Emergency Syndromic Surveillance: Adapting Real-Time Outbreak and Disease Surveillance (RODS) for Public Health in Canada

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Objective

This poster provides an overview of a RODS-based syndromic surveillance system as adapted for use at a Public Health unit in Kingston, Ontario Canada. The poster will provide a complete overview of the technical specifications, the capture, classification and management of the data streams, and the response protocols developed to respond to system alerts. It is hoped that the modifications described here, including the addition of unique data streams, will provide a benchmark for Canadian syndromic surveillance systems of the future.

Background

In September 2004, Kingston, Frontenac and Lennox and Addington (KFL&A) Public Health began a 2-year pilot project to develop and evaluate an Emergency Department Chief Complaint Syndromic Surveillance System in collaboration with the Ontario Ministry of Health and Long Term Care (MOHLTC) – Public Health Branch, Queen's University, Public Health Agency of Canada (PHAC), Kingston General Hospital (KGH) and Hotel Dieu Hospital (HDH). At this time, the University of Pittsburgh's Real-time Outbreak and Disease Surveillance (RODS, Version 3.0) was chosen as the surveillance tool best suited for the project and modifications were made to meet Canadian syndromic surveillance requirements.

Technical Implementation

The system takes advantage of a dedicated private provincial healthcare network known as Smart Systems for Health (SSH). SSH connects healthcare providers across the province of Ontario via secure, integrated, province-wide information technology infrastructure. For added security, policies have been implemented to govern the flow of HL7 messages and restrict user access using a token-based authentication system (Crypto-card).

Many modifications have been made to the open source RODS. The geospatial mapping feature has been extensively modified for application in a Canadian setting. Enhancements have also been made to the graphical user interface. A technical overview paper has been written to document the extensive alterations that have been included in the system[1].

Innovative Data Capture Elements

The system classification, alert generation and mapping capabilities of the system are based on six core data elements captured in real-time: chief complaint, data/time of visit, hospital name, age, gender and 5-digit postal code of the patient's residence. In addition, the system captures the Canadian Triage Acuity Score (CTAS) and positive Febrile Respiratory Illness (FRI) screening results. Similar elements are captured for emergency and elective hospital admissions, also captured in real-time. These data elements allow better characterization of outbreak severity and enable more effective resource allocation within acute care settings.

Syndrome Classification and Alerts

Current syndrome classification is based on the Bayesian naïve classification of chief complaints inherent in RODS, however a rule-based classification system capable of modifying or adding syndromes in real-time is under investigation. The system is focused on the classification of gastrointestinal, respiratory and fever syndromes while maintaining the original list of RODS syndromes.

Alerts are generated by RODS recursive least squares and cumulative sums algorithms while alternative detection algorithms are being explored to test their utility and possible incorporation into the system [2,3].

Public Health Response

Response procedures for communication and information sharing with acute and chronic institutions have been developed with KFL&A Public Health to ensure timely and appropriate response to alerts generated by the system. In addition, these protocols include steps to incorporate RODS as a tool to aid ongoing Public Health investigation of community or institutional outbreaks.

Next Steps

Process, technical and cost/benefit evaluations are currently underway with results expected by September 2005. A full outcome evaluation is scheduled for the spring of 2006. The potential for the system to be expanded to additional areas of the province and the utility of the real-time data capture for disaster and emergency planning is being explored.

References

[1] Moore, K. et al., Real-time Outbreak and Disease Surveillance (RODS) for use as an Ontario Syndromic Surveillance Tool: A Technical Overview. June 2000.

[2] Hutwagner, L. et al. Comparing Aberration Detection Methods with Simulated Data. Emerg Inf Dis. Vol. 11, No. 2, February 2005.

[3] Wong, WK et al. WSARE: What's Strange About Recent Events? J Urban Health. Vol. 80:i66-i75, 2003.

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