UNIVERSITY OF TORONTO

ENVIRONMENTAL HEALTH & SAFETY

AGENDA

PRINCIPLES & PRACTICES OF BIORISK MANAGEMENT

Monday 8th – Friday 12th August 2022

Bahen Centre for Information Technology, Room 1220

40 St. George Street

Day 1	Monday
9:00AM – 12:00PM	**Introduction to Biorisk Management** *(Ayoob Ghalami)* Biosafety involves the consistent application of safety measures to minimize or prevent harm to laboratory personnel, building occupants, the public at large, the animal population, and the environment resulting from exposure to the infectious material, infected animals, or toxins handled in a containment zone. **Learning Objectives** • Understanding biohazards and laboratory associated infections • Risk assessment and risk group of biological agents • Legal framework in Canada • The development and administration of a biosafety and biosecurity program
1:00PM – 2:00PM	**Zoonotic Diseases and Biosafety** *(Kerri Nielsen)* Because of the unpredictable behaviour of animals and the potential for shedding of pathogens, working with pathogens in live animals could significantly increase the risk associated with any given procedure. Specific considerations should be given to the design of the facility and experiment for work involving pathogens and toxins with animals. **Learning Objectives** • Understanding animal characteristics related to biosafety concerns • Animal containment zone design considerations • What is the unique infrastructure requirement? • How to handle and restrain animals to avoid contamination and injury

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2:15PM – 5:00PM	**Infection Control Pathogen Transmission in Clinical, Experimental and Field Research Settings** *(Samira Mubareka)* The purpose of this talk is to characterize the gray areas in biosafety for field studies and clinical settings. Developing creative solutions to solve unique problems not relevant in traditional laboratory setting. Foster discussion among participants through real scenarios. **Learning Objectives** • Overview of microbiological hazards in healthcare and field research settings • Considerations when assessing risk in these contexts

Day 2 **Tuesday**

9:00AM – 10:00AM	**Containment Principles in High Containment Industrial facilities** *(Toon De Kesel)* The construction of high containment facilities for large scale production facilities is a complex business and there are many potential risks associated with translating the design intent into the finished and fully operational facility. The final goal is to construct a safe, secure and reliable containment facility, also in compliance with the regulatory requirements. This session aims at providing an overview of the biosafety principles relevant for the (re)design of a safe and compliant BSL3 facility thereby starting from a risk-based approach. Learning Objectives • Understand the basic systems and (re)design features of a BSL3 facility • Identify and describe specific biosafety and biosecurity issues when (re)designing a BSL3 facility • Incorporate the user needs and legal requirements into a BSL-3 facility to ensure a safe and compliant BSL3 environment • Ensure that facilities and associated installations and equipment are designed in a safe and secure way with respect to biorisk management
10:15AM – 12:00PM	**CRISPR Biosafety** *(Jennifer Griffin)* Genome editing (also called gene editing) is a group of technologies that give scientists the ability to change an organism's DNA. These technologies allow genetic material to be added, removed, or altered at particular locations in the genome. Several approaches to genome editing have been developed. A recent one is known as CRISPR-Cas9, which is short for clustered regularly interspaced short palindromic repeats and CRISPR-associated protein 9. **Learning Objectives** • Learn various applications of CRISPR • Understanding the biosafety and biosecurity concerns • How CRISPR can be used in human subjects • Non-human germline editing • Germline editing and gene drive differences and local risk assessment
1:00PM – 2:00PM	**Prions Biosafety** (Jennifer Griffin) Prion diseases or transmissible spongiform encephalopathies (TSEs) are a family of rare progressive neurodegenerative disorders that affect both humans and animals. They are distinguished by long incubation periods, characteristic spongiform changes associated with neuronal loss, and a failure to induce inflammatory response. **Learning Objectives** • Learning about prions related diseases • Understanding the unusual pathogen Prion Protein (PrP) • Stringent decontamination methods • Understanding prion blood borne transmission and required PPE

