An Innovative Design for Conducting Simulation Exercises on Electronic Disease Surveillance Systems

Marvin L. Sikes Jr, MHA, Rekha Holtry, MPH, Steve Babin, MD, PhD, Wayne Loschen, MS, Jacqueline S. Coberly, PhD, Sheryl L. Happel Lewis, MPH
The Johns Hopkins University Applied Physics Lab (JHU/APL)

OBJECTIVE

This is a description of an innovative design and format used to exercise public health preparedness in a tri-jurisdictional disease surveillance system in the spring of 2006.

BACKGROUND

In order to be best prepared to identify health events using electronic disease surveillance systems, it is vital for users to participate in regular exercises that realistically simulate how events may present in their system following disease manifestation in the community. Furthermore, it is necessary that users exercise methods of communicating unusual occurrences to other intra and extra-jurisdictional investigators quickly and efficiently to determine first, if an event actually exits and if one does its characteristics. A simulation exercise held in the National Capital Region (NCR) in the spring of this year exercised a novel format for engaging users while testing the utility of an embedded event communication tool.

METHODS

The exercise scenario was a large scale food-borne outbreak that was modeled after an actual Hepatitis A outbreak in 2003 that spanned across Pennsylvania, Ohio, and West Virginia and infected over 600 people. The developers of the disease surveillance system at the Johns Hopkins University Applied Physics Laboratory crafted the outbreak scenario and generated statistical estimates for Hepatitis A infected cases, with appropriate demographics, chief complaints, geographic distributions, etc. They also synthesized the background data into which outbreak-related cases were inserted. Unlike previous exercises where participants traveled to a central location for a one day exercise simulating a multi-day scenario, this one exercised a unique design. It involved users logging on to a website identical to their actual system from their offices and investigating a simulated outbreak over three consecutive days. As various stages of the scenario unfolded each day, epidemiologists used the system's embedded communication capabilities to pass valuable information within and among jurisdictions securely. Additionally, an exercise control center was available for users to access via telephone. The center provided information and responded to questions from participants that would have typically been asked of external partners such as hospitals, laboratories, etc., and also provided relevant scenario injects. At the conclusion of each day, users completed an evaluation form that they submitted electronically to exercise control.

RESULTS

On the 4th and final day, an exercise hotwash was conducted at the Johns Hopkins University Applied Physics Laboratory. Participants provided feedback and recommendations based on experiences from the exercise. In addition, evaluators presented a summary of their observations and data collected from participant evaluation forms. The design of this exercise provided an excellent format allowing users to review and investigate simulated disease injects embedded in their disease surveillance system, and communicate their findings with other participants using the ECS. In addition it provided an opportunity to identify 1) areas for improving the event communication capabilities 2) policies and procedures needed for overcoming gaps in intra-jurisdictional outbreak follow-up processes.

CONCLUSIONS

To fully understand the functionality of an electronic disease surveillance system including event communications capabilities, and to grasp how jurisdictions communicate early findings from their systems with other users, there is a critical need to exercise systems in real-time. The approach described above used in the recent NCR simulation exercise is an excellent example of how this may be accomplished in a single or multi-jurisdictional situation.