CLINICAL INFORMATION TECHNOLOGY

Linking Personal, Public Health Data via Electronic Health Records

During the 2009 influenza A (H1N1) pandemic, investigators at the New York City (NYC) Department of Health and Mental Hygiene (DOHMH) piloted a respiratory virus surveillance system in 9 community health centers in Manhattan and the Bronx with a networked electronic health record system (EHR) and standardized electronic communication to DOHMH. Triggered by symptoms listed in the EHR meeting a predefined case definition of influenza-like illness (ILI), providers were alerted by the EHR to obtain confirmatory testing (rapid influenza diagnostic test [RIDT] and PCR assay for respiratory viruses). Demographic data, ordered tests, and test results were subsequently transmitted from the EHR to DOHMH. The primary goal of the study was to assess the effectiveness of using surveillance clinics with multisystem electronic linkages to develop real-time data on the epidemiology of respiratory virus outbreaks. The sensitivity and specificity of RIDT and symptom criteria for ILI as predictor of a PCR positive for H1N1 were also compared.

Of 9,375 adult and pediatric patient visits during the study period, 537 (6%) met criteria as ILI visits. Children accounted for 63% of all ILI visits, with 12% occurring in 0- to 2-year-old children, 22% in 3- to 5-year-olds, 20% in 6- to 12-year-olds, and 9% in 13- to 17-year-olds; 48% of H1N1 cases confirmed by PCR occurred in children <17 years old. Despite EHR alerts, respiratory virus testing was only performed in 17% of ILI cases; overall, 40% of specimens for testing ordered by clinicians were in patients who were not identified as having an ILI. In 132 cases with both RIDT and PCR results, the ILI case definition was more sensitive (70% vs 29%), but less specific (48% vs 94%) and had a lower positive predictive value (59% vs 83%) when compared to RIDT as a diagnostic test for H1N1.

The authors conclude that despite the low sensitivity of RIDT as a test for H1N1, the study results demonstrate the potential of linked data from EHRs to provide important epidemiologic data on emerging respiratory virus epidemics.

James A. Taylor, MD contributed to this summary.

PICO

Question: Can a system linking electronic health records, clinical decision support, and diagnostic test results in community clinics provide useful epidemiologic information on emerging influenza epidemics?

Question type: Diagnosis

Study design: Cohort

Commentary by

George R. Kim, MD, FAAP, Baltimore, MD

Dr Kim has disclosed no financial relationship relevant to this commentary. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.

The ideal of health information technology for community health practice is a combination of workflow and technology that automatically collects, links, and organizes data from patient encounters, communicates it in real time to organizations and agencies for timely surveillance-response, and uses knowledge to guide timely and optimal care of individual patients. This ideal connects providers to care networks and public health agencies as well as EHRs to health information exchanges (HIE)[1] and public health surveillance networks.

The authors of this study describe part of an ongoing NYC effort to realize this ideal in a community health network. Note that the "intervention" (coordinated data collection, structured data communication to the DOHMH, defined point-of-care case identification/alerts, and ongoing data analysis during a defined outbreak) is not the "system" (the networked clinics, the laboratory, the analysis team, the DOHMH) and it is also not the "information technology" (the networked EHR, the clinical decision support rules/alert, the standard queries and electronic communication protocol). Evaluation of clinical information technology's true impact on outcomes and its translation/dissemination (ie, the evidence for HIE) may be difficult. Deployment of this EHR within a different structure, workflow, and culture may well produce different outcomes.[2]

Qualitative observations may be of equal value in understanding the success or failure of systems. For example, it was noted that during data collection, DOHMH discouraged RIDT/PCR testing in mild cases (which may have contributed to the low completeness rate), and that ILI symptoms/findings that defined a case were broad and not specific to the diagnosis. As US EHR adoption increases,[3] more projects that use networked data from EHRs for surveillance, research, and practice improvement may help measure and address some of the more difficult problems in pediatric and adult primary care.

Editors' Note

The results of this study are disappointing. The RIDT was not as sensitive as an old-fashioned symptom checklist as a test for H1N1 during the pandemic. (It should be remembered, however, that RIDT is known to be a relatively insensitive test for pandemic influenza H1N1.) Perhaps more worrisome, even with electronic triggers to direct care, the RIDT was only ordered 17% of the time that it was indicated. As all clinicians frustrated by the inadequacies of current systems know, we have a long way to go in maximizing the clinical utility of EHRs.

References

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Key words: electronic health records, influenza, polymerase chain reaction

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