

**Canadian and United States Cross-Border Collaboration for Syndromic Surveillance: Overview and Recommendations from an International Society for Disease Surveillance**

Consultation, Kingston, Ontario, Canada, June 11–12, 2007

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The objectives of this consultation, supported by the International Society for Disease Surveillance (ISDS), were to develop expert, consensus-based recommendations to promote Canadian and U.S. collaboration in using syndromic surveillance (SS) to detect, assess, monitor, or respond to potential or actual public health threats. The consultation focused on the Great Lakes region of the Canadian-U.S. border—a region where there is substantial flow of people and goods between the two nations, a potential for occurrence of public health emergencies that affect people in both countries. Despite prior advances achieved by participants in the Early Warning Infectious Disease Surveillance (EWIDS) program regarding cross-border collaboration in notifiable disease reporting and follow-up, the EWIDS deliberations had not substantially addressed the role and uses of syndromic surveillance as part of cross-border disease prevention and control efforts, particularly in the context of potential large-scale public health emergencies. Presentations addressed a mix of issues that define the context for cross-border collaboration, including updates on SS practice and development in jurisdictions in the region, shared methodological challenges, protocols for responding to SS alerts, health information privacy regulations, and policies concerning public health emergencies that may shape information sharing during a crisis. Potential legal barriers to information sharing centered on individual-level privacy concerns, as opposed to sharing of aggregate SS data or notices of statistical alerts based on SS data. The meeting provided an impetus and agenda for future, ongoing consideration of including syndromic surveillance as a key component within the broader context of the EWIDS process. Identified priorities included development of procedures to share information about SS alerts and alert response protocols within EWIDS, increased use of SS inputs in cross-border tabletop exercises for pandemic influenza, and further collaboration in development of mapping projects that use data inputs from both sides of the border. In addition, the participants recommended that annual ISDS conferences provide a forum to address challenges in cross-border collaboration in SS practice and research.

BACKGROUND

The Canadian–U.S. border is a busy interface between the two nations, and the flow of people and goods across the border provides opportunities for cross-border spread of disease, as seen with recent instances of illness associated with food products shipped across the border (1,2) and the case of a traveler thought to have extremely drug-resistant tuberculosis (3). In urban areas that straddle the border, such as

the Windsor-Detroit region, a bioterrorist event, hazardous environmental exposure, or natural disaster originating on one side of the border could readily affect the health of large numbers of people on both sides. Any of these events, especially if they occurred in urban areas where large numbers of people cross the border daily for work and commerce, would require an efficient and timely cross-border public health response.

Recognition of this shared risk for public health threats prompted the funding and development of the Great Lakes Border Health Initiative (GLBHI), a subsidiary of the U.S. Centers for Disease Control and Prevention (CDC)-sponsored Early Warning Infectious Disease Surveillance (EWIDS) program. EWIDS, which received initial funding in 2003, is a unique collaboration of state, federal, and international partners who collaborate to provide rapid and effective laboratory confirmation of urgent infectious disease case reports in the border regions of the United States, Canada, and Mexico. Activities can include assessing surveillance and laboratory capacity on each side of the international border, improving electronic sharing of laboratory information, maintaining a database of all sentinel/clinical labs, and work to develop and agree on a list of notifiable conditions.

The work of the GLBHI is consistent with recommendations from World Health Organization's (WHO) International Health Regulations regarding international cooperation on assessment of public health threats, minimizing the risks of international spread of unusual or unexpected diseases, and averting the economic impacts of possible travel or trade restrictions (4). To date, the EWIDS process has focused largely on outbreak investigations, laboratory testing, case investigations and follow-up, communication linkages, and data sharing agreements for notifiable diseases. In contrast, consideration of potential cross-border collaboration regarding the development and uses of syndromic surveillance (SS) has been limited within the EWIDS agenda, essentially creating a "logjam" that constrained progress toward effectively integrating syndromic surveillance capacities on both sides of the border into efforts to detect and respond to public health emergencies affecting public health in the border region. The consultation described in this report was the first formal collaboration on Canadian-U.S. cross-border initiatives related to SS research, development, and practice and was positioned to integrate SS into the EWIDS process.

