

The role of environmental public health professionals in collaborative foodborne illness outbreak investigations

Project Aims

- To raise awareness of issues that impact FBI outbreak response and to complement existing outbreak tools, policies, and guidelines.
- Examine foodborne outbreaks focusing on the roles and responsibilities of EPHPs in different foodborne outbreak categories



Glossary

Term	Definition
Environmental Public Health Professional (EPHP)	A person working in the field/science/profession of environmental public health who holds the CPHI(C) credential.
Environmental assessment	This involves inspecting food production, processing, and preparation facilities to identify potential sources of contamination and assess compliance with food safety regulations. This may include interviews with food handlers, owners, and operators. Emphasis is on the identification of the source of foodborne illness.
Emerging EPHP	EPHPs with limited to no experience in foodborne illness outbreak investigations. Includes students in accredited EPHP programs, recent graduates, uncertified public health inspectors, and newly certified inspectors not routinely involved in outbreaks.

Key Messages

- Outbreaks are becoming more complex, requiring collaboration across disciplines and authorities
- EPHPs have unique skill sets to support FBI outbreak response
- Emerging EPHPs need mentoring, practical experience, and training
- Information silos within and between health authorities can disrupt communication and coordination
- A centralized repository of FBI outbreak investigation resources (such as outbreak summaries) can support information sharing

Background – Evolving Landscape

Response often involves several organizations at multiple levels of government with complementary (and sometimes overlapping) responsibilities

Increasingly, food is global in origin and distributed through emerging systems such as e-commerce.

Poses challenges for investigating foodborne illness (FBI) outbreaks

Public health needs faster, streamlined, and more coordinated investigations to address these challenges

Methodology – Environmental Scan



Of Canadian public health websites and foodborne outbreak-related websites from the United States and the World Health Organization.



To identify classifications of foodborne outbreaks and to enhance the roles and responsibilities identified in the Outbreak Toolkit



Literature reviews focused on public health outbreak roles and responsibilities, recent foodborne outbreaks in Canada, core competencies for foodborne outbreak response, and emerging food safety technology (specifically WGS)

Methodology – Key Informant Interviews



14 surveys and 20 key informant interviews (KIIs) with a selection of public health professionals from federal, provincial, and local health authorities experienced in outbreak



The survey focused on clarifying outbreak roles and identification of outbreak tools and resources.

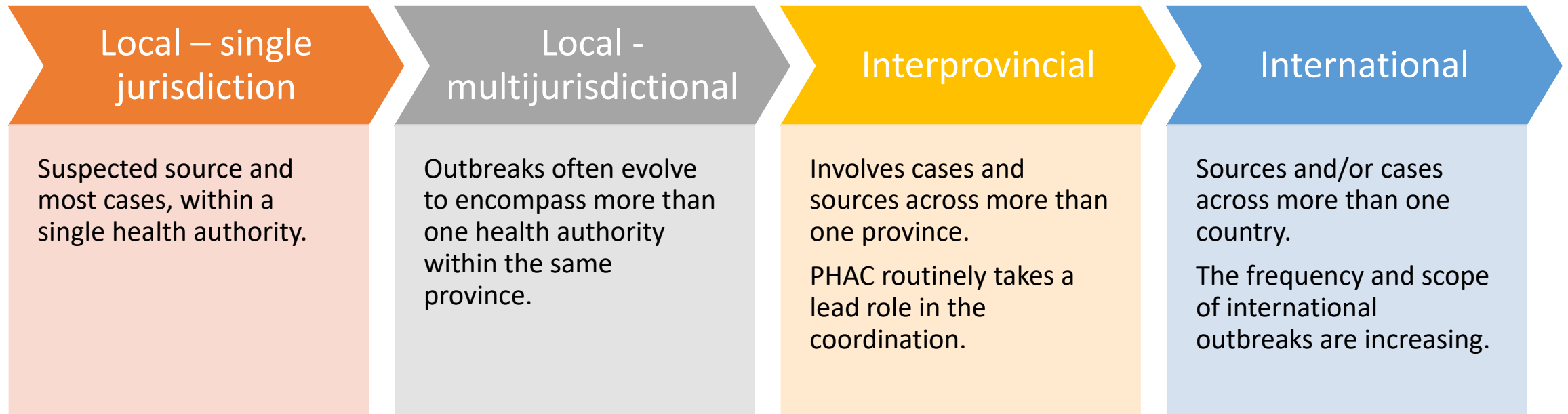


KIIs provided insight into foodborne outbreak experiences and identified themes (challenges and opportunities) related to foodborne outbreak response

The background of the slide is a dark blue gradient. In the center, there is a blurred image of a microscope on the left and a book on the right. The text 'Key Findings' is overlaid in the center in a white, sans-serif font.

