BI Safety Program

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# Introduction

The purpose of the Biointerfaces Institute (BI) Safety Program is

* to educate users on safety references that influence BI policies and procedures
* to define health and safety responsibilities and accountabilities within the BI
* to outline BI specific policies and procedures

## Disclaimer

The BI safety manual, policies and standard operating procedures are intended to provide basic rules for safe work practices in the BI facility. These guidelines may be supplemented with McMaster University policy, risk management, and the lab safety handbook, in addition to the Occupational Health and Safety Act. Individuals frequenting the BI are encouraged to consult relevant McMaster University safety committees (e.g. EOHSS and the Biosafety Office), handbooks, Standard Operating Procedures, policies and the Risk Management Manual, in addition to governmental safety programs.

BI policies are by no means all-encompassing and any omission is not an excuse for unsafe practices. Furthermore, BI safety procedures and policies do not replace the user’s supervisor responsibility for having experiment-specific safe work practices and SOPs, and the use of such proper procedures to eliminate unnecessary hazards.

Any concerns, questions and conflicts between BI policies and other safety governing bodies and/or user specific procedures should be brought to the attention of BI staff.

# Acronyms

|  |  |
| --- | --- |
| **Acronym** | **Definition** |
| BI | Biointerfaces Institute |
| BSL | Biosafety Level |
| BUP | Biohazard Utilization Protocol |
| CBSG | Canadian Biosafety Standards and Guidelines |
| CFIA | Canadian Food Inspection Agency |
| CJHSC | Central Joint Health and Safety Committee |
| CL | Containment Level |
| EOHSS | Environmental & Occupational Health Support Services |
| GHS | Globally Harmonized System  |
| HC | Health Canada |
| HPA | Hazardous Products Act |
| JHSC | Joint Health and Safety Committee |
| OHSA | Occupational Health and Safety Act |
| OML | Ontario Ministry of Labour |
| PBAC | Presidential Biosafety Advisory Committee |
| PHAC | Public Health Agency of Canada |
| PSDS | Pathogen Safety Data Sheet |
| PPE | Personal Protective Equipment |
| RMM | Risk Management Manual |
| SDS | Safety Data Sheet |
| SOP | Standard Operating Procedure |
| WHMIS | Workplace Hazardous Materials Information System |

