The Canadian Association for Biological Safety
Association canadienne pour la sécurité biologique

2021 Canadian Biosafety Symposium Program

*Please note all times are in Central Standard Time

TUESDAY, October 26, 2021

11:30am -11:40am		**Welcome and Opening Remarks** Tom Walus CABS-ACSB
11:40am -3:20pm		**Pre-symposium Workshop** **Containment Laboratory Design Considerations and Lessons Learned** David Barnes, Lee Bourgoin, Hayden Chesser, Alexandra Johnson and Mathieu Njoo Public Health Agency of Canada
3:20pm - 3:30pm		**Conclusion and Wrap Up**

WEDNESDAY, October 27, 2021

11:30am - 11:35 am		**Welcome/Housekeeping** Tom Walus CAB-ACSB
11:45am - 12:45pm		KEYNOTE SPEAKER: **What Virus Goes There? Emerging Virus Research from the Field to the Lab** Jason Kindrachuk, University of Manitoba **Proudly supported by NuAire**
12:45pm - 1:05 pm		**Cultivating the Biosafety Profession** Stephanie Norlock, International Federation of Biosafety Associations
1:05pm - 1:20pm		**Health Break**
1:20pm - 1:40pm		**Surveillance of Laboratory Exposures to Human Pathogens and Toxins, Canada 2020** Emily Thompson, Public Health Agency of Canada
1:40pm - 2:00pm		**Fight Against the Rise of Antibiotic Resistance in the Environment: Why Should We be Interested in the DNase Properties of Liquid Waste Decontamination Methods?** Suzanne Loret, University of Namur
2:00pm - 2:30pm		**Operational Readiness: What makes the Johns Hopkins Biocontainment Unit ready for patient care?** Jade Flinn, Johns Hopkins Hospital Biocontainment Unit (JH BCU)
2:30pm - 3:30 pm		**CABS-ACSB AGM**

THURSDAY, October 28, 2021

11:30am - 11:35am		**Welcome/Housekeeping** Tom Walus CAB-ACSB
11:35am - 12:00pm		**Centre for Biosecurity - Virtual Inspection Program** **Jessica Amell, PHAC**
12:00pm - 12:40pm		**Virtual CL3 Licensing with the Public Health Agency of Canada During the Pandemic** David Barnes (PHAC), Aurel Tamburri (PHO - retired), Ryan Gregory (Merrick) **Proudly supported by Merrick Canada ULC** MERRICK CANADA
12:40pm - 1:00pm		**Applications for Connectivity in Class II Biological Safety Cabinets** David Phillips, Thermofisher
1:00 am - 1:15pm		**Health Break**
1:15pm - 2:15pm		**My CFIA Platform: Intro and Q&A** Jennifer Gallant, Nooshin Ghazi, Michelle Laporte, Maxime Pilon, CFIA
2:15pm - 2:45 pm		**Blastomyces - A Cinderella Story** Andrea Smida, University of Saskatchewan
2:45pm - 3:05pm		**Lessons Learned from 15 Years of Managing Emergency Response and Post-Exposure Planning for Biosafety** Ayoob Ghalami, University of Toronto
3:05pm - 3:25 pm		**National Security Threats to Canada's Biopharma and Health Sectors** CSIS - Senior Intelligence Analyst (Anonymous/Not Recorded)
3:25pm - 3:30 pm		**Closing Remarks** **Tom Walus** **CABS-ACSB**

OCTOBER 26, 2021 ABSTRACT

Containment Laboratory Design Considerations and Lessons Learned

David Barnes, Lee Bourgoin, Hayden Chesser, Alexandra Johnson, Mathiue Njoo, Public Health Agency of Canada (PHAC)

The Center for Biosecurity (CB) administers the oversight for the establishment of a biosafety and biosecurity regime to protect the health and safety of the public against risks posed by human pathogens and toxins. Part of this oversight is done by working closely with Regulated Parties to work towards full compliance with Physical, Operational and Testing requirements as laid out in the Canadian Biosafety Standard, 2nd Edition, 2015.

In this Workshop, representatives of the Engineering Science and Support (ESS) group will go over both Physical and Testing requirements specific to CL2 and CL3 laboratories. In doing so, the ESS representatives will go over Lessons Learned in relation to these requirements. Topics covered will include Design Considerations, Equipment Knowledge, Mechanical Failures and Incomplete Commissioning. Specific examples will be given, stating our regulatory expectations, as well as what labs can expect transitioning to the next version of the Canadian Biosafety Standard, and how other labs go above and beyond.

