

Benefits of Rapid Influenza and Respiratory Syncytial Virus (RSV) Testing in Pediatric Clinic Patients



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Objective

- To evaluate the effect of providing rapid influenza and RSV test results to physicians caring for infants and children in the clinic setting.
- We hypothesize that when physicians receive rapid test results, they will more appropriately prescribe antiviral agents and antibiotics than when the test results are not made available to them.

Background and Significance

Winter viral respiratory illness is responsible for a tremendous increase in outpatient clinic visits, especially in the pediatric population. Two of the most common viral pathogens causing these annual winter epidemics are influenza and RSV. The majority of influenza-like illness (ILI) in patients of all ages is due to infection with these viruses. Symptoms are most frequently related to respiratory tract involvement and may include coryza, congestion, cough, sore throat and respiratory distress. In addition, many of these patients present with moderate to high fever, which often heightens parental concern. Although the majority of pediatric febrile illness during winter is due to viral infection, the risk of serious bacterial infection (SBI) is not insignificant and may result in increased ancillary testing and antibiotic prescribing. Symptoms due to viral and bacterial infections often overlap and make definitive diagnosis difficult, especially in a clinic setting with limited diagnostic resources.

Multiple studies have found that 50-70% of children and adults with viral illness are treated with antibiotics. Antibiotic resistance is a significant societal threat and is primarily due to indiscriminant antibiotic use. Specific antiviral therapy for children and adults with documented influenza has proven to be safe and effective, especially when initiated within the first 48 hours of symptom onset. In spite this data, many physicians rarely prescribe antiviral agents or avoid their use due to the following: 1) patients often present with symptoms >48 hours, 2) antivirals increase expense, and 3) influenza is usually self-limited.

CLIA-waived rapid diagnostic tests for influenza and RSV are being used more frequently in the outpatient setting. Several studies involving rapid influenza testing of children in the Emergency Department (ED) setting have demonstrated that physician knowledge of a positive influenza test results in decreased antibiotic use, increased antiviral use and a decrease in ancillary testing. To date, there are no pediatric clinic studies that evaluate the impact of providing physicians with rapid RSV results in addition to rapid influenza test results for infants and children with ILI.

Funding and Support

Quidel provided funding plus QuickVue® Influenza A+B and RSV tests

Methods

- This study examines all pediatric patients (<18 years of age) that were enrolled as part of a larger prospective study evaluating POC testing for influenza and RSV in patients of all ages presenting with acute respiratory symptoms to an academic medical center in Central Texas during the winter of 2005-06
- The study was approved by the Scott & White Hospital IRB
- Informed consent was obtained from each subject/guardian prior to enrollment
- Subjects were enrolled during acute care visits to one of three different outpatient primary care clinics
- Subjects were assigned by alternate day assignment into two groups:
 - MD Aware: the physician received the rapid test results during the visit
 - MD Unaware: the physician did not receive the rapid test results
- A respiratory specimen was collected from each subject by either: 1) nasal swab, 2) nasopharyngeal aspirate, or 3) nasopharyngeal swab
- Swab specimens were suspended in 1.0 ml of sterile saline (transport medium). NP aspirates were collected using 1-2 ml of saline.
- All 1071 samples were tested with the QuickVue® Influenza A+B test and RSV testing was performed simultaneously on 876 of the samples. All samples were tested within 15 minutes of collection using the manufacturer's instructions for testing NP aspirate samples.
- 0.3 ml of specimen in saline transport was placed in Universal Transport Media (Copan, Corona, CA) and stored at 2-8°C for <8 hours before culture was performed using R-Mix shell vials (Diagnostic Hybrids, Athens, OH).

Results

- Enrolled 1071 patients ≤17 yrs of age from December 2005 - March 2006.
- There was no difference in gender or age within each of the two groups. By design, patients in the RSV and influenza test group were younger and had more NP aspirates than the influenza only test group in order to optimize sample collection. RSV tests were not routinely used in the older patients.
- Fever and MD receipt of results were statistically significant due to the change in study design to an effectiveness model for ethical considerations.
- Please refer to Tables 1. and 2. for outcomes of testing and prescribing.

Conclusions

- Physician decision-making was significantly improved regarding appropriate antiviral use in patients tested for influenza alone. While antibiotic use was not significantly decreased, this may have been due to antibiotic prescribing for otitis media. The influenza only test group was slightly older and consisted of a larger number of preschool aged children.
- When physicians were given a positive test result for either influenza or RSV, they significantly reduced inappropriate antibiotic prescribing, while more appropriately prescribing antivirals for those testing positive for influenza.

Table 1. Simultaneous Rapid Influenza & RSV Testing: Effect on MD Decision-Making

Prescriptions Given	MD Received Rapid Influenza & RSV Results	MD Did Not Receive Rapid Influenza & RSV Results	p-value
All Subjects¹ N=876			
Antivirals	67/492 (13.6)	10/384 (2.6)	<0.0001
Antibiotics	151/492 (30.7)	153/384 (39.8)	0.005
Rapid Flu Positive / RSV Neg N=158			
Antivirals	62/117 (52.9)	5/41 (12.2)	<0.0001
Antibiotics	23/117 (19.7)	17/41 (41.5)	0.006
Rapid RSV Positive / Flu Neg N=206			
Antivirals	2/118 (1.7)	0/88 (0.0)	0.33
Antibiotics	30/118 (25.4)	44/88 (50.0)	0.0003
Rapid Influenza / RSV Neg N=498			
Antivirals	2/246 (0.8)	5/252 (2.0)	0.17
Antibiotics	94/246 (38.2)	91/252 (36.1)	0.63

QuickVue® Influenza A&B Test: Sensitivity=91.1% Specificity=91.2% versus culture

QuickVue® RSV Test: Sensitivity=97.2% Specificity=93.7% versus culture

¹Includes 14 subjects who were rapid flu and RSV positive: antivirals and antibiotics were not statistically significant

Table 2 Rapid Influenza Testing Only / No RSV Test: Effect on MD Decision-Making

Prescriptions Given	MD Received Rapid Influenza Result	MD Did Not Receive Rapid Influenza Result	p-value
All Subjects N=195			
Antivirals	31/129 (24.0)	4/66 (6.1)	0.002
Antibiotics	31/129 (24.0)	15/66 (22.7)	0.839
Rapid Flu Positive N=60			
Antivirals	25/46 (54.4)	2/14 (14.3)	0.008
Antibiotics	6/46 (13.0)	1/14 (7.1)	0.34

QuickVue Influenza A&B Test: Sensitivity=86.0% Specificity=92.0% versus culture