Respiratory viral testing in laboratories serving acute care hospitals in Rhode Island

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ABSTRACT

BACKGROUND: The rapid detection of respiratory viral infections is associated with several positive health outcomes. However, little is known about the availability of rapid respiratory viral testing in acute care hospital laboratories.

METHODS: A survey was sent to 13 hospital laboratories assessing results' turnaround time, the number of ordered tests and positive results.

RESULTS: Rapid viral panel (RVP), respiratory syncytial virus (RSV), and rapid influenza testing was available in 9 of 13, 13 of 13, and 13 of 13 hospitals, respectively. Results were available within 24 hours of specimen collection in 1 of 9 hospitals for RVP; RSV and rapid influenza results were available within 12 hours in 8 of 13 and 13 of 13 hospitals, respectively.

CONCLUSIONS: Rapid diagnosis of respiratory viral infections in RI acute care hospitals can be made for influenza and RSV. However, rapid results for other respiratory viruses are unavailable in most of RI hospitals.

KEYWORDS: viral testing, Rhode Island, respiratory viral infection

BACKGROUND

Respiratory viral infections are the most common infections in humans.[1] Though they affect all ages, those at highest risk for morbidity and mortality are children, older adults and individuals with chronic medical conditions.[2] Globally, the burden of respiratory infections exceeds that of any other disease etiology and is responsible for 18% of deaths in children under five years of age.[3] In the United States, influenza-associated deaths are estimated to have been 12,000 in 2011-2012 and 56,000 in 2012-2013.[4] Based on a recent study of nosocomial respiratory viral infections in a Rhode Island teaching hospital, the authors estimated that there are approximately 15,834 adult and 3,121 pediatric nosocomial respiratory viral infections nationally each year.[5]

Studies have demonstrated improved outcomes and cost benefits of rapid viral testing.[6-8] For example, reduced duration of antibiotic therapy and length of stay have been documented after implementing rapid detection of respiratory viruses.[7] Such testing has been associated with decreased mortality and improved antibiotic stewardship.[6] Despite these findings, to our knowledge, only one study assessed availability of rapid respiratory viral testing in acute care hospitals.[8] As such, the present study's objective was to survey hospital laboratories in Rhode Island to describe the availability of respiratory viral testing, timeliness of results, and the proportion of tests that had positive results.

METHODS

The Rhode Island Department of Health, the Rhode Island State Laboratory, Healthcentric Advisors (the Centers for Medicare & Medicaid Services' Medicare Quality Innovation Network-Quality Improvement Organization for New England), and one of the authors (LM) developed a brief survey sent to laboratory directors of 13 hospital-affiliated laboratories (all 11 non-federal acute care hospitals in Rhode Island, the Providence VA Medical Center and Eleanor Slater Hospital [state-run facility]) to assess respiratory viral testing during the calendar year 2016. The electronic survey was emailed to lab directors by one of the authors (CV), Director of the Rhode Island State Laboratory.

RESULTS

RVP, RSV, and rapid influenza testing was offered in 9 of 13, 13 of 13, and 13 of 13 hospitals, respectively (**Table 1**). Results were available within 24 hours of specimen collection in 1 of 9 hospitals for RVP testing; RSV and rapid influenza test results were available within 12 hours in 8 of 13 and 13 of

Table 1. Rapid respiratory virus testing in Rhode Island acute care hospitals

Respiratory Virus Test; Turnaround Time*	Off-site Processing N	On-site Processing N
RVP	(N = 7)	(N = 2)
<24 hours	0	1
>24 hours	7	1
RSV	(N = 5)	(N = 7)
<12 hours	1	7
>12 hours	2	0
Greater than 24	2	0
Rapid Influenza	(N = 0)	(N = 13)
<12 hours	–	13
>12 hours	–	0

* Time from specimen collection to availability of results

13 hospitals, respectively. Test processing was off-site in 8 of the 9 hospitals with RVP test result availability beyond 24 hours. Test processing was off-site in all 5 hospitals with RSV test result availability beyond 12 hours.

Among the 13 hospitals, 6803, 521, and 15224 RVP, RSV and rapid influenza tests were ordered in 2016. In the one hospital able to provide the number of positive RVP test results, 52 of 206 (25%) were positive. In the one hospital able to provide the number of positive RSV test results, 12 of 35 (34%) were positive. Of the 8 hospitals able to provide rapid influenza test results, 1095 of 6110 (18%) were positive.

DISCUSSION

Clinicians in 9 of 13 Rhode Island acute care hospitals have access to RVP testing, but the availability of test results were delayed beyond 24 hours in all but 1 hospital. Clinicians at all 13 hospitals have access to RSV and rapid influenza testing. The time from specimen procurement to availability of results depends on a large part as to whether or not specimen processing is done by an individual hospital's laboratory (i.e., on-site) or carried out at an affiliate hospital laboratory (i.e., off-site). This was particularly problematic regarding RVP testing. Not unexpectedly, 68% of the all respiratory viral testing done in our acute care hospitals involved a rapid influenza test.

The fact that most clinicians in our state treating patients that present with symptoms of a respiratory viral tract infection do not have access to rapid turnaround testing for respiratory viruses other than influenza and RSV, raises concerns regarding antibiotic stewardship and placing hospitalized patients with suspected respiratory viral infections in the same hospital room. It is possible that availability of test results for multiple respiratory viruses with a short turnaround time would assist in decision-making by the patient's medical team regarding whether or not antimicrobial therapy should be initiated, or discontinued if such medications have already been implemented unless there is a suggestion of a bacterial superinfection. Though still clinically useful, if such test results are not available in a timely manner, there may be a greater risk of transmission to other patients or staff if isolation precautions are not implemented pending such results. Expeditious diagnosis of a patient's respiratory viral infection may alleviate some angst among patients concerned about a bacterial infection. Moreover, such testing enables clinicians to confirm a viral infection, and in doing so, justify withholding antimicrobial therapy.

Due to the nature of survey instrument, responses were self-reported with potential for reporting bias. Although our survey involved all acute care hospitals in Rhode Island, the small number of hospitals may limit generalizability to other states.

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Disclaimer

The views expressed herein are those of the authors and do not necessarily reflect the views of the Brown University School of Public Health, Warren Alpert Medical School, Rhode Island Hospital, or Healthcentric Advisors.

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