Automated Real-Time Detection and Notification of Positive Infection Cases
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Infection control in the healthcare setting is an essential component for patient safety and quality of care. To assist with daily infection control functions, we have implemented an alert in the Vigilens Health Monitor (a clinical decision support system at our institution) for real-time detection and notification of positive infection cases in both inpatient and outpatient settings.

INTRODUCTION. Clinical decision support systems have become prevalent in the health care setting and can play a valuable role in patient care and safety\textsuperscript{1}. At NewYork-Presbyterian Hospital (NYPH), we have been developing the Vigilens Health Monitor for monitoring clinical events in real-time and generating alerts as specified by a set of rules\textsuperscript{2}. Most recently, we have implemented an alert for detecting and notifying infection control personnel about new positive infection cases.

The Department of Epidemiology at NYPH is responsible for surveillance, prevention, and control of infection. To assist with these functions, a Web-based infection control system (ICS) was developed to provide daily listings of inpatients with positive results for a particular organism (e.g., MRSA, \textit{C. difficile}, and influenza\textsuperscript{3}). This listing is generated daily, at midnight, and contains information about the case such as patient name, location, and specimen source. Since a clinical laboratory may generate the evidence for infection cases that require immediate isolation at any time, there was a need to develop a mechanism for detecting and notifying infection control personnel about new cases that arise between generation of daily listings. In response to this, we designed and implemented a real-time infection alert in Vigilens and applied it to the most common isolation-requiring viral infections that can occur during the winter season: influenza A and B, rotavirus, and respiratory syncytial virus (RSV).

METHODS & RESULTS. The infection alert is dependent on some external resources and involves several steps as depicted in Figure 1. These resources from the ICS server include: daily listing – consists of positive inpatient infection cases for that day, location table – contains mapping of location codes to names and other location-specific information, and configuration tables – specify which laboratory results are indicative of a positive infection case. To trigger the infection alert, HL7-encoded laboratory results that are received by Vigilens are filtered using the configuration tables leaving only positive infection cases (both inpatient and outpatient). Next, these cases are compared to those in the daily listing. If the case is not in the listing, an alert message is formulated consisting of the patient name and medical record number, location name (as translated by the location table), specimen source, organism, and laboratory result (e.g., ‘Positive for RSV’). This message is then posted to a Web site on the ICS server for viewing. Additionally, an email is sent to the specified infection control personnel notifying them about the new case and directing them to the Web site to view the details.

\textbf{DISCUSSION & CONCLUSION.} Since November 2005, the infection alert has been operational on the west campus of NYPH for identifying influenza, rotavirus, and RSV cases. In a recent analysis, the alert was found to have notified infection control personnel about 62 influenza, 20 rotavirus, and 69 RSV cases in a month. These alerts have permitted rapid isolation of patients and have reduced exposure to potentially susceptible patients, employees, and visitors. Next steps include extending the alert to the east campus of NYPH, detecting other types of infections, advancing the notification capabilities, and evaluating the alert’s impact on patient safety and care for both campuses.

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References