Bridging the Gap Between Public and Private Healthcare: Influenza-like Illness Surveillance in a Practice-Based Research Network

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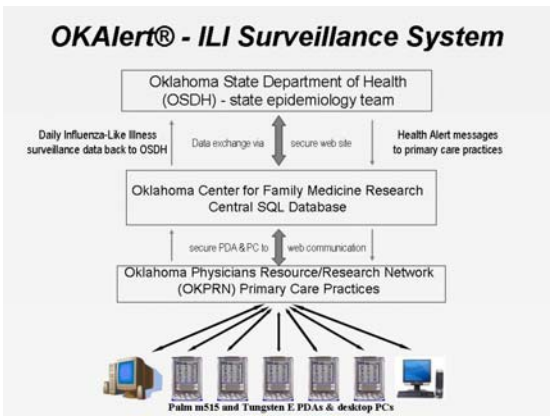
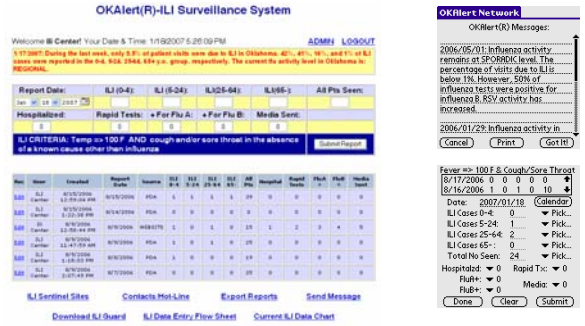
Abstract

This poster describes the development, testing, and implementation of the OKAlert® - ILI System, a bidirectional, dual-use influenza-like illness surveillance and messaging system, during the influenza seasons of 2003–2004 and 2004–2005 in the Oklahoma Physicians Resource/Research Network (OKPRN), a primary care practice-based research network (PBRN). We describe how the Oklahoma Physicians Resource/ Research Network connected 30 primary care providers to the Oklahoma State Department of Health and how surveillance results were analyzed and fed back to the clinicians on a weekly basis. We demonstrate the timeliness, sensitivity, specificity, acceptability, validity, flexibility, and cost of the system. Finally, we describe upgrades and enhancements to the system based on user evaluation and feedback.

Description of the System

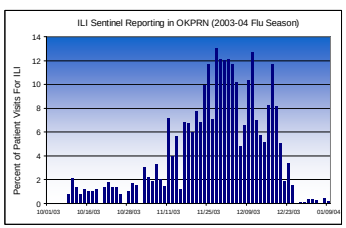
The OKAlert®-ILI System was developed in an open-source environment utilizing Apache Tomcat server 4.1.3 and Java Struts technology on SuSE Linux Professional 9.1. ILI data were captured in a PostgreSQL 7.3.4 database via a secure Web interface using OpenSSL 0.9.7b. The secure Web interface was utilized by the OSDH epidemiology staff to send OKAlert® messages directly to OKPRN providers, to review and analyze ILI report data, and to provide feedback to participating sites on local and statewide influenza activity. Alternatively, the system was accessible via Palm® OS– based handheld devices. The Palm® client was designed in NSBasic for Palm, a Visual Basic—like rapid development environment. The personal digital assistants (PDAs) were connected to an open source PostgeSQL database to capture and store ILI messages synced from the handheld devices. The PDA client included a basic error-checking algorithm to ensure ILI data integrity. The client was able to track PDA users' actions within the ILI system to determine daily handheld usage, options users selected to share health alerts with others, and possible errors users encountered. The PDA and the Web client prompted providers to answer three simple questions each day: (1) the number of patients with ILI symptoms seen that day, (2) the number of patients with ILI symptoms hospitalized that day, and (3) total number of patients seen that day.