Most U.S. border states have operational SS systems that use a variety of data streams, and state development of SS has been largely supported through bioterrorism and emergency preparedness funding from the CDC. While the province of Ontario and the Canadian federal government have made substantial progress in the areas of SS research and practice in recent years, SS has been significantly less extensively implemented in Canada than in the United States. In Ontario, 3 of the 36 health units have SS systems that use emergency department (ED) data. The provincial government (Public Health Division) has started the evaluation of Ontario's Telehealth service as a potential data source for surveillance, and the federal government has sponsored the Alternative Surveillance Alert Program (ASAP) for monitoring of over-the-counter (OTC) medication sales. Outside Ontario, to our knowledge, the Public Health Agency of Canada's (PHAC) SS demonstration

project in Winnipeg, Manitoba, is the only other electronic SS system in Canada.

CONSULTATION OBJECTIVES

With funding from the International Society for Disease Surveillance (ISDS), the SS team at Kingston, Frontenac and Lennox & Addington (KFL&A) Public Health in Kingston, Ontario, hosted a consultation on Canadian-U.S. cross-border SS collaboration. Given our (BE and KM) experience in developing and evaluating SS for use in Ontario, we were eager to meet with colleagues from the United States to identify opportunities for greater cross-border collaboration. We sought to build on relationships established through the GLBHI, describe SS capacities from a cross-border perspective, highlight applicable ongoing research, and develop recommendations to advance Canadian-U.S. collaboration in the development and use of SS. Discussions considered the use of SS to detect, assess, monitor, or respond to public health emergencies, especially a bioterrorism attack or infectious disease outbreak. Specific objectives were to:

- Identify and understand SS systems in place on each side of the border among jurisdictions in the Great Lakes region.
- Clarify how these systems are or could be integrated into the broader spectrum of public health surveillance activities and emergency response planning such as EWIDS.
- Highlight existing cross-border collaborations and consider how this work could provide a foundation for ongoing communication and collaboration.
- Identify barriers and enablers for cross-border sharing of information from SS systems and recommend approaches to more effective sharing of information about SS alerts and data.
- Identify opportunities for collaborative research and practice-based projects, including the use of SS to enhance infectious disease surveillance throughout the border region and among people who cross the border.

CONSULTATION PROCESS

The consultation was held on June 11–12, 2007, in Kingston, Ontario. Participants included representatives from local, provincial/state, and federal public health agencies; academic researchers; and others with expertise in cross-border health, epidemiology, biostatistics, syndromic surveillance practice, evaluation, public health ethics and law, health policy, emergency preparedness, and medicine. Appendices I and II provide a list of participants and the meeting agenda. In addition to overviews of existing SS systems and their attributes, presenters provided updates on aberration detection methods, spatial analysis and mapping, public health laws that affect cross-border sharing of surveillance information, examples of SS use in both tabletop

exercises for pandemic influenza planning and actual public health emergencies, lessons learned about cross-border surveillance collaboration from the EWIDS projects, public health preparedness activities, and disaster planning and response protocols. At the conclusion of the first day, small group and plenary feedback discussions examined cross-border collaboration in the use of SS and other surveillance methods in 4 scenarios: an outbreak of gastrointestinal illness due to *E. coli* originating in Buffalo, New York; an outbreak of gastrointestinal illness due to *Cryptosporidium* infections originating in Watertown, New York; an outbreak of severe respiratory illness of unknown but presumed infectious etiology originating in Kingston, Ontario; and an alert regarding suspected cases of botulism arising in Michigan.

Discussion on the second day focused on procedures and policies for cross-border information sharing in the context of both Canadian and U.S. health privacy regulations and laws that define government responsibilities and authorities in the event of public health emergencies. An ISDS representative presented an update on the DiSTRIBuTE project—a proof-of-concept national influenza surveillance system based on collection of aggregate data for ED visits from existing SS systems. This project has the potential to include data from Canada and other countries, and, by virtue of its collection of aggregate counts rather than individual-level syndromic data, the approach minimizes if not obviates concerns regarding the privacy of individuals and cross-border sharing of health information.

KEY ISSUES AND RECOMMENDATIONS

The deliberations highlighted that SS practice represents a fusion of information technologies, epidemiologic and biostatistical methods, and personal interactions among public health officials and health care providers. With respect to the last of these elements, an important utility of the consultation was the personal networking opportunities the meeting afforded. Initial communications about situations that may or may not be prove to require further public health assessments are often informal, and the discussions provided a chance for participants to explore when, in the course of noting or assessing SS alerts, it would be appropriate to “pick up the phone and call” or e-mail a colleague across the border. In addition, both the Canadian and U.S. federal governments have developed utilities that allow for secure and confidential electronic communication among provincial/state and local public health authorities. Participants agreed that public health officials in Ontario should have access to the U.S. Epi-X system (5) and that officials in U.S. border states should have access to the Canadian Integrated Outbreak Surveillance Centre (CIOSC) (6). This could foster communication about noteworthy SS alerts that may prompt or improve recognition of cross-border infectious disease threats.