# Safety Terms & Definitions

|  |  |
| --- | --- |
| Audit | A systematic check to determine quality in the operation of some function or the performance of some activity. |
| BI Associate Director  | The secondary supervisory BI staff member who is responsible for the BI facility and its staff. |
| BI Director | The primary supervisory BI staff member who is responsible for the BI facility and its staff. |
| BI Research Technician | A hired employee of the BI that reports to the BI Director and/or BI Associate Director responsible for the BI laboratory space. |
| BI Staff | Employees of the BI within the administrative, business, and technical offices. |
| BI User | An individual that has authorization to access and work in the BI laboratories independently. |
| Biohazard | Any biological material that could cause health hazards to humans or animals, including infectious or potentially infectious agents. Such agents could include bacteria, tissues, cell lines, fungi, microorganism toxins, viruses and prions. |
| Biohazard Risk Groups or Levels | Categorized risk groups of relative hazards or infective organisms, based on pathogenicity, infectious dose, mode of transmission, host range, effective preventive measures and effective treatment methods. |
| Biohazard Risk Group 1 | Biohazardous materials unlikely to cause disease in healthy workers, animals or the environment. |
| Biohazard Risk Group 2 | Biohazardous materials that could cause disease following exposure, but under normal circumstances, are unlikely to be a serious hazard to workers, animals, and the environment. |
| Biohazard Containment Level | Containment levels describe biological, physical and operational means to minimize exposure and aerosol production of a biohazardous material. |
| Biohazard Containment Level 1 | Biohazards in this containment level require no special design beyond a typical research laboratory. Exposure hazards are low. Biological safety cabinets are not required, and containment is achieved through good (microbial) laboratory practices. |
| Biohazard Containment Level 2 | Biohazards in this containment level require personal protective equipment, the use of biological safety cabinets and sealed containment when used outside of a biological safety cabinet. Exposure hazards include ingestion, inoculation, mucous membrane transmission, with a possibility of aerosol production leading to airborne exposure. Good hygiene practices, such as frequent handwashing, and decontamination procedures are advised. |
| Biohazard Risk Assessment | Detailed risk assessments (including the likelihood of aerosol production, quantity, concentration, agent stability, type of work, and the use of recombinant organisms) to determine the risk group and containment level for a biohazardous material.  |
| Biohazardous Waste | Waste from biohazards, items that have come into contact with biohazards, anything labeled with a biohazard symbol, or any item(s) that may “appear” to be associated with biohazards. |
| Buddy System | A system of organizing work so that a worker can be seen or heard by another worker, who is close to the workstation. |
| Contaminant | Any solid, liquid or gas, odour, heat, sound, vibration or radiation resulting from human activities that may cause adverse effect on people, property, or the natural environment. |
| Critical injury | An injury of a serious nature that, places life in jeopardy; produces unconsciousness; results in substantial loss of blood; involves the fracture of a leg or arm, but not a finger or toe; an amputation of a leg, arm, hand or foot but not a finger or a toe; consists of burns to a major portion of the body; or causes the loss of sight in a eye. |
| Controlled Goods | Goods and technology, as listed in the Defence Production Act (DPA), related to military, strategic and military-related items, and those defined as dual-use. |
| Compressed Gas | Any product, materials, or substance contained under pressure, including dissolved gas or a gas liquified by compression or refrigeration. |
| Cryogen | Liquified gases at very low temperatures. |
| Designated Substance | A biological, chemical or physical agent, or combination thereof, to which the exposure of a worker is prohibited, regulated, restricted, limited or controlled. |
| Due Diligence | A general duty to take every precaution reasonable in the circumstances to protect health and safety. |
| Environment | Surroundings which include air, water, land, natural resources, flora, fauna, humans, and their interaction.  |
| Hazard | A situation or incident that may results in injury or a “near miss”. |
| Hazardous Material | A material regulated by WHMIS or other legislation, including but not limited to toxic agents, flammable material, oils and other petroleum products, corrosive substances, explosives, oxidizers and organic peroxides, compressed gases, pesticides and herbicides, pyrophoric materials, and contaminated soil.. |
| Hazardous Waste | Waste of a hazardous materials, items that have come into contact with hazards, anything labeled with a hazard symbol, or any item that may “appear” to be associated with hazards. |
| Inspection  | An examination of the workplace physical condition to identify deficiencies that may case injury, illness or property damage. |
| Principal Investigator | Research supervisor who has authority or control over a worker. |
| Safety Data Sheet | Information on a specific hazardous material for the health protection of people in the workplace. |
| Safety Orientation | A process of education to ensure person(s) are aware of the hazards prior to commencing the activity and practice the procedures to prevent injury, adverse health exposure and/or property damage. |
| Sharp | Needles, microtome blades, razor blades, lancets, knife blades and glass contaminated with a biohazard. |
| Standard Operating Procedure (SOP) | Written and communicate procedures that define the techniques, processes and best practices required to prevent injury and/or occupational illness or damage to equipment or the environment. |
| Spill  | A discharge of a pollutant into the natural environment, which is the land, air or water, from out of a structure, vehicle or other container, that is abnormal in quality or quantity, in light of all the circumstance of the discharge. |
| Supervisor | Person who has authority or control over a worker. |
| Unsafe work | A situation or incident that the user has reason to believe may endanger the health or safety or themselves or other users. |
| User | Person who is authorized to perform work within the BI. |
| Visitor | Person who does not work within the BI but wishes to enter the BI facility. |
| Volunteer | A person who performs work or supplies services for no monetary compensation. |
| Worker | A person who performs work or supplies services for monetary compensation. |
| Workplace | Any land, premises, location or thing at, upon, in or near which a worker works. |

# The Biointerfaces Institute

The Biointerfaces Institute (BI) is a collaborative, shared environment designed to connect researchers and industrial users. The BI is located on the 4th floor of the Engineering Technology Building (ETB) on McMaster University’s main campus, in Hamilton ON, Canada.

*Reference: http://biointerfaces.mcmaster.ca/*

## BI Facilities

BI facilities include:

|  |  |
| --- | --- |
| BI Main Offices | ETB 412, 413, 414, 415, 416, and 416A (accessed via ETB 480) |
| BI Laboratory Hallway | Hallway via ETB 480b or 482a; used to access BI Laboratories |
| BI Laboratories | ETB 417, 418, 419, 420, 420A, 421, 423, 424, 425, 433 and 435 |
| BI Staff Office | ETB 422 (accessed via BI Laboratory Hallway) |
| Waste Disposal Room  | ETB 430 |

### BI Facility Map



## BI Safety Hierarchy

The BI safety hierarchy, and affiliated responsibilities, is defined as having the BI Director and BI Associate Director being informed of safety information from BI Staff, BI Research Technicians, BI Users and BI User’s Supervisors.