OCTOBER 27, 2021 ABSTRACTS

What Virus Goes There? Emerging Virus Research from the Field to the Lab

Jason Kindrachuk, University of Manitoba

Emerging zoonotic viruses are a critical threat to global public health and spillovers can results in severe illness and complex pathogenesis that are often poorly understood. In recent years, multiple zoonotic viruses, including Ebola virus and severe acute respiratory syndrome coronavirus-2 have resulted in devastating effects to public health and the global economy. Response to such events often relies on both outbreak containment efforts, including rapid identification of transmission chains and supportive care for patients, and laboratory-based investigations, including pathogen characterization and therapeutic discovery. However, there is an urgent need for increased preparedness strategies that prioritize early identification of emerging threats. This includes an urgent need to identify the mechanisms that underlie zoonotic spillovers, viral pathogenesis and long-term health impacts in survivors. Here, I will address these knowledge gaps and discuss opportunities for targeted surveillance capacities in underserved communities that utilize both field- and lab-based investigations.

Cultivating the Biosafety Profession

Stephanie Norlock, Maureen Ellis – International Federation of Biosafety Associations

A knowledgeable and capable biosafety officer, whether a full-time employee or part-time responsibility, is a foundational element of an organization's biosafety and biosecurity program. The COVID-19 pandemic has placed significant demand upon the biosafety and biosecurity profession. Consequently, many countries, including Canada, face an overall shortage of these specialized professionals. Despite the roles of many biosafety and biosecurity professionals on the front lines, the profession remains largely invisible to students considering careers in the life sciences, and as such are steered toward more visible vocational options. In early 2021, a virtual survey focusing on the impact of age and gender upon one's experience as a biosafety and biosecurity professional was dispatched to the global community. Respondents to the survey reported that, "the lack of a degree program specifically in biosafety leads to skilled and experienced biosafety professionals being undervalued by those holding doctorate degrees in other disciplines". Formalizing a biosafety career path within the higher education system is a key priority for cultivating a diverse and sustainable next generation of biosafety professionals in Canada and globally. The International Federation of Biosafety Associations (IFBA), in collaboration with the Canadian Association for Biological Safety (CABS) and other partners, is placing a priority on the identification of approaches for formalizing careers in the field of biosafety and biosecurity. Formal cultivation of the biosafety and biosecurity profession in this regard will also include the support of young scientists and other youth professionals, providing them with tools and resources to establish or otherwise transition into the biosafety and biosecurity workforce. This initiative's outcomes will extend into a post-pandemic era, preparing the world's next generation of biosafety and biosecurity professionals with relevant skills to meet ongoing and emerging needs at the national level and beyond. Ongoing objectives of the initiative include:

1. Understand the challenges and needs of the biosafety and biosecurity workforce in Canada and globally;

2. Enhance the foundation and responsiveness of the education system to meet the needs of a strong, skilled, and sustainable biosafety and biosecurity workforce; and,

3. Improve youth access to training, skills development, and employment opportunities in the biosafety and biosecurity workforce.

Surveillance of laboratory exposures to human pathogens and toxins, Canada 2020

Emily Thompson, Public Health Agency of Canada (PHAC)

Background:
The Laboratory Incident Notification Canada (LINC) surveillance system monitors laboratory incidents reported under the Human Pathogens and Toxins Act and the Human Pathogens and Toxins Regulations.

Objective:
The objective of this report is to describe laboratory exposures that were reported in Canada in 2020 and the individuals that were affected.

Methods:
Laboratory incident exposures occurring in licensed Canadian laboratories in 2020 were analyzed. The exposure incident rate was calculated and descriptive statistics were performed. Exposure incidents were analyzed by sector, activity type, occurrence type, root cause, and pathogen/toxin. Affected persons were analyzed by education, route of exposure sector, role and laboratory experience. The time between the incident and the reporting date was also analyzed.

Results:
Forty-two incidents involving 57 individuals were reported to LINC in 2020. There were no suspected or confirmed laboratory acquired infections (LAIs). The annual incident exposure rate was 4.2 incidents per 100 active licenses. Most exposure incidents occurred during microbiology activities (n=22, 52.4%) and/or were reported by the hospital sector (n=19, 45.2%). Procedural issues (n=16, 27.1%) and sharps-related incidents (n=13, 22.0%) were the most common occurrences. Most affected individuals were exposed via inhalation (n=28, 49.1%) and worked as technicians or technologists (n=36, 63.2%). Issues with standard operating procedures (SOP) was the most common root cause (n=24, 27.0%), followed by human interactions (n=21, 23.6%). The median number of days between the incident and the reporting date was 6 days.

Conclusion:
The rate of laboratory incidents were lower in 2020 than 2019, although the ongoing pandemic may have contributed to this decrease because of the closure of non-essential workplaces, including laboratories, for a portion of the year. The most common occurrence type was procedural while issues with not complying to SOP and human interactions as the most cited root causes.

