Detection of Walkerton Gastroenteritis Outbreak Using Syndromic Surveillance of Emergency Room Records

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Background and Objective

In May 2000 accidental contamination of the water supply led to an outbreak of severe gastroenteritis in Walkerton Ontario, Canada. Of 1346 cases associated with exposure to Walkerton water, 65 were admitted to hospital, 27 developed Hemolytic-Uremic Syndrome, and six died. Estimates that 42% of cases were unreported indicate that the actual number of cases was likely 2321.

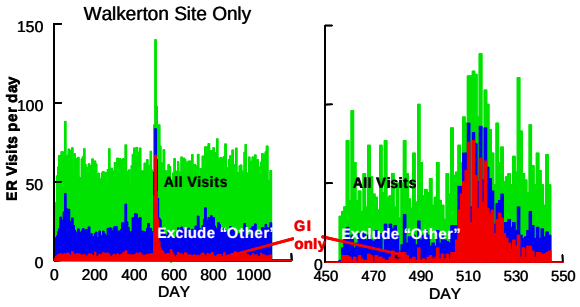
This abstract reports preliminary results of a retrospective study of the effectives of ER syndromic surveillance in detecting this outbreak.

Methods

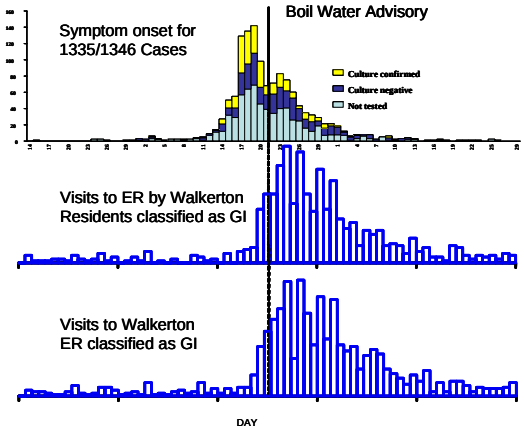
After review and approval by three research ethics boards, we accessed 396,698 ER records of patients seen in the Grey Bruce area of Ontario in the years 1999 to 2001. 392,699 were in electronic format, and the remaining 3,999 records were abstracted manually. Following removal of personally identifying information, data were transferred to AMITA Corporation, converted to a compatible format and processed using a "Canadianized" version of RODS (version 2.0.3) provided by the CNPHI Project, Public Health Agency of Canada. Chief complaints were categorized into one of 7 syndromes or an "other" category. Analyses on the resulting data sets were conducted at the University of Ottawa Heart Institute using Systat, Version 11, and at the Auton Laboratory, Carnegie Mellon University using their own specialized algorithms.

Results

ER visits associated with the outbreak were highly concentrated in the Walkerton Hospital.



The use of text mining to identify specific syndromes (RODS CoCo) dramatically reduced the signal to noise ratio, and resulted in a much clearer outbreak signal (Figure 1).



The sensitivity of outbreak detection was dependent on the number of regions and syndromes searched. Focusing on GI syndromes in Walkerton, the peak in associated ER visits lagged the retrospective outbreak curve by several days, but was clearly abnormal two days before the boil water advisory was issued.

Conclusions

Syndromic Surveillance of ER records would have provided timely warning of the Walkerton GI outbreak, and provided data that would have helped in its characterization.

ECADS Partners

University Partners:

- University of Ottawa Heart Institute (Scientific Lead)
- Michigan State University, National Food and Toxicology Center
- Carnegie Mellon University's School of Computer Science Auton Laboratory

Canadian Federal Government Partners:

- CBRN Research and Technology Initiative
- National Research Council of Canada Institute for Marine Biosciences (lead agency)
- National Research Council of Canada Institute for Information Technology
- Public Health Agency of Canada Foodborne, Waterborne and Zoonotics Infections Division

Industry Partner:

- AMITA Corporation

Public Health and Hospital Partners:

- Grey Bruce Public Health Unit
- Grey Bruce Health Services
- South Bruce Grey Health Centre
- Hanover and District Hospital

ECADS Collaborators

- Public Health Agency of Canada's CNPHI Project and Centre for Surveillance Coordination.
- Altarum Corporation