

Tracking Outbreaks

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Five major laboratories gather and provide electronic laboratory results from health-care providers across Texas, and each submits as many as 7,800 records a year to the Texas Department of State Health Services (DSHS). The state then submits the data to the Centers for Disease Control and Prevention (CDC) as part of the National Electronic Disease Surveillance System (NEDSS).

The slow and costly process of manually entering data sent in by labs is now becoming a thing of the past in Texas as the state pioneers a data conversion tool that will automatically convert lab results to the appropriate data format regardless of the format in which it was submitted.

Since 1946, the CDC's mission has been to prevent disease outbreaks and deal with incidents that potentially could cause epidemics, such as the anthrax scare of 2001 and the spread of infectious diseases in the aftermath of Hurricane Katrina. When President George W. Bush signed the Public Health Security and Bioterrorism Preparedness and Response Act into law in 2002, the CDC introduced the NEDSS as part of a nationwide effort to provide real-time disease reporting and automate disease-tracking processes.

A key goal of the NEDSS, developed in part with the Texas DSHS, is to facilitate the development of integrated, registry-based public health surveillance systems through the exchange of data based on a single set of criteria. The data travels securely via the Internet to the CDC's Public Health Information Network Messaging System.

The system can identify people in a region who are developing common symptoms, such as a flulike illness or even bioterrorism.

The vision of NEDSS is to have an integrated surveillance system in all states that can transfer public health, laboratory and clinical data efficiently and securely over the Internet. The CDC claims NEDSS will revolutionize public health by gathering and analyzing information quickly and accurately. This will help improve the nation's ability to identify and track emerging infectious diseases and potential bioterrorism attacks, as well as investigate outbreaks and monitor disease trends.

Overcoming Slow Reporting

For agencies required to submit data, the process wasn't so simple. In 2004, the need to automate NEDSS reporting in Texas was clear, said Doug Hamaker, NEDSS coordinator for the Texas DSHS. Each lab result record took about three minutes to manually enter into the DSHS disease tracking system.

The problem was the Texas DSHS had a tracking system that involved several manual steps for converting data formats and electronic files to NEDSS compliance. The source files were often received by fax or download, then manually sorted and saved according to geographic jurisdiction. The files were then electronically copied to shared folders on a secure portal. To make matters worse, some labs submitted paper forms. The files were reviewed manually, and records requiring action were manually recorded in the NEDSS system and followed up with an investigation.

Hamaker wanted to take the state's time-sensitive laboratory result data and integrate it with statewide and national data systems -- without interfering with established practices.

"We needed to develop a solution that would not disrupt current business processes, yet moved us toward increased standardization of how laboratory result messages were processed, as well as working on standardization of message content when created at each participating laboratory," Hamaker said.

The Texas DSHS partnered with the CDC, which was in the process of implementing NEDSS. Through NEDSS, the CDC seeks to establish an Internet framework that allows states to collect data from the state and local level and report communicable diseases to the CDC's Public Health Information Network for analysis and response. The Texas DSHS served as a beta site for the CDC effort, and the DSHS worked with the CDC to develop the NEDSS system.

The electronic laboratory reporting process the Texas DSHS implemented helps the DSHS receive, translate and load messages into the NEDSS database, where records are reviewed, marked, and an investigation will ensue, if need be.

The biggest challenge for the Texas DSHS -- as well as other states undergoing NEDSS compliance -- was the transition of old legacy systems that in many instances were either paper-based or used nonstandard data formats, Hamaker said. The DSHS didn't want to lose data by discouraging labs from participating, so the new system would have to accept data in the format participating labs were comfortable with.

Art Ramos, Rhapsody services manager for Orion Health, said the biggest challenge for the DSHS was determining how to make the existing solution work without requiring a major overhaul.

"How do we leverage what's already been done without having to do a lot of redesign and rearchitecture with our current solution, and still provide the CDC with the information they need and integrate seamlessly the applications they are forced to integrate with?" he said.

To transition to an automated system, Texas DSHS worked closely with the CDC's NEDSS Brokering Tool to develop electronic laboratory reporting message translation maps and data routes within the Orion Health Rhapsody Integration Engine -- the software engine of the NEDSS Brokering Tool. Rhapsody is a message broker used by health-care organizations that enables efficient exchange of electronic data.

Fortunately for Texas, Orion Health software was already being used in the state health department to manage data internally for a number of agencies. The Texas DSHS integrated Rhapsody and used it to map the various data and file formats -- such as Excel and ASCII -- from various agencies to a standard HL7 format.

The solution has been implemented by the Texas DSHS at 20 percent of state laboratories so far, saving approximately 390 hours of manual data entry time per year, Hamaker said. The system also is more accurate because there are fewer chances for data entry errors.

"The major return on investment is time savings in terms of decreasing the need for manual data entry," Hamaker said. "With each laboratory we bring into this system, we realize additional savings."

By developing solutions to business process needs in line with industry and national standards, the Texas DSHS has achieved successful interoperability between state health reporting agencies, Hamaker said. It is also important for reporting agencies, such as laboratories, to know what raw data to provide the state, according to Orion Health. Each state health department should be aware of which lab values to report, the format required by the receiving agency and the transfer method, Ramos said. A method for reidentifying a reported patient if the CDC requires follow-up information also must be in place.

As the solution is rolled out to additional laboratories in the state, other sensitive health data, such as laboratory results indicating noncontagious diseases, like *E. coli* outbreaks, will be tracked using the same system. Health workers at the local, regional and federal level will have fast access to data necessary for trend analysis and clinical decision-making for community health efforts.

"We are now able to customize data for state reporting requirements and integrate data into our legacy systems, which have very specific and differing data requirements, without replacing our existing software to achieve interoperability," said Hamaker.

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