2:15PM – 4:00PM	**Viral Vectors Biosafety** *(Martha Brown)* Viral vectors have become a fundamental tool among molecular biology researchers. It is important to understand how these tools came about and the potential implications of their use. Viral vectors are tailored to their specific applications, but must generally share a few key properties: Safety, Stability, Cell type specificity and Selection. **Learning Objectives** • How to identify lower and higher viral vectors • How to identify lower risk and higher risk research projects • Understanding the replication incompetency of viral vectors and why it is still harmful • Learning what are cell tropisms, the nature of transgene, mutagenesis • Safety features-reversion prevention
4:00PM – 5:00PM	**Personal Protective Equipment** *(Geoff Shirtliff-Hinds)* Proper Personal protective equipment (PPE) use would minimize the risk of exposure to various hazards. PPE is the last line of defence to protect personnel and to minimize the risk of transmitting pathogens and toxins to the public and the animal population. **Learning objectives** • Understanding the various types and selection of proper PPE (gloves, lab coats, eyewear) • Who to prepare a respiratory protection program • Equipment certification and special protection equipment

Day 3 **Wednesday**

9:00AM – 10:00AM	**Introduction to Facilities Safety** *(Chris Pickard)* This session will introduce participants to selected aspects of and inter-relationships between the Ontario Building Code (OBC), the Ontario Fire Code (OFC) and regulations under the Ontario Occupational Health and Safety Act (OHSA) as may apply to diagnostic laboratories, with an emphasis on flammable liquid safety. **Learning objectives** • Understand the various codes' applicability in general to diagnostic laboratories • Understand when the codes apply • Understand how to selected aspects of each code may apply to their particular circumstances, including recognizing the conflicting aspects of the codes
10:15AM – 12:00PM	**Objective for New Emerging Pathogens and Public Health Biosafety** *(Aimin Li)* **Learning objectives** • Review with participants the recent historical public health crisis associated with new emerging diseases, including current covid-19 pandemic and monkey pox outbreak. • Provide guide to participants in compliance with The Canadian Biosafety Standard for Facilities Handling or Storing Human and Terrestrial Animal Pathogens and Toxins (CBS) when making biosafety policy. • Provide participants with microbiological and molecular understanding of the new emerging pathogens, including realtime PCR, whole genome sequencing, and bioinformatics analysis. • Discuss with participants on how to use the cutting edge molecular tools in making decisions on public health policy, community crisis management, international travel plan, and business continuity plan. **Agenda** 1. Concept of new emerging pathogens and biosafety 2. Historical review of major public health crisis in associated with infectious diseases 3. Canadian and global response to public health crisis 4. Microbiological and Genetic Technologies used in emergency preparedness 5. Summary and Conclusion

1:00PM – 3:00PM	**Holistic Engineering Considerations for Containment Laboratories** *Engineering team from the PHAC*
3:00PM – 5:00PM	**Engineering Considerations for Containment Laboratories** *(Tracy Gould)* The physical containment requirements designed to mitigate the risks associated with handling or storing pathogens, toxins, infected animals, or other regulated infectious material. Physical containment is achieved through specific physical barriers provided by engineering controls and facility design. **Learning Objectives** • Understanding the concept of containment barrier • Controlling and securing access to facilities and safeguarding biological material • Surface finishes and casework assessment • Air handling and directional air flow • Facility services required in biological laboratories • What are the essential biosafety equipment?