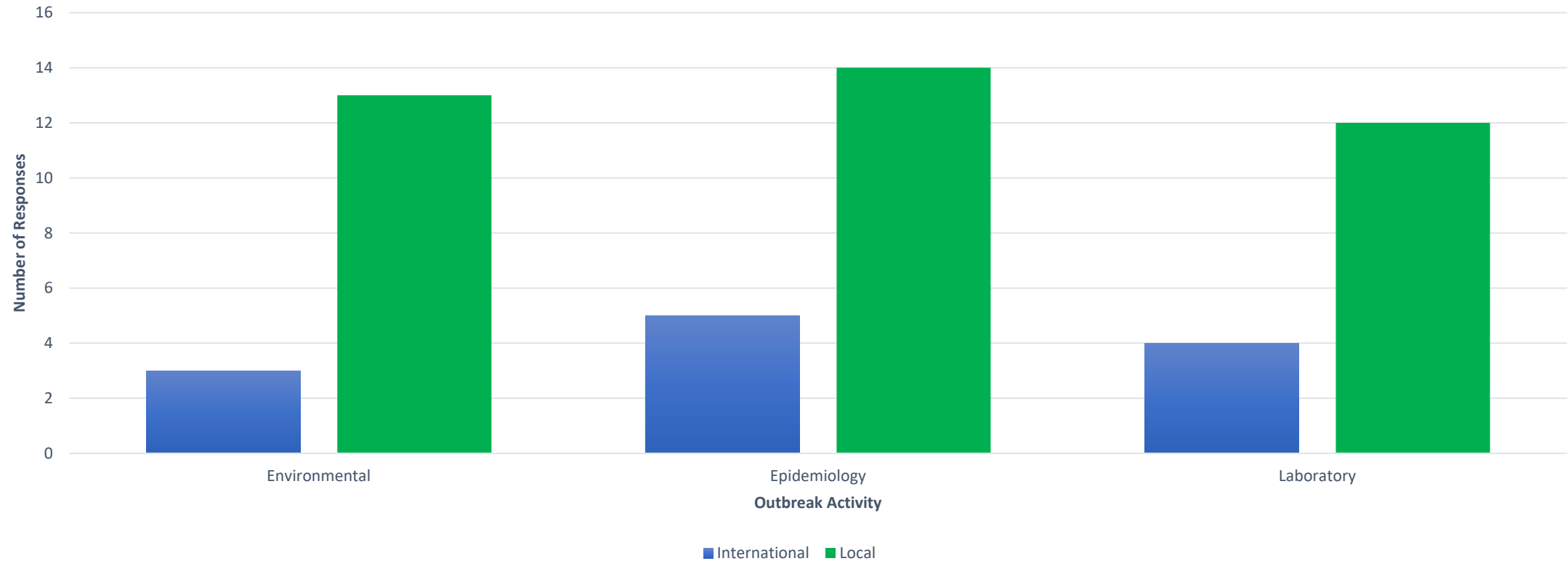
Key Findings

Foodborne outbreak categories



EPHP outbreak experiences – an emerging need

EPHPs self-reported experiences in the three phases of outbreak response (environmental, epidemiology, and laboratory) for local outbreaks compared with multi-jurisdictional



Uniqueness of EPHPs

Uniqueness of EPHPs

Most participants highlighted the nature of EPHPs accredited education, practical training, and field experience that makes them uniquely qualified to support FBI outbreak investigations.

EPHPs are critical to successful outbreak response because they are **embedded in the local community**, they are the “boots on the ground” [P9]

WHY EPHPs?

EPHPs are critical to successful outbreak investigations providing unique context and understanding of the communities served.



Outbreak response requires expertise in:

Microbiology

Epidemiology

**Environmental
Public Health**

**Food
Science**

Communication

Interviewing

Enforcement

Environmental Public Health focus

EPHPs are unique in their **environmental public health focus**, understanding of food safety and source attribution, and community connections.