Fight against the rise of antibiotic resistance in the environment: why should we be interested in the DNase properties of liquid waste decontamination methods?

Suzanne Loret, University of Namur
Boutaina HABIB1, Pierre ROMAIN1, Angéline REBOUL1, Xavier DE BOLLE1 and Suzanne LORET2

University of Namur, 1Molecular Biology Research Unit / 2Biosafety Office, Rue de Bruxelles 61 – 5000 Namur – Belgium

With the generalization of DNA-recombinant technologies in research and production laboratories, one of the biosafety goals is the prevention of the accidental release of genetically modified microorganisms (GMOs) in the environment. Routine laboratory work includes the daily use of non-pathogenic E coli strains transformed with a variety of plasmids expressing at least one antibiotic resistance gene (ABR) used as a selecting tool of successfully transformed bacteria. To prevent their accidental release in the environment, different disinfection / decontamination methods are used to neutralized those GM bacteria at the end of their use.

In order to check the efficacy of those methods, we collected samples of waste water from two research institutes, from laboratory sink exhaust ducts, as well as from treatment tanks of waste water treatment plants. Isolates were identified using the 16s ribosomal RNA sequencing and they were tested for the presence of two replication origins and seven ABR frequently found in laboratory plasmids. Only one isolate (out of 64) was an E. coli, indicating that laboratory staff applied correct neutralization methods.

Surprisingly, in the vicinity of research institute mostly, plasmid origin of replication typical of Enterobacteriaceae was found in non-Enterobacteriaceae bacterial strains (such as Pseudomonas sp. and Aeromonas sp.) suggesting an interspecies transfer of antibiotic resistant plasmids. This also raised a question about the efficacy of disinfection / decontamination methods to breakdown DNA (DNase effect). Indeed, sodium hypochlorite (largely used in research laboratories to neutralize biological organisms) has only a limited DNase effect compared to acids and quaternary amine compounds (QACs), moist heating or UV treatments. Using quantitative Polymerase Chain Reaction (qPCR), we determined the Decidual value (D) of several (chemical and physical) neutralization methods for their DNAse effect. This work led to recommendations for the treatment of liquid laboratory wastes aimed at reducing the risk of accidental release of intact ABR plasmids in the environment and therefore to prevent the contribution of research laboratories to the horizontal transfer of antibiotic resistance gene.

Operational Readiness: What makes the Johns Hopkins Biocontainment Unit ready for patient care?

Jade Flinn, Johns Hopkins Hospital Biocontainment Unit (JH BCU)

The biocontainment unit (BCU) at the Johns Hopkins Hospital (JH) is a specially designed, inactive high-level isolation unit designated to care for patients infected with high-consequence infectious diseases including viral hemorrhagic fevers and novel respiratory pathogens. The BCU team designed a facility-specific readiness scale and checklist that focus on infrastructure, consumable supplies, and staffing to assess activation readiness of the biocontainment unit. These tools were used as part of a routine risk assessment to first identify barriers and then tier the impact of these barriers into activation categories of ‘‘Ready,’’ ‘‘Ready with Considerations,’’ and ‘‘Not Ready.’’ The findings of the BCU’s routine risk assessment identified specific failure points to inform further development of emergency preparedness related to emerging infectious diseases and disaster contingency plans to maintain the ability to safely care for this special patient population. Additionally, these routine preparedness activities led to an active and ready stance to efficiently activate the JH BCU for the initial critically ill persons under investigation and confirmed cases of COVID-19 in Maryland during the early phase of the 2020 pandemic as well as contribute to the overall JH hospital emergency response.

Presentation Objectives

1.) Discuss the 2014 response to special pathogens in the United States (US) and subsequent infectious disease preparedness activities including the origin of the National Emerging Special Pathogens Education and Training Center (NETEC)
2.) Describe NETEC members and its regional emerging special pathogens treatment centers (RESPTC) capacities to address national infectious disease outbreak preparedness
3.) Describe the Johns Hopkins RESPTC experience, specifically quantified activation readiness and contributions to COVID-19 response

Associated publications:

1. Flinn et al. (2020). The risk of not being ready: A novel approach to managing constant readiness of a high-level isolation unit during times of inactivity. Health Security, 17(1), 212-218. doi: 10.1089/hs.2019.0130
2. Flinn et al. (2020). The role of a dedicated biocontainment patient care units in preparing for COVID-19 and other infectious disease outbreaks. Infection Control & Hospital Epidemiology, 1-14. doi: 10.1017/ice.2020.451

OCTOBER 28, 2021 ABSTRACTS

Centre for Biosecurity – Virtual Inspection Program

Jessica Amell, Public Health Agency of Canada (PHAC)

The COVID-19 pandemic presented a unique challenge to the Public Health Agency of Canada's ability to carry out on-site inspections, due to restrictions on travel and laboratory access. The Agency's virtual inspection program was developed to ensure compliance monitoring and verification activities continued, under the Human Pathogens and Toxins Act/Regulations and sections of the Health of Animals Act/Regulations. This presentation covers how the virtual inspection program was developed, including an overview of security concerns, site selection, and running the pilot program.