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Day 4 Thursday

9:00AM – 10:00AM	**Diagnostic Laboratories in Canada – the Path to Accreditation** *(Terri Molloy)* Participants will gain an understanding of diagnostic laboratory accreditation with, An overview of the accreditation landscape in Canada A Description of the key components to ISO 15189 accreditation A focus on getting value out of the accreditation process to gain: • Confidence in your results • Risk mitigation • Valuable corrective action • Standardized processes
10:00AM – 12:00PM	**Diagnostic Lab design and workflow** *(Lauren Richardson, Ryan Gregory)* • Understand the importance of lab design • Incorporate design and workflow based on modernization, automation or renovation • Assemble the project team to execute a lab build/renovation that is effective, efficient and minimizes risk
1:00PM – 2:30PM	**Emergency Response: From Planning to Recovery** *(Aurel Tamburri, Ryan Gregory)* It is critical that all laboratories particularly containment zones address situations where biosafety or biosecurity issues may arise as a result of an emergency prior to starting work. Preparing an emergency plan specific to the research must be completed in advance to ensure when there is an emergency, lab personals and emergency responders will know how to deal the situation. **Learning objectives** • Understanding the importance of an emergency response plan development and implementation • How to prepare a spill response for chemicals, biological agents Assessment of exposure and how to prepare in case of exposure

3:00PM – 5:00PM	**Medical Surveillance** *(Gabor Lantos)* The basic purpose of a medical surveillance program is to help prevent and detect illnesses related to the exposure to pathogens or toxins. The program can include physical exams, laboratory testing, data analysis, x-rays, lung capacity and other medical tests. This presentation will provide methodology to determine, establish and streamline an effective medical surveillance program. **Learning Objectives** • What are the common biological hazards, prevention methods and controls • How to prepare a medical surveillance & pre/post exposure management program • Exposure assessment and decision making of post-exposure emergency actions • Risk assessment of biological exposure • Pre-placement and medical evaluation • Additional considerations for working with higher risk pathogens

Day 5 **Friday**

9:00AM – 10:00AM	**Bio-Waste and other Hazardous Waste** *(Rob Provost)* Waste management is an integral component of a biosafety program, and comprises policies, plans, and procedures to address all aspects of waste management, including decontamination and disposal. Waste leaving the containment zone may be destined for disposal, movement or transportation to a designated decontamination area outside of the containment zone or transported off-site for decontamination via a third-party biohazardous waste disposal facility (e.g., incineration, steam sterilization). Learning Objectives • What are considered as biological waste • Designations of biological waste and exemptions • Standards for waste disposal • Waste facilities and storage of biological waste • Shipping, transporting and documentation
10:00AM – 12:00PM	**A Guided Tour: Biosafety Inspections of Research Laboratories** *(Shannon McCaw)* Workplace inspections drive the mitigation of incidents, injuries and illnesses. Through an in-depth review of the laboratory, inspections help to identify risks and hazards and reveal non-compliance issues. A good inspection program is a key component of an integrated biosafety and biosecurity management program. **Learning Objectives** • Understanding the essentials elements of an internal inspection program • Learning the critical elements to review in a laboratory • How to plan and prepare for biosafety inspections • Types of hazards found in laboratories • Elements to include in a report
1:00PM – 2:00PM	**Freedom of Information and Protection of Privacy** *(Rafael Eskenazi)* Biosafety professionals may have access to highly sensitive information e.g. intellectual property, personal health information, security sensitive information to perform their duties. It is critical that the information is filed/shared properly to protect them from misuse. **Learning Objectives** • Understanding the security and storage of information • How to prepare a proper documentation system • How to share sensitive information and maintain confidentiality and privacy
2:15PM – 3:15PM	**Cyber security** *(Isaac Straley)*
3:15PM – 4:15PM	**A Data-driven Approach to Emergency Preparedness** *(Pierre Hanna)* The continuous evolution of data management methods and technologies can help eliminate the guesswork out of research lab emergency preparedness and management. Risk can be identified,

	evaluated, and mitigated using historical and comparable data, and comprehensive preparedness and response plans can be put in place accordingly. **Learning Objectives** • The role data management plays in the four major phases to managing an emergency • Data integrity in an emergency: a single source of truth (SSOT) approach • Analysing risk probability using historical data • Emergency preparedness: investment vs. risk • Emergency communication: a data security issue?
4:15PM – 4:30PM	**Course evaluations**

Presenters

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