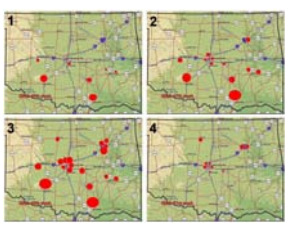




2003–2004 Influenza Season Results (October 2003–May 2004)

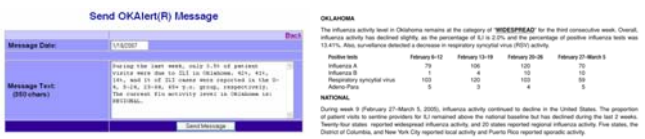
- 15,428 individual patient encounter reports from 30 volunteer OKPRN clinicians in 15 counties
- Six percent of patient encounters (927 cases) resulted in ILI reporting
- Patients required hospitalization in 20 cases (0.1%)
- ILI cases appeared first in the southern part of the state with a subsequent northward shift
- Approximately 4 weeks after a significant increase in ILI reports, ILI activity had peaked
- Testing of referred isolates confirmed influenza type A (H3N2, both Fujian-like and Panama-like)
- No influenza type B was confirmed in Oklahoma in this season

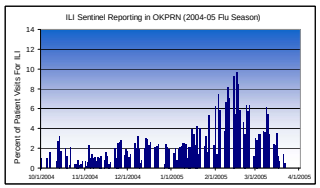


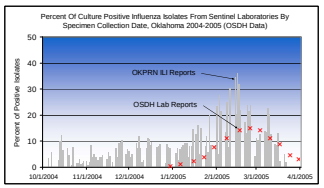


2004–2005 Influenza Season Results (October 2004–April 2005)

- 33,437 individual patient encounter reports from 31OKPRN providers in 15 counties
- Three percent of patient encounters met the ILI criteria (1,114 cases)
- 19 patients (0.06%) were hospitalized because of ILI
- ILI activity peaked in mid-February, much later than during the 2003–2004 season
- Circulating viruses included adenovirus, parainfluenza, influenza types A and B, and RSV







Timeliness of ILI Reporting

- Average lag time between seeing and reporting ILI cases was 1.8 days (approx.44 hours)
- Daily reporting of ILI cases took an average of 30 seconds to 1minute
- 7-day lag time between OKPRN and OSDH reports in favor of the sentinel surveillance

Sensitivity and Specificity of ILI Reporting

- Very strong correlation between ILI surveillance reports and independent laboratory reports on Type A culture positive isolates from sentinel laboratories (r=0.827)

Acceptability and Simplicity of the OKAlert® - ILI System

- High level of user satisfaction with the system
- All components were found to be easy to use (PDA, PC, and Web portal)
- 85 percent of providers reported consistently (at least three times every 5 days)
- Only three providers dropped out before or during peak ILI activity

Representativeness, Usefulness, and Importance of System

- Providers represented 15 counties from all regions in Oklahoma, except the Panhandle
- Small and mid-size practices, academic, community and Native American health centers
- Dual-use potential: first-line responder messaging in bio-emergencies (150 providers)
- More timely and accurate response to ILI cases (selection of appropriate therapy)
- Tiered OKAlert® messages: concise rapid messages followed by detailed listserv e-mails

Flexibility of the System

- The system can shift from outbreak detection to management via two-way messaging
- A newer version will be able to collect alternative surveillance data year round
- System is very scalable (number of sentinels can increase rapidly and significantly)
- Geographical location of sentinels is not a limiting factor

Limitations

- ILI data were not captured by patient age groups (current version tracks 4 age-groups)
- It has been difficult to maintain the same level of sentinel participation year round

Conclusion

The success of the OKAlert® - ILI System demonstrates that PBRNs have a significant potential for bridging the communication gap between the public and private healthcare sectors. Their unique position and affiliation with an array of healthcare entities empowers them to develop and implement viable disease surveillance solutions that are accepted and utilized by all parties. They are able to understand and approach all stakeholders and bring together professionals with a variety of expertise to develop and implement a complex public health solution cost effectively.