Improving mutual understanding of day-to-day SS activities was considered an important next step in fostering collaboration. Given the longer-term and more extensive experience with SS in the United States than in Ontario, a proposal was made to send a representative from Ontario to New York or Michigan to participate firsthand in reviewing data and alerts, examine syndrome classification methods, and observe procedures for communications and alert investigations.

Participants in the GLBHI have invested substantial effort in developing a data sharing agreement (7), and this document was referenced throughout the consultation as a guide to information sharing at various stages of an event from initial recognition to full-scale investigation and response. Privacy regulations that shape surveillance practice focus on concerns about individual-level health information. As a result, sharing aggregate count data, rather than person-specific data from SS, may facilitate cross-border data sharing, geo-spatial-temporal analyses, and mapping. There are unmet opportunities for collaboration in SS research and development as well as practice and implementation, and participants identified a need to clarify how laws in the two countries distinguish between research and practice and the implications of these distinctions in defining public health authorities to conduct surveillance and develop surveillance methods.

The Ontario Ministry of Health and Long-Term Care (MOHLTC) is developing a secure Web portal for the sharing SS documentation, providing a discussion forum, and posting publications of interest. The ISDS has started a similar model using a Wiki (accessible via the ISDS Web page, www.syndromic.org) although a key difference is that the ISDS Wiki is publicly accessible. In addition, ISDS is developing a registry of SS systems, with a goal of including a secure Web-based utility within the registry for SS practitioners to share information about insights from their experience. Going forward from the consultation, there was a need to articulate appropriate uses of these various systems to facilitate cross-border sharing of resources and information about SS systems.

Presentations and discussion on mapping and spatial analysis revealed an unmet need for and substantial interest in developing procedures to map disease spread across the Canadian-U.S. border. Future development could include use of historical data to refine methods for illustrating the spread of influenza across the border and demonstrate the potential utility of a real-time, Web-based trend mapping applications using SS data to track disease spread along or across the border. Consultation participants were also interested in extending the use of SS in tabletop exercises for pandemic influenza, building on the precedent of exercises conducted at the 2006 ISDS Conference in Baltimore, Maryland, and at a Maine and New Brunswick cross-border pandemic influenza exercise in 2007.

CONCLUSION

With support from the ISDS, KFL&A Public Health in Kingston, Ontario, convened a meeting to foster collaboration across the Canadian-U.S. border in the development and use of SS in public health practice. Key issues included identifying strategies to improve communication among SS practitioners and researchers in Canada and the United States, approaches to sharing information in the context of Canadian and U.S. laws that govern health information privacy and public health authorities, positioning SS within the existing EWIDS process and opportunities to develop and apply mapping and analysis strategies to better characterize the spread of disease across the border. Participants agreed that the attention focused on SS during the consultation provided an impetus and basis for substantial inclusion of SS in the ongoing cross-border collaboration in public health surveillance within the EWIDS program.

ACKNOWLEDGMENTS

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APPENDIX I

List of Participants

Name	Title	Organization
Allen-Bridson, Kathy RN, BSN, CIC	Border Health Program Coordinator	Michigan Department of Community Health
Aramini, Jeff PhD, MSc, DVM	Senior Epidemiologist and Project Manager	Canadian Network for Public Health Intelligence
Clark, Stephanie	Project Manager	Public Health Agency of Canada
Bassil, Kate MSc, PhD (candidate)	Epidemiologist	University of Toronto, Toronto, Ontario
Buck, Richard	Border Health Manager	Public Health Preparedness Program New York State Dept of Health, Albany, NY
Buckeridge, David MD PhD	Assistant Professor	Epidemiology, Biostatistics and Occupational Health McGill University Clinical & Health Informatics Montreal, QC
Buckley, Mary Ann	Senior Attorney	Emergency Preparedness Bureau of House Counsel Albany, NY
Buehler, James MD	Research Professor	Dept. of Epidemiology Center for Public Health Preparedness & Research Rollins School of Public Health, Emory University Atlanta, GA