Virtual CL3 Licensing with the Public Health Agency of Canada During the Pandemic

David Barnes (PHAC), Aurel Tamburri (PHO – retired), Ryan Gregory (Merrick)

During the COVID-19 pandemic the need for licensed Containment Level 3 (CL3) space has surged, while the conduct of licensing inspections has become far more difficult.

This challenge lead the Public Health Agency of Canada (PHAC), Public Health Ontario (PHO) and Merrick Canada ULC (Merrick) to develop a methodology for virtual CL3 licensing which was then executed and resulted in the first virtually inspected and licensed new CL3 facility in Canada at PHO's new London Hub facility.

PHO and Merrick collaborated with PHAC to develop a plan (story board) that would simulate the essential requirements of an in-person inspection including CL3 physical walk inspection, standard operating procedure (SOP) demonstration and performance verification testing (PVT). Through a combination of extensive written documentation, video recordings and live streaming, PHO / Merrick were able to demonstrate compliance to the CBS requirements and achieve CL3 licensing on the first attempt, using readily available technology. All documentation, recordings, and live streams were circulated for full review and archived by all three participants for future reference.

This presentation will cover the process PHO/Merrick undertook in collaboration with PHAC in order to achieve CL3 licensing along with lessons learned that can be applied to any licensing process be it virtual or in person.

Applications for Connectivity in Class II Biological Safety Cabinets

David Phillips, Thermo Fisher Scientific

Objectives: While fundamental design, manufacture and performance of Class II biological safety cabinets is established with recognized standards such as NSF/ANSI 49, additional capabilities in the area of connectivity are offered in various models. What benefits can BSC connectivity provide and how can pitfalls be avoided?

Method: A review of BSC features and new capabilities in the light of specific needs in building management, cGMP, and intelligent assistance for laboratory workflow.

Results: Some newer cabinets offer increased capabilities in connectivity. There are at least three varieties of connectivity as it applies to BSCs; building management supporting energy conservation and use monitoring, GMP supporting process monitoring, and laboratory assist supporting workflow awareness and efficiency. In some cases, the cabinets can provide more connection than can be used. In other cases, connection raises significant safety concerns. While connectivity is of great interest, there are concerns for data security and privacy. Each application for connectivity has specific requirements and challenges.

Conclusion: Identification of the particular type of connectivity required is key selecting and properly using BSCs for these applications. Awareness of these different applications and their requirements in connectivity allow the biosafety professional to assess offerings and use connectivity effectively to promote biosafety and the needs of their organizations.

My CFIA Platform: Intro and Q&A

Jennifer Gallant, Nooshin Ghazi, Michelle Laporte, Maxime Pilon, CFIA

An introduction to the My CFIA platform: a step by step guide to enrolment for the purpose of obtaining pathogen import permits, followed by a Q&A session with the My CFIA Enrolment team, National Centre for Permissions and the Office of Biohazard Containment and Safety

Blastomyces – A Cinderella Story

Andrea Smida, University of Saskatchewan

This is a story about a researcher who wanted to work with a Risk Group (RG) 3, *Blastomyces dermatitidis*, in a containment level 2 lab and small animal facilities at the University of Saskatchewan. This presentation is to provide a summary on how this 'happily ever after' occurred.

Lessons Learned from 15 Years of Managing Emergency Response and Post-Exposure Planning for Biosafety

Ayoob Ghalami, University of Toronto

Planning and performing Post-Exposure Prophylaxis is a critical component of any medical surveillance and emergency response program. It is a balancing act that needs to put the health and wellbeing of personnel at the highest priority while protecting their confidentiality in meeting the legal obligations for HPTA, MOL, or insurance companies. It could be designed to be self-sufficient or have an assigned periodic reviews program.

National Security Threats to Canada's Biopharma and Health Sectors

Anonymous, Canadian Security Intelligence Services (CSIS)

The Canadian Security Intelligence Service (CSIS) will describe the current threat landscape facing Canada's biopharma and health sectors, including the evolution of threat activity during the pandemic, an explanation of the main threat vectors and targets in Canada, and identify the top risks for all individuals and organizations to be mindful of in their daily scientific research and development activities. CSIS will also answer questions from session participants at the end of the threat briefing.