructions, and free from materials that are in excess, not required, or that cannot be easily decontaminated) B. Aisles and exits are free from obstruction, no tripping or slippery hazard present?		<b>4.6.35</b>
Y I N	<b>18</b> Two-way communication system(s) provided allows communication between inside the containment barrier to outside the containment zone?		<b>3.7.18</b>
Y I N	<b>19 BSC:</b> Biosafety Cabinet located away from high traffic areas, doors, and air supply/exhaust diffusers?		<b>3.7.6</b>
Y I N	<b>20 BSC:</b> Authorized personnel trained in BSC correct use and have a good understanding of the different types of usage.		<b>4.10.1</b>
Y I N	<b>21 BSC:</b> A. BSC certified? B. Biological Safety Cabinets are certified annually, after repair or relocation? (certification posted)		<b>4.6.15 / 5.1.5</b>
	<b>22 BSC:</b> Centrifuged biological samples open immediately inside a BSC?		<b>4.6.28</b>
Y I N	<b>23 BSC:</b> A. Sustained open flames prohibited in a BSC; on-demand open flames avoided? Open flames to be avoided when using the BSC.		<b>4.6.30</b>

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Y I N	<b>24</b>	<b>BSC:</b> A. Vacuum systems, when provided, equipped with a device to prevent internal contamination? B. Filters are inspected regularly and changed when needed?	3.7.17 / 5.1.3
Y I N	<b>25</b>	<b>BSC:</b> A. UV light is turned off when BSC is in use? B. Replaced when needed?	3.7.14
Y I N	<b>26</b>	<b>BSC:</b> Proper BSC procedures are performed when in use?	4.6.26
Y I N	<b>27</b>	<b>BSC:</b> BSC benches are not cluttered and airflow is unrestricted?	4.6.18
Y I N	<b>28</b>	<b>BSC:</b> Leak-proof waste containers available near or inside BSCs?	4.8.8
Y I N	<b>29</b>	<b>BSC:</b> Work surfaces are decontaminated after use?	4.8.2 / 4.6.11
<b>30 Section D: Good Microbiological Laboratory Practices</b>			<b>4.6.18</b>
Y N		Long hair tied back, restrained, or covered? <b>(4.6.2)</b>	Y N No contact lens solution or case? <b>(4.6.18)</b>
Y N		No Jewellery? <b>(4.6.4)</b>	Y N No evidence of food or drinks? <b>(4.6.1)</b>
Y N		Hand washing observed? <b>(4.5.15)</b>	Y N No cosmetic makeup? <b>(4.6.18)</b>
Y N		First Aid kit available with waterproof dressing to cover wounds, cuts, scratches? <b>(4.6.6)</b>	
<b>Section E: Personal Protective Equipment</b>			
Y I N	<b>31</b>	A. Appropriate dedicated PPE donned in accordance with policy, and to be exclusively worn and stored in the containment zone? B. lab coats? C. eye/face protection used?	<b>4.4.1</b>
Y I N	<b>32</b>	Personal clothing physically stored separately from dedicated PPE?	<b>4.5.10</b>
Y I N	<b>33</b>	Personal belongings kept separate from areas where biological material or chemicals are handled or stored?	<b>4.5.11</b>
Y I N	<b>34</b>	Gloves are worn by authorized personnel when handling biohazardous materials or infected animals?	<b>4.4.4</b>
Y I N	<b>35</b>	Face/eye protection used where there is a risk if exposure to splashes or flying objects?	<b>4.4.2</b>
Y I N	<b>36</b>	Personnel (including visitors, trainees and all others) are wearing protective footwear (Closed-toed and closed-heel with no or low heels) when working in the containment zone?	<b>4.6.3</b>
Y I N	<b>37</b>	PPE decontaminated prior to disposal or laundering when a known or suspected exposure has occurred?	<b>4.8.5</b>
Y I N	<b>38</b>	<b>LEVEL 2:</b> Respirators are provided when necessary, and selected on the basis of hazard present (users are trained and fit tested)?	4.1.13
<b>Section F: Decontamination and Waste Disposal</b>			
Y I N	<b>39</b>	A. Sufficient disinfectants effective against infectious materials in use are available at all times within the laboratory? B. What disinfectants are used and where are they located?	<b>4.8.2 / 4.6.11</b>
Y I N	<b>40</b>	Gross contamination removed from surfaces and equipment, including prior to maintenance or disposal?	<b>4.8.1 / 4.8.4</b>
Y I N	<b>41</b>	A. Syringes and sharps use is limited? B. If used, are disposed in labeled sharps container? C. Recapping, bending or removal of needle from the syringe avoided if possible?	<b>4.6.10 / 4.8.3</b>
Y I N	<b>42</b>	Biohazard waste stored in labeled leak-proof waste containers until decontaminated?	<b>4.8.8</b>
Y I N	<b>43</b>	All contaminated materials are decontaminated before disposal?	<b>4.8.7 / 4.8.8</b>
Y I N	<b>44</b>	A. Autoclave used? B. Biohazard autoclave bags are available? C. All solid biological waste is placed in biohazard autoclave bags and autoclaved? D. If not, biological waste is placed in proper containers until picked-up by the waste contractor?	<b>3.7.15 / 4.8.8</b>
<b>Section G: Emergencies</b>			
Y I N	<b>45</b>	A. Emergency eyewash and shower equipment available in proximity of laboratory? B. Checked weekly? C. Authorized personnel know closest location?	<b>3.6.6</b>
Y I N	<b>46</b>	An Emergency Plan is available to all laboratory personnel? Includes emergency numbers, MSDS information, and emergency protocols?	<b>4.9.1</b>
Y I N	<b>47</b>	Emergency procedures for spill cleanup, BSC failure, fire, and other emergencies are available and easily accessible?	<b>4.9.1</b>
Y I N	<b>48</b>	Biological Spill Kit is available and all personnel are familiar with location and associated protocols?	4.9.6
Y I N	<b>49</b>	Emergency Spill Response posted and authorized personnel aware of its location?	<b>4.9.1</b>
Y I N	<b>50</b>	Outside containment zone emergencies considered?	4.9.2
Y I N	<b>51</b>	All incidents, accidents, exposures, loss of containment involving biological materials are reported to the laboratory supervisor and the Biosafety Officer?	4.9.7
Y I N	<b>52</b>	<b>LEVEL 2:</b> Authorized personnel know to immediately notify their supervisor of any illness caused by, or that may have been caused by, the biological material or toxin(s) being handled or stored?	4.2.3