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List of Participants

Name	Title	Organization
Burkom, Howard PhD		National Security Technology Dept. The Johns Hopkins University Applied Physics Laboratory
Collins, Jim	Surveillance Systems Section Manager	Bureau of Epidemiology Michigan Department of Community Health
Craig, Carole MSc, DVM	Epidemiologist	Surveillance Unit, Epidemiology and Evaluation Public Health Services City of Hamilton Hamilton, ON
Davies, Rick MD		University of Ottawa Heart Institute Ottawa, ON
Donovan, Tara MSc	Epidemiologist	Queen's University / KFL&A Public Health, Kingston, ON
Drayton, Marlon	Senior Policy / Business Analyst	IPHS Business Team The Ontario Ministry of Health and Long-term Care, Toronto, ON
Edgar, Bronwen MHSc	Program Manager	Syndromic Surveillance KFL&A Public Health, Kingston, ON
Edge, Victoria PhD	Senior Epidemiologist	Foodborne, Waterborne & Zoonotic Infections Division Public Health Agency of Canada
Gournis, Effie MPH, MSc	Manager	Communicable Disease Surveillance Unit Toronto Public Health
Graham, Phil	Manager	Public Health Emergency Preparedness Emergency Management Unit Ontario Ministry of Health and Long-Term Care
Hay, Karen	Surveillance Lead	Infectious Diseases Surveillance Section Ontario Ministry of Health & Long-Term Care
Hoey, John MD	Special Advisor to the Principal	Queen's University Kingston, ON
Hotte, Alan	Project Manager	Office of Public Health Practice Public Health Agency of Canada Ottawa, ON
Hutwagner, Lori MSc		Bioterrorism Preparedness and Response Program Centres for Disease Control and Prevention Atlanta, GA
Hunter, Duncan PhD	Associate Professor	Department of Community Health and Epidemiology Queen's University Kingston, ON
Keller, Rick	Senior Systems Engineer	Altarum, Detroit, MI
Kirkwood, James	Public Health Representative	Public Health Representative Bioterrorism Epidemiology Program, New York State Department of Health

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List of Participants

Name	Title	Organization
Leffley, Alanna	Public Health Epidemiologist	Grey Bruce Health Unit Owen Sound, ON
Lombardo, Joseph MS		National Security Technology Department, The Johns Hopkins University Applied Physics Laboratory
Majury, Anna MD	Microbiologist Manager	Eastern Ontario Public Health Laboratories Ontario Public Health Laboratories Branch Ministry of Health and Long Term Care & Queen's University Kingston, ON
Moore, Eric PhD	Consultant	Queen's University Geography Kingston, ON
Moore, Kieran MD	Assistant Professor of EM Project Director, Syndromic Surveillance	Queen's University Department of Emergency Medicine Kingston, ON
Oldfield, Eddie	Director	Climate Change PEO New Brunswick Lung Association Fredericton, NB
Rolland, Liz MSc, PhD (candidate)	Epidemiologist	London School of Hygiene and Tropical Medicine
Samadhin, Mark	Regional Coordinator	Emergency Preparedness & Response Public Health Agency of Canada Ontario and Nunavut Region
Scott, Liam	Counsel	Legal Services Branch Ministry of Health and Long- Term Care Ministry of Health Promotion
Smieja, Marek MD PhD FRCPC	Associate Professor, Microbiologist and Infectious Disease Physician	Hamilton Regional Laboratory Program Hamilton, ON
Sonricker, Amy MPH	Project Manager	International Society for Disease Surveillance Boston, MA
vanDijk, Adam MSc	Epidemiologist	KFL&A Public Health Kingston, ON
Ward, Donald	Director	Division of Public Health Systems DHHS, MCDC Augusta, ME
Williams, Hugh	Representative	Health and Human Services Solutions ESRI Canada Toronto, ON
Willson, Kristie	Senior Epidemiologist	Infectious Diseases Surveillance Section Ontario Ministry of Health and Long-Term Care
Wong, Tom MD MPH FRCPC	Director	Division of Community Acquired Infections Centre for Infectious Disease Prevention and Control Public Health Agency of Canada Ottawa, ON