“Public health inspectors are infinitely more suited to be doing these types of investigations...**because their whole focus and scope of everything have always been environmental**; it’s never been patient-focused.” [P12]

Challenges in current FBI outbreak response

01

Experience

02

Competencies
in Outbreak
Investigation

03

Sharing
Lessons
Learned

04

Outbreak
resources and
emerging
trends

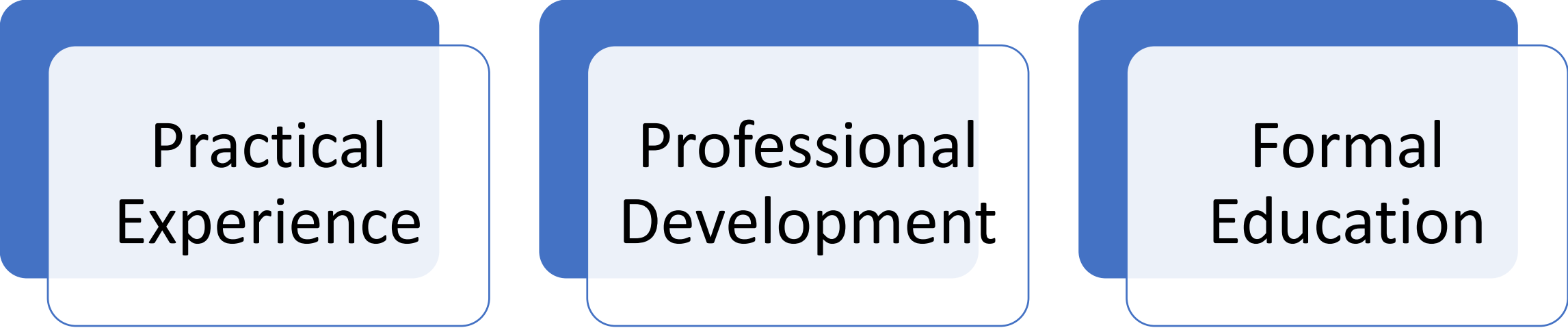
05

Professional
Development



1. Experience Matters

Outbreak Experience is Needed



Practical
Experience

Professional
Development

Formal
Education

“...But now there’s really no training. It’s all sort of passed down word of mouth. And we lost a lot of those experienced staff through the pandemic, where they took other opportunities or retired” [P3].

Experience Matters

EPHPS need to be comfortable “**living in the grey**” [P19], as their role requires flexibility and adaptability to changing environments during the outbreak.

It is also helpful to develop a “**dogged determination**” [P19] to continue to chase leads.

All FBI investigators, including EPHPs, need to accept “**the fact that they’re going to need to ask for help**” [P8].


This highlights the importance of a coordinated approach and “**strong collaboration skills, because [during] outbreaks you’re working within a multidisciplinary team**” [P14]




Experience Matters

“We had our internal food safety training before, that our staff used to take. But now there’s really no training. It’s all sort of passed down word of mouth. And we lost a lot of those experienced staff through the pandemic, where they took other opportunities or retired” [P3].

Environmental Assessments



EPHPs conduct **environmental assessments** at food facilities and collaborating with other public health professionals



Focus on the factors contributing to the cause of the outbreak and include inspection practices, sample collection, and food handler interviews.

Importance of Environmental Assessments

“Not understanding the nuances between a routine inspection and an investigation [environmental assessment] for an outbreak; so a lot of times it’s literally completing the checklist and saying whether or not this premise is in compliance when [in an outbreak] it is a lot of interviewing, a lot of actual investigation, and how that differs from inspection, because inspection is really about observing what you see at the time; but you know, in that outbreak [assessment] you’re trying to create the picture of what happened” [P2].