## BI Director Responsibilities

The BI Director is responsible for:

* having up-to-date relevant McMaster safety training, as required
* advising staff under his/her supervision on safety action items
* ensuring staff under his/her supervision adhere to McMaster manuals and policies
* ensuring staff under his/her supervision have up-to-date relevant McMaster safety training
* approving and following the BI Safety Program, Policies and SOPs
* ensuring staff under his/her supervision adhere to BI Programs, Policies and SOPs
* ensuring that BI facilities are properly inspected, and any issues are remedied
* enforcing BI users in following to the BI Safety Program, Policies and SOPs

## BI Associate Director Responsibilities

The BI Associate Director is responsible for:

* having up-to-date relevant McMaster safety training, as required
* following the BI Safety Program, Policies and SOPs
* performing BI Director responsibilities should the BI Director be unavailable

## BI Staff and Research Technicians Responsibilities

BI Staff and Research Technicians are responsible for:

* having up-to-date relevant McMaster safety training, as required
* writing, reviewing, amending and following the BI Safety Program, Policies and SOPs regularly, at minimum annually or as new information is available
* ensuring BI users adhere to the BI Safety Program, Policies and SOPs
* training BI users on BI laboratories, BI equipment, and policies, as required
* inspecting BI facilities regularly, and resolving any non-compliance issues or infractions
* maintaining BI facilities, equipment, documentation and inventories
* update the BI Information Board as required

## BI Users and their Supervisor(s) Responsibilities

BI Users and their Supervisor(s) are responsible for:

* having up-to-date relevant McMaster safety training, as required
* following the BI Safety Program, Policies and SOPs
* communicating any lab specific SOPs to BI Research Technicians for work being performed within BI facilities
* reporting any relevant health and safety issues to BI Research Technicians
* reporting any BI facility or equipment issues to BI Research Technicians

# BI Safety Policies and SOPs

BI Safety Polices, and associated documents, although related to this parent document, are outlined as separate files. Refer to Appendix I for a complete Policy and Form List.

The BI Safety Program and affiliated policies are available online via the BI website and are communicated to BI Users during BI specific training modules.

BI Standard Operating Procedures (SOPs) are reserved for BI equipment procedures and are made available to BI Users during initial equipment training sessions.

*Reference: http://biointerfaces.mcmaster.ca/resources/policies*

# BI Safety Reviews and Amendments

The contents of the BI Safety Program and Policies will be reviewed and amended by BI Research Technicians at minimum, annually, or as needed due to changes in governmental and McMaster policies. Facility inspection and audits will also drive policy change as risks or hazards are identified and mitigated for continuing improvement towards best safety practices.

Administrative, grammatical and minor amendments, that do not increase safety risks within policies or SOPs will be added to documentation as needed, without formal communication of such amendments.

Major amendments that alter the content of policies or SOPs will be added to documentation as needed and communicated to BI Users online via the BI website, via the BI Information Board and captured during training updates.

For BI Safety Manual and Policy revision history, refer to Appendix II. Annual review logs are available upon request from by BI Research Technicians.

# Safety References

The BI Safety Program and affiliated policies are influenced by various government agencies, safety acts and policies, and internal McMaster University health and safety groups, policies and guidelines.

## Ontario Ministry of Labour

The Ontario Ministry of Labour (OML) develops and enforces labour legislation to create, communicate and maintain safe, reasonable and agreeable workplace practices. The OML aims to prevent and reduce workplace injuries and illnesses and offers guidance to implementing and interpreting the Ontario Occupational Health and Safety Act (OHSA).

*Reference: https://www.labour.gov.on.ca/english/*

### Ontario Occupational Health and Safety Act

The Ontario Occupational Health and Safety Act (OHSA) defines the rights and duties of all people in the workplace and defines procedures for handling workplace hazards. The Act advocates that workers have the workers “right to know”, “right to participate” and “right to refuse” and implies that all people in the workplace have the responsibility of promoting health and safety. It defines requirements for health and safety committees and provides legal enforcement of health and safety in the workplace.

*Reference: https://www.labour.gov.on.ca/english/hs/pubs/ohsa/*

## Health Canada

Health Canada (HC) is responsible for helping to maintain and improve health for Canadians. It provides services and information for occupational and environmental health and safety, including the Workplace Hazardous Materials Information System (WHMIS), the Hazardous Products Act (HPA) and other regulations to determine appropriate substance labeling and SDS requirements for suppliers.