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**Section H: Record Keeping / Administrative Controls**

Y I N	<b>53</b>	Authorized personnel know the location and contents of the Lab Safety Binders? (SDS, PSD sheets, biosafety manual, SOPs, training records, etc.)	<b>4.3.1-4.3.5 / 4.10.1</b>
Y I N	<b>54</b>	Training and retraining of all authorized personnel documented and records kept in accordance with the biosafety manual?	<b>4.3.1-5 / 4.10.1</b>
Y I N	<b>55</b>	Authorized personnel have completed A. biosafety training? B. Decontamination procedures? C. Proper BSC Use? D. Other equipment use? E. work specific potential hazards and precautions training?	<b>4.3.1 / 4.3.2 / 4.3.3 / 4.3.4 / 4.1.14</b>
Y I N	<b>56</b>	Authorized personnel have demonstrated knowledge of and proficiency in the SOPs on which they were trained? (sign-off sheets)	<b>4.3.1 / 4.3.7</b>
Y I N	<b>57</b>	Evidence to show authorized personnel are required to follow these SOP's? (sign off sheets)	<b>4.10.1 / 4.3.8</b>
Y I N	<b>58</b>	Was a local risk assessment (LRA) conducted to examine each task involving infectious material or toxins so that the risks were identified and safe work practices developed and documented?	<b>4.1.8</b>
Y I N	<b>59</b>	Emergency response procedures reviewed annually?	<b>4.3.10</b>
Y I N	<b>60</b>	Trainees supervised by authorized personnel until they have fulfilled the training requirements?	<b>4.3.8</b>
Y I N	<b>61</b>	A. Inventory of biological agents handled or stored in the containment zone maintained and kept up to date? B. Inventory records are updated regularly? C. Records of regulated materials are kept?	<b>4.10.2</b>

**APPENDIX 12**

	<b>Laboratory Medicine Program</b> <b>UOIT Specimen Release Form</b>
Lab area: Quality Management System	Document number: QMS07.31 F3
Section: Reporting of Laboratory Results	Page 1 of 1
Issued by: Judy Sherman-Jones	Effective date: 4/18/2017
Approved by: Runjan Chetty	Version: 3.0 Current
Distribution: Sharepoint	

Date: \_\_\_\_\_

Person releasing specimens: \_\_\_\_\_

Person receiving specimens: \_\_\_\_\_

Have all patient identifiers been removed for specimens?     Yes     No

Number/type of specimens: (please detail number of tubes/type of tissue, etc.)

Blood: \_\_\_\_\_

\_\_\_\_\_

Histology tissues: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Other: \_\_\_\_\_

\_\_\_\_\_

APPENDIX 13



**CERTIFICATE OF ANALYSIS**



**DETERGENT DISINFECTANT**

Lot # 17224F  
Date of Manufacture June 2024  
Expiration Date June 2025

SIZE	16oz (475mL)	32oz (950mL)	64oz (1.9L)	1gal (3.8L)
DECON #	4101	4102	4103	4104

TEST	SPECIFICATION	UNIT	TEST RESULT
Active Content	0.21 - 0.23	% w/w	0.21
pH	10.7 - 12.7	N/A	12.0
Density	8.08 - 8.86 lb./gal	lb./gal	8.38
Appearance	Clear to Yellow Liquid Characteristic odor	N/A	Pass

Reviewed and Approved by:

Date: June 2024

A handwritten signature in blue ink that reads 'Karen Wend'.

Karen Wend  
Manager, Quality and Technical Services  
Template revised 10/02/2012

**BSE/TSE Statement:** There are no materials of animal origin in the raw materials or in the process aides used to manufacture any Decon products.

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