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ABSTRACT

Using influenza rapid test positivity as an early indicator for the onset of seasonal influenza

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Objective
The objective of this study is to describe the use of point-of-care rapid influenza testing in an outpatient, setting for the identification of the onset of influenza in the community.

Introduction
Influenza causes significant morbidity and mortality, with attendant costs of roughly $10 billion for treatment and up to $77 billion in indirect costs annually.[1–3] The Centers for Disease Control and Prevention conducts annual influenza surveillance, and includes measures of inpatient and outpatient influenza-related activity, disease severity, and geographic spread.[4] However, inherent lags in the current methods used for data collection and transmission result in a one to two weeks delay in notification of an outbreak via the Centers for Disease Control and Prevention's website.[5] Early notification might facilitate clinical decision-making when patients present with acute respiratory infection during the early stages of the influenza outbreak.

In the United States, the influenza surveillance season typically begins in October and continues through May. The Utah Health Research Network has participated in Centers for Disease Control and Prevention's influenza surveillance since 2002, collecting data on outpatient visits for influenza-like illness (ILI, defined as fever of 100F or higher with either cough or sore throat). Over time, Utah Health Research Network has moved from data collection by hand to automated data collection that extracts information from discrete fields in patients' electronic health records.

We used statistical process control to generate surveillance graphs of ILI and positive rapid influenza tests, using data available electronically from the electronic health records.

Methods
Rapid influenza tests were introduced into Utah Health Research Network in December 2003. We extracted data from the clinical data warehouse for influenza seasons 2004–2005 through 2007–2008. ILI patients were those who: (1) had a measured temperature at the visit of at least 100F, and (2) had a 'reason for visit' field that contained either cough or sore throat. Regardless of ILI status, any patient who had a positive influenza rapid test was also identified.

The daily proportion of patients with ILI or with a positive rapid influenza test was graphed using statistical process control charts. Using the Western electric rules, we defined both the epidemic onset of the influenza outbreak and an early alert signal. We compared the presumed notification date for the early alert signal with the usual notification system in Utah that relies on data collected for Centers for Disease Control and Prevention's influenza surveillance to determine the timeliness of rapid test positivity surveillance.

Results
The peaks for ILI and rapid test positivity coincided in time. An early alert was identified in all four seasons using rapid test positivity, although no early alert was clearly identified for ILI in any season. The early alert for rapid test positivity occurred a median of 16 days before the epidemic onset. Assuming dissemination by email within two days of the alert, Utah Health Research Network clinicians could be notified of the start of the influenza outbreak about nine days earlier than ILI surveillance alerts posted to the Utah Department of Health website.

Conclusions
Influenza rapid test positivity provided an early alert, 16 days before the epidemic onset, and earlier than traditional surveillance for ILI. This early awareness could guide clinician decisions regarding diagnostic testing, prescription of antivirals, and counseling their patients on preventive behaviors.

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