*Reference: https://www.canada.ca/en/health-canada.html*

### Workplace Hazardous Materials Information System

The Workplace Hazardous Materials Information System (WHMIS) is a national, centralized system for controlled or hazardous products that are used, stored, handled or disposed of in the workplace. The system ensures appropriate hazard classification, cautionary labeling of containers, provisions of safety data sheets (SDS) and workers education and training programs.

*Reference: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/occupational-health-safety/workplace-hazardous-materials-information-system.html*

## Public Health Agency of Canada

The Public Health Agency of Canada (PHAC) promotes and protects the health of Canadians by preventing disease and injury, promoting good physical and mental health, and providing information to support informed decision making. It is the national authority on biosafety and biosecurity for human pathogens and toxins and houses many Pathogen Safety Data Sheets (PSDS).

*Reference: http://www.phac-aspc.gc.ca/lab-bio/index-eng.php*

## Canadian Food Inspection Agency

Canadian Food Inspection Agency (CFIA) defines the biocontainment levels, procedures and protocols for safely working with animal and zoonotic pathogens, and chemical hazards and plant pests to protect laboratory personnel, the public and the environment.

*Reference: http://www.inspection.gc.ca/eng/1297964599443/1297965645317*

## Canadian Biosafety Standards and Guidelines

The Canadian Biosafety Standards and Guidelines (CBSG) provides guidance and legislation for safe handling of human and animal pathogens, toxins and plant pest in laboratories and containment zones in Canada.

*Reference: http://canadianbiosafetystandards.collaboration.gc.ca/*

## McMaster Central Joint Health and Safety Committee

The Central Health and Safety Committee reviews the Ontario Health and Safety Act (OHSA) and manages McMaster Workplace Environment Health and Safety Policy, Programs and Procedures.

*Reference: http://www.workingatmcmaster.ca/med/document/RMM-104-Central-Joint-Health-and-Safety-Committee-1-36.pdf*

## McMaster Joint Health and Safety Committee

The Joint Health and Safety Committee (JHSC) is an advisory group of management and labour representatives that meet regularly to discuss McMaster health and safety issues. They conduct workplace inspections, safety audits, incident/injury review, and training, to identify safety-related issues, for the recommendation of the identification and control of hazards.

*Reference: https://hr.mcmaster.ca/employees/health\_safety\_well-being/our-safety/joint-health-and-safety-committees/*

## McMaster Environment & Occupational Health Support Services

The Environmental and Occupational Health Support Services (EOHSS) is a team of health, safety and risk management specialists. EOHSS offers information in injury/loss prevention, training and development, lab safety, risk management and mitigation.

*Reference: https://hr.mcmaster.ca/employees/health\_safety\_well-being/#tab-content-ov*

## McMaster Biosafety Office

The McMaster Biosafety Office governs the McMaster Biosafety Program. This office communicates, facilitates and enforces biosafety, provides biosafety training, offers support for biohazard importation and ensures McMaster’s legislative compliance with Health Canada, PHAC and CFIA.

*Reference: http://www.mcmaster.ca/biosafety/*

## McMaster Presidential Biosafety Advisory Committee

The McMaster Presidential Biosafety Advisory Committee (PBAC) discusses and recommends the policies or changes to existing policies to support the reasonable management of biosafety and biosecurity at McMaster. PBAC reviews McMaster biosafety research, audits, incidents and injuries to identify and mitigate risk and to ensure compliance of Principal Investigators with established biosafety and biosecurity guidelines.

*Reference: https://biosafety.mcmaster.ca/biosafety\_pbac.htm*

## McMaster Risk Management Manual

The McMaster Risk Management Manual outlines specific policies and programs, as approved by the McMaster University Board of Governors, to manage the risks related to environmental and occupational health and safety, public safety, fire safety and the protection of McMaster University’s physical and financial assets, through Loss Prevention and Loss Mitigation programs.

*Reference: https://hr.mcmaster.ca/employees/health\_safety\_well-being/our-safety/risk-management-manuals-rmms/*

## McMaster Laboratory Manual

The McMaster Laboratory Manual defines health & safety responsibilities and accountabilities within McMaster, outlines specific procedures and programs, where applicable, explains basic emergency procedures and provides information and standards in the form of established Safety Guidelines in laboratories.

*Reference: https://hr.mcmaster.ca/app/uploads/2019/07/2019-McMaster-Lab-Manual.pdf*

## McMaster Emergency Guidebook

The McMaster Emergency Guidebook provides McMaster faculty and staff with clear, concise, and up-to-date safety resources to aid stakeholders prepare and deal with emergency situations.

