GIS as a Patient Care Visibility System

For Hospital and Community Infection Control

CODIGEOSIM Workshop
September 3rd, 2008
GIS - Patient Care Visualization

- **Project: Micro-Geomatic Infection Control in a Hospital Setting**
- Solution is being currently being commercialized following a successful pilot
- Develop, deploy and promote an integrated system comprising Geographic Information Systems (GIS), Geomatic analysis, RTLS, location-based business intelligence, and workflow
- Address rapidly emerging threat of acquired antibiotic-resistant strains of disease in hospitals
- Surveillance: Outbreaks within the surrounding community
CASE STUDY: C. DIFF HOSPITAL OUTBREAK
What is C. difficile?

- *Clostridium difficile* or *C. difficile* is a bacterium that causes diarrhea and more serious intestinal conditions such as colitis.

- It is the most common cause of infectious diarrhea in hospitalized patients in the industrialized world.

- It is also one of the most common infections in hospitals and long-term care facilities.
Case Study - Mapping C. difficile

- A local community hospital encounters serious & persistent C. difficile outbreak
- Public Health requests assistance with mapping the locations of outbreaks within the hospital
Mapping C. difficile

- Using hospital floorplans, a digital 2-D & 3-D GIS layout of the hospital was created
Mapping C. difficile

- Historical patient movement through hospital was captured in a spatial data warehouse

- Spatial analysis of movement and interaction leads to faster, more targeted response.
The Outcome

Faster & More Effective Infection Control Response

- Tracking Location, Movement & Outbreak
- Outbreak Map: Location-Based Situational Awareness
The Outcome

Analyze Shared Rooms & Common Space:

- # of C. difficile patients over a period of time
- Identify suspect patients following outbreak alerts
The Outcome

Historical Infection Control Tracking:

- Post-diagnosis tracking patient movement & interaction throughout the hospital
Results:

- Graphical depiction of the SAH’s General site and a portion of the Plummer site, digitally in 3D – including patient flow over space and time.
- Visual representation of disease ‘hot-spots’ within the hospital allowing for targeted interventions.
- Data used to create recommendations that addressed factors contributing to the spread of the disease.
- *Reduction of new C.diff cases from 10 per month to only one per month – sustained over an 12 month period.*
- Other complementary benefits - from updates of emergency evacuation plans, staff workload & patient throughput & flow
Results:

- Sault Area Hospital is being touted by the province as an example of how to manage a C. difficile outbreak.
- “What makes SAH stand out is the way it used a combination of public health officials, experts on infection prevention and control, hospital staff and administrators to form a highly successful outbreak management team.”
- “SAH is a model for how C. difficile is managed. In fact we use that model and we recommend it to everyone.”
  - Dr. Michael Baker, UHN Physician-In-Chief
  - Provincial lead for patient safety and quality for the province's wait time strategy
## Related GIS Projects

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Infonaut

- Dedicated to development of GIS solutions in health
- Technology and services system strategy, work flows, operational performance, reporting requirements & patient-care needs
- Combine GIS, location data & devices (e.g. RTLS) with BI software
- Continue to build on our strong position as a GIS solution specialist for hospitals, Public Health, CCACs, RHAs & government
- Recognized and supported by MaRS as an innovation leader - commercialization of in patient and health data visualization solutions
Sault Ste Marie Innovation Centre

- SSMIC’s Community Geomatics Centre model that is unique, proven, & recognized as an innovation leader in Ontario and across North America
- Proven to promote and establish partnerships and technology to share geospatial data, tools and knowledge amongst community organizations to create a safer, healthier and more prosperous community
- Catalyst for growth in the Information Technology Sector in Northern Ontario
- Successful project experience with Ontario hospitals
Recent Awards and Publications

SSMIC
- ESRI Inc. 2007 Special Achievement Award in GIS
  - International Award (Category: Public Health & Human Services)
- URISA 2006 Leadership in the Field of GIS
- URISA 2006 Best Municipal GIS Award
- ESRI Canada 2006 Award of Excellence

Infonaut
- ESRI Canada – Business Partner of the Year 2007
- GeoConnections Funding (Numerous awards for GIS solution and standards development)
- ESRI Health GIS Conference - Real-time geospatial mapping of hospital triage data with ArcGIS Server
Questions & Comments?

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