Surveillance of Laboratory Exposure to Human Pathogens and Toxins – The Canadian experience

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Background

- Human pathogens and toxins use in laboratories can pose an inherent risk of exposure to those who work in them and broader public health, should they spread to the community.
- The Public Health Agency of Canada established one of the first comprehensive and standardized surveillance systems of laboratory incidents involving human pathogens and toxins at the national level.
- The Laboratory Incident Notification Canada (LINC) surveillance system was launched in December 2015 in response to the requirements established by the 2009 Human Pathogens and Toxins Act (HPT Act) and the enactment of the HPT Regulations in 2015.

LABORATORY INCIDENT*

An event or occurrence with the potential of causing injury, harm, infection, intoxication, disease, or damage.

*Source: Canadian Biosafety Standard (2nd Ed. March 2015)
What incidents are reportable under the HPTA/R?

- **Exposure**
  - Exposure
  - Suspected or confirmed laboratory-acquired infection or intoxication (LAI)

- **Non-Exposure**
  - Inadvertent possession or production
  - Inadvertent release
  - Missing or stolen
  - SSBA not received within 24hrs of expected arrival

**LAI** = Laboratory-acquired infection  
**HPTA** = Human Pathogens and Toxins Act  
**HPTR** = Human Pathogens and Toxins Regulations  
**SSBA** = Security sensitive biological agent
Notifications received
(Dec 1, 2015 to Sep 31, 2018)

- 337 notifications received
  - 37 Ruled out
  - 151 Exposures or LAI
    - 135 Exposures
    - 16 LAIs
    - 136 Inadvertent poss./prod. or release
    - 13 Missing, stolen or lost agent
  - 149 Non-Exposures

405 people exposed
Trends in notifications (Dec 1, 2015 to Sep 31, 2018)

*For 8 incidents, the incident date was unknown so the notification date was used as proxy.*
Root causes analysis

• Causes of exposure incidents
  – Sharps-related incidents (n=45; 30%)
  – Procedure breaches (n=42; 28%)
  – Inadvertent possession (n=37; 25%)

• Area for improvements
  – Standard operating procedures (n=103; 73%)
  – Human interaction (n=55; 36%)
What do we do with this?

- Biosafety advisories, notifications and updates
- Inform and update biosafety standards and guidelines
- Recognize/develop best practices
- Contributes to national and international knowledge
  - Baseline estimates
  - Time trends
  - Annual updates
Conclusion

• Data collected serves to **inform evidence-based** decision-making regarding biosafety and biosecurity.

• Baseline estimates are still being established but eventually, we will be able to **detect trends** and potential **patterns of concern** near real time.

• LINC continue to **identify risk factors** and **recurrent challenges** in laboratory settings and contribute to building excellence in investigation and response to laboratory incidents by sharing expertise and lessons learned among the laboratory community.

• As stakeholders become more accustomed to reporting, the accuracy and timeliness of reporting will increase. This ultimately will benefit the culture of biosafety as well as public health in Canada.
Thank you!
Any questions?

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Notifications and exposures reported by sector (Dec 1, 2015 to Sep 31, 2018)

Proportion by sectors

Number of active licences* (n=975)
- Other Government: 94 (30)
- Public Health: 452
- Private Industry/Business: 200
- Academic: 199
- Hospital: 150

Number of incidents (n=300)
- Other Government: 33 (18)
- Public Health: 58
- Private Industry/Business: 150
- Academic: 49
- Hospital: 52

Number of Exposures (n=151)
- Other Government: 13 (13)
- Public Health: 24
- Private Industry/Business: 49
- Academic: 13
- Hospital: 52

* Number of active licences as of September 31, 2018