APPENDIX II

Agenda DAY 1: Monday, June 11, 2007

Time	Activity	Presenter
8:30–9:15	Registration	
Focus of Day 1	Overview of syndromic surveillance systems, data sources, data sharing	
9:15	Welcome, Introduction, Conference Overview	Dr. John Hoey (Queen's U); Dr. Kieran Moore (QUESST)
AM focus	Overview of syndromic surveillance systems	Facilitator: Dr. Kieran Moore
9:25–10:30	Overview of syndromic surveillance systems in the United States: BIOSENSE and CDC activities, ESSENCE, state and local systems Details of systems in place: data collected (data sources), system/software, syndromes, anomaly detection, representativeness, lessons learned, future directions	Dr. Jim Buehler (CDC, Emory); Joseph Lombardo (Johns Hopkins); Jim Collins (Michigan); Jim Kirkwood (New York) Don Ward (Maine) (approx. 10 minutes each)
10:30–10:45	Break	
10:45–11:45	Overview of syndromic surveillance systems in Canada ASAP, CNPHI, QUESST, ECADS, MOHLTC portal details of systems in place: data collected (data sources), system/software, syndromes, anomaly detection, representativeness, lessons learned, future directions	Dr. Victoria Edge (Public Health Agency of Canada); Dr. Jeff Aramini (Public Health Agency of Canada); Dr. Kieran Moore (RODS, Ontario public health units); Dr. Rick Davies (ECADS); Karen Hay (Ontario) (approx. 10 minutes each)
11:45–12:15	Discussion of existing cross-border surveillance programs: EWIDS, Great Lakes and North Eastern Activities (overview of progress to date, avoid duplication) How can syndromic surveillance activities be integrated? How to use existing communication networks and partnerships Using syndromic surveillance data Overview of ISDS DiSTRIBuTE project	Kathy Allen-Bridson (Michigan); Phil Graham (Ontario, GLBHI); Richard Buck (New York, EBHI); Amy Sonricker (ISDS) (approx. 10 minutes each)
12:30	Wrap-up discussion: Opportunities for cross-border surveillance: moving forward from what has been accomplished by existing programs Recommendations	ALL
12:30–1:30	Lunch	
PM focus	Alert/Data-Sharing workshop	Dr. John Hoey
1:30–2:15	Legal issues and parameters Ethics and privacy issues	Liam Scott (Ontario) Mary Ann Buckley (New York)
2:15–2:30	Discussion and questions	ALL
2:30–2:45	Break	
2:45–4:00	Epidemiological investigation, data/alert sharing, communication networks, similarities/differences among SS systems (syndromes, anomaly detection, etc.) discussion of when and how information could be shared, barriers to sharing (Recommendations)	Small group scenarios: 20 minutes to discuss, 15 minutes to present and discuss each scenario (4 different scenarios) = 15 x 4
4:00–4:30	Overall Conclusions Consensus and Finalization of Recommendations Wrap-up	ALL
7:00	Dinner event	

DAY 2: Tuesday, June 12, 2007

Time	Activity	Presenter
Focus of Day 2	Spatial analysis and emergency preparedness and response	
AM focus	Spatial analysis and mapping workshop	Dr. David Buckeridge (McGill University)
9:00–10:15	Geographical issues in the analysis of Telehealth and ED for influenza Experience with using SaTScan for surveillance: Requirements and lessons learned The impact of population mobility on spatial cluster detection: extending SaTScan ESRI tools for mapping and spatial analysis	Dr. Eric Moore (Queen's University Geography) Dr. Howard Burkom (Johns Hopkins) Dr. David Buckeridge (McGill) Hugh Williams (ESRI) (approx. 15–20 minutes each)
10:15–10:45	Discussion: spatial analysis, mapping, level of aggregation, Canada vs. U.S. geographical units (regional perspective), problem areas, solutions	(30 minutes)
10:45–11:00	Break	
11:00–11:20	Case Study (cross-border pandemic influenza mapping): Overview of exercise and lessons learned	Eddie Oldfield (New Brunswick) (20–25 minutes)
11:20–1:45	Discussion: Can we do a cross-border “tabletop” pandemic exercise using syndromic surveillance data? What is the process for creating a cross-border “tabletop” pandemic exercise using syndromic surveillance systems as initial detection systems Discussion and recommendations	(20 minutes)
11:45–12:30	Lunch provided	
PM focus	Emergency preparedness and alert-response protocols workshop	Dr. Jim Buehler (Emory University)
12:30–1:45	Alert-response protocols in U.S. and Canada (natural disaster, bioterrorism and infectious disease examples) Event surveillance Discussion: Situational awareness: How do/could syndromic surveillance alerts or data help shape the response? How is the response integrated into public health practice? What are the legal requirements for response?	Lori Hutwagner (CDC) Phil Graham (Ontario) Mark Samadhin (Public Health Agency of Canada) Joe Lombardo (Johns Hopkins) (approx. 15 minutes each)
1:45–2:00	Break	
2:00–2:30	Discussion: Gaps in capacity to respond What's worked/What hasn't; examples Data-sharing agreements Communication and response protocols between Canada and the U.S Recommendations	ALL
2:30–3:00	Overall conclusions Consensus and finalization of recommendations Wrap-up Evaluation	
3:00	Adjourned	