GIS Application for Early Detection Tracks Hospital-Reported Symptoms
Online, Interactive Maps Keep Community Informed

Health services groups in Ontario, Canada, are working with geographic information system (GIS) consultants to make real-time emergency room information available online as a way to inform community health providers, community members, and stakeholders. The application, based on ESRI’s ArcGIS Server technology, generates summary maps of real-time respiratory and gastrointestinal data reported in hospital emergency rooms. Online access to these maps gives community stakeholders an at-a-glance picture of where to expect spikes in these illnesses.

“The key element of this project is enhanced communication and collaboration between the acute care sector, public health, and the community at large to protect the public and prevent illness,” says Dr. Kieran Michael Moore, project director at Queen’s University Public Health Informatics (QPHI). The maps serve to inform decisions made by public health workers as well as family physicians, community care access centers, long-term care facilities, school and child care center administrators, and the general public. Institutions and schools can better understand and plan for absenteeism, and visitors to the site can also find related disease prevention and treatment information.

ESRI business partner Infonaut Inc. and the Sault Ste. Marie Innovation Centre developed the application in collaboration with Kingston, Frontenac, Lennox and Addington (KFL&A) Public Health; QPHI; and ESRI Canada Limited. GeoConnections, a Canadian government program that promotes geospatial initiatives, awarded sponsorship to develop the application.

“It’s a great way to disseminate data,” says Infonaut chief operating officer Matt McPherson. “You can see where a disease is active by a partial postal code [first three digits]. You can identify neighborhoods, towns, and municipalities and zoom in to identify different features of the community—schools, hospitals, day care, universities—in relation to reported hospital activity.”

The KFL&A area is a public health region that covers some

A new Web application, Infection Watch Live, uses geography to inform an Ontario, Canada, community with current data on respiratory and gastrointestinal illnesses reported from nine area hospitals.

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180,000 residents in the municipal and county areas surrounding the city of Kingston—where Lake Ontario meets the St. Lawrence River—north through Frontenac County and Lennox and Addington County including rural towns and villages such as Napanee, Cloyne, and Sharbot Lake. From the start, project objectives were to contribute to informing the community, understanding and limiting disease spread, reducing mortality and morbidity among at-risk populations, and reducing impacts on hospital emergency departments. Presentation of the most up-to-date information in an easy-to-use interface would provide an easily understood disease activity to the community.

“The establishment of a surveillance system using data from hospital emergency departments has been an invaluable tool for public health to identify infectious disease risks early,” says Dr. Ian Gemmill, medical officer of health for KFL&A Public Health. He explains, “The identification of salmonella in bean sprouts is an excellent example. Extension through the Infection Watch Live Web site to our partners in the community and to the public will provide our whole community with real-time communicable disease activity information, allowing better health decisions.”

For application development, two variables, respiratory and gastrointestinal complaints, were chosen because of their rapid transmission rates and high burden on community health services. The data source is real-time data collected from nine area hospitals by an electronic system adapted from the University of Pittsburgh’s Real-Time Outbreak and Disease Surveillance (RODS) system, in use since 2004. Map data was obtained from the Canadian Geospatial Data Infrastructure, which provides online resources for digital maps and satellite images. A public health epidemiologist working on the project created an algorithm that models the seasonal patterns of respiratory and gastrointestinal infections in the community.

Application maps present a generalized view of illness rates using three color zones—red, yellow, and green—to indicate high, elevated, and normal activity zones, respectively, in a display similar to at-a-glance air quality maps. This generalized view complies with health data privacy constraints by showing results for each syndrome by age groups (child, school child, and adult) and obscuring details about specific hospitals or patients. Results are displayed as a static snapshot of current activity or as interactive maps that group historical activity by syndrome and age group. The application can also make detailed data available to authorized health authorities, providers, and researchers through a secure Web mapping service.

For more information, visit www.kflapublichealth.ca or contact Hugh Williams at hwilliams@infonaut.ca.