Summary of Discussion for

Technical description of RODS: a real-time public health surveillance system
Tsui FC, Espino JU, Dato VM, Gesteland PH, Hutman J, Wagner MM.
Journal of the American Medical Informatics Association (September-October 2003) 10(5): 399-408.

Removing a barrier to computer-based outbreak and disease surveillance--the RODS Open Source Project
Espino et al.
MMWR Morb Mortal Wkly Report. 2004 Sept 24;53 Suppl:32-9.

Automated syndromic surveillance for the 2002 Winter Olympics
Gesteland PH, Gardner RM, Tsui FC, Espino JU, Rolfs RT, James BC, Chapman WW, Moore AW, Wagner MM.
Journal of the American Medical Informatics Association. November-December 2003) 10(6): 547-54.

Presented by Noel Fiser
INLS279: Bioinformatics Research Review
April 5, 2006

This week we looked at three articles related to the *Real-Time Outbreak and Disease Surveillance* (RODS) project, developed at the University of Pittsburgh. The first article presents a technical description of an earlier version of RODS (v1.0), the second addresses the next version of RODS (v2.0), and the final article discusses the usage of RODS at the Winter Olympics in Salt Lake City in 2002.

RODS is a computer-based syndromic surveillance system which attempts to gather basic chief complaint information from emergency departments (along with other sources like over-the-counter drug sales) in order to develop a real-time picture of the population health in a given area. The data is transferred from individual hospitals and clinics using the HL7 data standard. The data are then parsed within the RODS system and the chief complaint information is extracted and analyzed. When RODS' detection algorithms recognize a predetermined pattern of abnormality within the population (e.g., a spike in one or more chief complaint symptoms), the system responds by alerting designated individuals who can then examine the aberrant data via the RODS web interface. The system has been offered as open-source software since its inception (with expanded distribution licensing since version 2.0), but the developers have found that the system requires enough diverse expertise to set up and manage it that the creators have come to recommend a buy-in shared regional program model for RODS instantiation.

RODS' user interface includes three basic views: the main screen, the epiplot screen, and the mapplot screen. The main screen rotates through the various data sources (i.e. emergency departments), giving basic information about each. The Epiplot screen, as its name implies, allows a user to overlay various data trend graphs in order to make specific comparisons and draw conclusions about the state of the population. The Mapplot screen uses a GIS component to color city areas and zip codes based on the degree of presence of a variable.

RODs was deployed at the Winter Olympics in Salt Lake City in 2002 as a test of its possible application in such short-term drop-in situations (Gesteland et al, 2003). While it was not allowed to be the primary method of surveillance because of the time frame, RODS did prove useful in monitoring the large and diverse population of the Olympics. The main purpose of implementing RODS was to automate an otherwise expensive, round-the-clock surveillance process. The RODS team worked with modified HL7 data shared between Intermountain Health Care and the University of Utah. The RODS system "fired" twice (i.e. indicated a possible anomaly in the data); both times the appropriate authorities were notified and the alarms were determined to be false positives. Within the inherent limitations of the seven-week establishment of the RODS system, the project was highly successful in proving how a computer-based, minimally invasive syndromic surveillance system can work.

In correlation with some of the articles we discussed this semester, the largest problems that RODS has encountered thus far have not been a limited vision or even implementation but the bureaucracy surrounding the creation and implementation of such a system. At the Olympics the largest problems faced by the investigators corresponded to data sharing, privacy and IRB consent. The major data contributors (IHC and U of Utah) could not share the same HL7 data sets because of proprietary data collection issues. This is understandable since knowing how the "other guy" is handling patients can yield a market advantage; but it slowed down the process of implementation in a situation where time was essential. Similarly the project ended up treated as a research project (and thus needed to pass IRB regulations) because one of the many participating hospitals would not acknowledge the addition of RODS as a primary piece of the Olympic surveillance plans. Over and over, we noted how the real issue with RODS is acceptance and scale, not the conceptual framework and implementation. We guessed the RODS project probably spent well over half of their seven weeks in this project managing administrative issues instead of actually setting up the RODS system.

We also discussed the RODS concept and brainstormed about our own "killer app" ideas. We agree that the RODS project has no reason it shouldn't succeed other than wide dissemination and acceptance of the shared RODS hub model in order to reduce cost.