2. Competencies in Outbreak Investigation

For EPHPs and other public health professionals

Outbreak Competencies

Investigation

Environmental Assessments

Interview skills

Critical Thinking

Control Measures

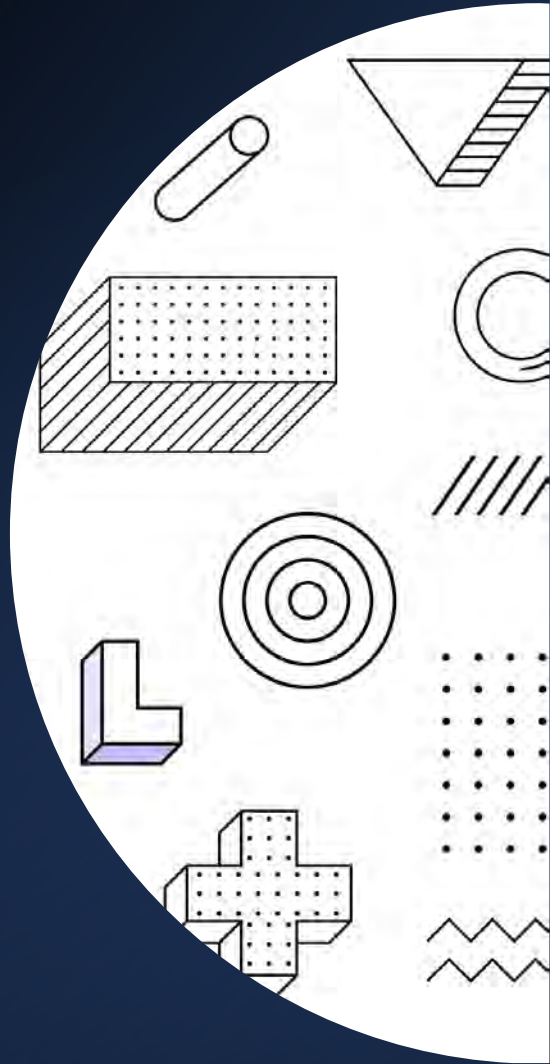
Progressive Enforcement

Note Taking

Competencies
should be used

ACTION - By academia and public health authorities to evaluate the readiness of staff to support FBI outbreak investigations

ACTION - To develop training materials



3. Sharing Lessons Learned

Sharing Lessons Learned

- Participants identified the need to explore opportunities to share experiences in outbreak response, especially at the **local level**
- **Allocating time and resources** for outbreak summaries was identified as a critical barrier to sharing lessons learned.
- **ACTION** - outbreak summaries should be considered part of regular outbreak response, with appropriate allocation of time and resources.

“It would be great if we had more resources...so that we could get more attention as [EHPs] to write up all these great things that we do, so that there’s more awareness in the public realm...because we do a fantastic job” [P9].



Sharing lessons learned

ACTION - To facilitate effective data sharing, templates and standard tools should be developed in advance and included in FBI outbreak procedures for all parties to use

ACTION - PHAC's Outbreak Management Division should consider surveying public health authorities to identify ways to increase the awareness and use of the toolkit and any additional outbreak or training needs

Opportunities to share lessons learned



Communities of practice, webinars, conferences, curated lists of outbreak summaries, and blog posts.



Conferences to share lessons learned and professional development opportunities



Outbreak summaries could be shared on a blog site, like the Worms and Germs blog from the University of Guelph's CPHAZ



Outbreak summaries can be used by other health authorities and academia to develop training materials

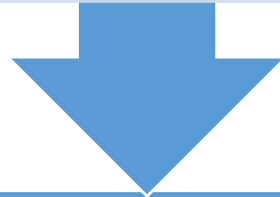


4. Outbreak Resources and Emerging Trends

Awareness of outbreak tools

Many participants noted a lack of awareness about key FBI outbreak tools and resources

“It’s one thing to have these great tools, but if they’re not being used, if people aren’t being trained on them, then they become useless” [P2].



Participants expressed interest in accessing more standardized and easily accessible resources. One participant relayed the centralization of pandemic data as an example for FBI outbreak resources to mimic:

“For COVID, I go to the [provincial] website; all my documents, my guidance, like everything’s right there. It’s a one-stop shop...there needs to be something similar” [P5].

Outbreak Toolkit

OUTBREAK TOOLKIT BACKGROUND CASE STUDY TOOLS FRANÇAIS



Enteric Outbreak Toolkit

The Outbreak Toolkit is a one-stop shop for resources and tools to assist epidemiologists, practitioners involved in enteric outbreak investigations. The purpose is to strengthen public health at provincial/territorial and federal level.

The Outbreak Toolkit theme areas loosely follow the steps in an outbreak investigation. The

CANADA'S FOODBORNE ILLNESS OUTBREAK RESPONSE PROTOCOL (FIORP)

A GUIDE TO MULTI-JURISDICTIONAL ENTERIC OUTBREAK RESPONSE



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iak Investigation

ic Sequencing

Pathogen
ion Pipeline

Applied Outbreak Investigation

Our Applied Outbreak Investigation Training is an interactive, hands-on training program that provides public health practitioners with the methods to foodborne outbreak investigation. This training is designed for public health practitioners who may potentially work on foodborne outbreaks. It includes practical exercises and optional mobile phone-based practical exercises. This content was developed by the Colorado Integrated Food Safety Center of Excellence.

