Systematic Review Snapshot

TAKE-HOME MESSAGE

The results of rapid influenza diagnostic tests can be used to rule in but not rule out influenza.

METHODS

DATA SOURCES

After reviewing studies from the PubMed, BIOSIS, EMBASE, and Web of Science databases, the authors searched their bibliographies, other narrative reviews, and recent guidelines for additional data. Tests manufacturers were contacted for any unpublished data.

STUDY SELECTION

Studies were considered for inclusion only if they investigated the accuracy of a rapid influenza diagnostic test using either viral culture or reverse transcriptase polymerase chain reaction as criterion standards.

DATA EXTRACTION AND SYNTHESIS

One reviewer extracted data from all of the studies, using a standardized form. A second reviewer extracted data from a random subset of the studies for quality control. The quality of individual studies was assessed with the Quality Assessment for Diagnostic Accuracy Studies criteria. The systematic reviewers attempted to contact authors of the original studies when clarification of the data was needed to construct 2×2 tables. Bivariate

How Accurate Are Rapid Influenza Diagnostic Tests?

EBEM Commentators
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Results

Pooled test characteristics for all rapid influenza diagnostic tests.

Test	No. of Studies/No. of Tests Performed	Sensitivity, % (95% CI)	Specificity, % (95% CI)	Positive Likelihood Ratio	Negative Likelihood Ratio
Rapid influenza diagnostic tests	159/83,664	62.3 (57.9–66.6)	98.2 (97.5–98.7)	34.5	0.38

The authors reviewed the full text of 286 studies. Of these, 119 articles (which evaluated a total of 159 rapid influenza diagnostic tests) were included in the final review. The remaining 167 were excluded for one or more of the following reasons: case-control study design, use of an inappropriate or composite criterion standard, partial verification bias (applying the criterion standard only to samples testing negative on rapid influenza diagnostic tests), performance of the test on patients who did not have an influenza-like illness, or lack of original data. Sensitivity ranged from 4.4% to 100% and specificity from 50.5% to 100%. This significant heterogeneity was expected by the authors because of factors such as variety in population age, virus type, confirmatory study, brand of test, and methodological quality. Subgroup analysis indicated that sensitivity is higher in children compared with adults (66.6% versus 53.9%) but specificity was similar. The sensitivity for influenza A was better than for influenza B (64.6% versus 52.2%). Specimen type (nasopharyngeal wash, nasopharyngeal swab, throat swab, etc) did not affect the accuracy of the test.

Commentary

Patients with influenza-like illness commonly present to emergency departments (EDs) during the winter, significantly increasing ED crowding during those times.[1] Seasonal influenza also carries a substantial burden of morbidity and mortality, killing 24,000 people per year and hospitalizing 370,000; those chronically ill or

random-effects regression models were used to estimate pooled sensitivity and specificity, which allowed the addition of covariates thought to potentially explain heterogeneity; subgroup analyses (eg, adult versus pediatric) and the covariates entered into the models were specified a priori.

at the extremes of age are at particular risk.[2,3] The ability to rapidly diagnose influenza may help decrease further diagnostic testing and inappropriate antibiotic use, as well as increase timely antiviral administration to appropriate patients.

This high-quality diagnostic meta-analysis used state-of-the-art methods to examine the accuracy of commercially available rapid influenza diagnostic tests. Sensitivity, pooled across the different tests examined, was moderate but specificity was high. According to the likelihood ratio estimates, the use of rapid influenza diagnostic tests in the ED will be highly dependent on the pretest probability of the patient population being tested. If confirmation is needed for a patient with a high clinical suspicion for acute influenza and a negative rapid test result, a specimen should be sent for reverse transcriptase polymerase chain reaction or viral culture. Head-to-head comparisons of the different brands of tests were not performed, but no test was noted to outperform any other.

Editor's Note: This is a clinical synopsis, a regular feature of the *Annals'* Systematic Review Snapshot (SRS) series. The source for this systematic review snapshot is: Chartrand C, Leeflang MMG, Minion J, et al. Accuracy of rapid influenza diagnostic tests: a meta-analysis. *Ann Intern Med.* 2012;156:500-511.

1. Schull MJ, Mamdani MM, Fang J. Community influenza outbreaks and emergency department ambulance diversion. *Ann Emerg Med.* 2004;44:61-67.
2. Centers for Disease Control and Prevention. Antiviral agents for the treatment and chemoprophylaxis of influenza. *MMWR Morb Mortal Wkly Rep.* 2011;60:1-25.
3. Schull MJ, Mamdani MM, Fang J. Influenza and emergency department utilization by elders. *Acad Emerg Med.* 2005;12:338-344.

Michael Brown, MD, MSc, Alan Jones, MD, and David Newman, MD, serve as editors of the SRS series.