*Reference: http://security.mcmaster.ca/campus\_emergencies\_guide.html*

# Appendix I: BI Polices (alphabetical)

|  |  |  |
| --- | --- | --- |
| **Policy Name** | **Policy ID** | **Policy Forms/Documentation** |
| BI Access Policy | Access |  |
| BI Biosecurity Policy | Biosecurity |  |
| BI Biohazardous Work Policy | BioWork |  |
| BI Biohazardous Work Policy – 420  | BioWork420 |  |
| BI Biohazardous Work Policy – 425  | BioWork425 |  |
| BI Code of Conduct Policy | Conduct |  |
| BI Documentation Policy | Documentation | BI Laboratory Posters (templates) |
| BI Emergency Procedures Policy | EmergProc | McMaster Incident/Injury Report |
| BI Emergency Procedures Policy – Biohazardous | EmergProcBio |  |
| BI Emergency Procedures Policy – Equipment  | EmergProcEqp |  |
| BI Emergency Procedures Policy – Post Emergency | EmergProcPost |  |
| BI Emergency Procedures Policy – Spill Biohazardous | EmergProcSpBio | BI Bio Spill Procedures Poster“Biohazardous Spill” sign |
| BI Emergency Procedures Policy – Spill Hazardous | EmergProcSpHaz | “Hazardous Spill” sign |
| BI Equipment Policy | Equipment |  |
| BI Equipment Policy – Biohazardous | EquipmentBio |  |
| BI Equipment Policy – Scheduling & Usage | EquipSchUsage |  |
| BI Housekeeping Policy | Housekeeping | CL-2 Mamm. Lab Cleaning Log |
| BI Infraction Policy | Infraction | BI Infraction Form |
| BI Inspection Policy | Inspection | BI Inspection Form |
| BI Personal Protective Equipment (PPE) Policy | PPE | PPE Poster |
| BI Risk Assessment Policy | RiskAsess |  |
| BI Substances Policy | Substances |  |
| BI Substances Policy – Compressed Gas  | SubstCompGas |  |
| BI Substances Policy – Cryogens  | SubstCryogens | BI Liquid Nitrogen Labels |
| BI Substances Policy – Designated | SubstDegSub |  |
| BI Training Policy | Training | BI Training MatrixBI Safety Training FormBI Policy Training Form  |
| BI Visiting Scholars Policy | VisitScholar | OLS Participant WaiverBI Use of Facilities Agreement Form |
| BI Visitors Policy | Visitors | BI Visitor Log |
| BI Laboratory Waste Disposal Policy – Biohazardous | WasteBio | BI BioWaste Storage & Disposal Log |
| BI Laboratory Waste Disposal Policy – General and Hazardous | WasteGenHaz |  |
| BI Working Alone Policy – After Hours  | WrkAlnAftHrs | BI Working Alone – After Hours Form |
| BI Working Alone Policy – Extended Hours | WrkAlnExtdHrs | BI Working Alone – Extended Hours Form |

# Appendix II: Version History

|  |  |  |
| --- | --- | --- |
| **Safety Program Version** | **Written By** | **Comments** |
| BI Biosafety ManualVersion: v.2013.1Year: 2013  | Dr. Marta Princz BI Biological Research Technician | First edition of BI Biosafety Policies. |
| BI Safety ProgramVersion: v.2014.1Year: 2014  | Dr. Marta Princz BI Biological Research Technician | Created BI Safety Program to include general safety and biosafety.  |
| BI Safety ProgramVersion: v.2014.1Year: 2015 | Dr. Marta Princz BI Biological Research Technician | Program and policies reviewed Spring 2015; no major edits. (No major edits in 2016). |
| BI Safety Program and PoliciesVersion: 2017.1.Year: 2017 | Dr. Marta Princz BI Biological Research Technician | Major edits and amendments to safety program and policy documentation; reviewed Fall 2016. Implemented Jan. 2017. |
| BI Safety Program and PoliciesVersion: 2017.1.Year: 2017 | Dr. Marta Princz BI Biological Research Technician | Reviewed Jan. 2018. No major edits. |
| BI Safety Program and PoliciesVersion: 2019.1Year: 2019 | Dr. Marta Princz BI Biological Research Technician | Reviewed Jan. 2019. Major edits and amendments to safety program and policies. Implemented Jan. 2019. |
| BI Safety Program and PoliciesVersion: 2019.1Year: 2020 | Dr. Marta Princz BI Biological Research Technician | Reviewed Jan. 2020. No major edits. |
| BI Safety Program and PoliciesVersion: 2021.1Year: 2021 | Dr. Marta Princz BI Biological Research Technician | Reviewed Jan. 2021. Major edits and amendments to safety program and policies. Implemented March 2021. |
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