Procedures to Investigate Foodborne Illness

Sixth Edition

Environmental Health Services (EHS)

EHS > EHS e-Learning

EHS

EHS e-Learning

Environmental Assessment Training Series (EATS)

CEUs - EATS-101

CEUs - EATS-102

Environmental Health

Environmental Assessment Training Series (EATS)

Print

The skills needed to investigate outbreaks of foodborne illness in restaurants are different from those needed to inspect restaurants. It is critical to have environmental health staff on outbreak investigation teams. EATS provides training on the role of environmental assessments in the broader context of outbreak investigations and the food safety system.

EATS Food Safety
Promo Video



Public Health Inspectors Guide

The Public Health Inspector's (PHI) Guide to Environmental Microbiology Laboratory Testing is designed to support effective public health practice, ensuring that inspectors have timely information on PHO's laboratory environmental microbiology services and expertise.

Emerging metadata trends

Table 5. Examples of platforms using big data to support FBD investigations

Platform Name	Country	Link
Integrated Rapid Infectious Disease Analysis (IRIDA) ⁶⁸	Canada	https://irida.ca/
GenomeTrakr ⁴¹	United States	https://www.fda.gov/food/whole-genome-sequencing-wgs-program/genometrakr-network
PulseNet ⁶⁹	United States and International	https://www.cdc.gov/pulsenet/index.html

Emerging metadata that includes:

- WGS metagenomics,
- data from industry biosensors, and
- consumer data

New Resources to support outbreak response - RACI



Responsible

Designates tasks directly to this group

Every task should have at **least one** responsible



Accountable

Make sure the responsible and consulting members know the expectations

Every task should have **only one** accountable group



Consulted

Provide input and feedback on the work being done on a task

They have a stake in the outcomes of a task



Informed

Need to be looped into the progress of a project but not consulted or overwhelmed with the details.

Coordination of outbreak resources

Public health would benefit from a curated list of FBI outbreak resources housed on a publicly available website and updated regularly.

ACTION - CIPHI National or the NCCEH websites would be optimal sites for such a list.

ACTION - Accredited institutions should then consider incorporating these resources into their curricula to develop the knowledge and FBI outbreak investigation skills for emerging EPHPs.

Collaboration Challenges

- Investigation of FBI outbreaks must be collaborative because they are complex
- Communication, data collection, standardization, and information sharing
- Local public health structure – general program vs. specialized
- Data Collection and standardization



5. Professional Development Needs

Professional Development Needs



EPHPs need a **strong food safety foundation**



Keen **awareness of emerging food safety trends**



How to conduct **environmental assessments**



Experience matters — emerging EPHPs need training and mentoring

Professional
Development
Needs of
emerging
EPHPs

ACTION - incorporate more FBI outbreak learning opportunities, including case studies and simulations into schooling and field training

ACTION - incorporate outbreak competencies into the curricula of all public health programs

Training needs include interviewing skills, the use of standardized interviewing tools, and strategies to address cultural and language barriers

Employer Opportunities

Students would benefit from opportunities to work with EPHPs on foodborne outbreak investigations, providing hands-on experience in outbreak identification, investigation, and response.

ACTION - Public health authorities should provide FBI outbreak experience for emerging EPHPs, during practicum placements and early in their careers

ACTION - Where outbreaks are scarce, training organizations could provide mock outbreak simulations as discussed above and have students complete outbreak training modules

Professional Development Opportunities

Outbreak simulations and table-top exercises can help support skills development and collaborative response

ACTION – develop annual Foodborne Outbreak Challenge, E.g., using the Colorado Integrated Food Safety Center of Excellence at the Colorado School of Public Health

ACTION - Local public health authorities and professional associations (e.g., CIPHI) should continue to work with provincial and federal public health partners to identify needs and facilitate the delivery of training for outbreak investigators

Limitations

- The qualitative research methods used are not intended to be fully generalizable.
- Participants in this study may not represent all EPHPs or public health authorities in Canada.
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- The environmental scan used in the study did not include a review of public health authorities' internal FBI documents or policies.
- The delivery of public health programming, especially environmental health and communicable diseases, varies significantly across provinces and health authorities, making it impossible to generalize tools, recommendations, or guidelines applicable to all organizations and outbreak situations.

Summary

EPHPs are critical to successful outbreak response

Emerging EPHPs need mentoring, practical experience, and training

Experience matters

Incorporate outbreak competencies into public health curricula

Need to enhance sharing of lessons learned



Questions