Performance Test Characteristics of the Febrile Respiratory Illness and Influenza-like Illness Infection Screening Tools during Pandemic H1N1 Influenza Season

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Background: During the Severe Acute Respiratory Syndrome (SARS) outbreak and H1N1 influenza pandemic, hospital personnel were required to use clinical questionnaires to assess and isolate potential cases of transmissible infection in the emergency department. These questionnaires, known as the Febrile Respiratory Illness (FRI) and Influenza-like Illness (ILI) screening tools, were mandated for use in Ontario's hospitals. However, there is no published data on the accuracy of the FRI and ILI screening tools. Overlooking cases of contagious disease may lead to hospital outbreaks with fatal consequences, while inappropriate isolation of patients results in a disruption of patient flow in the emergency room, adverse clinical events and a strain on hospital resources.

Objective: The objective of this study is to determine the performance test characteristics of the FRI and ILI screening tools during the pandemic H1N1 influenza season, including sensitivity, specificity, negative predictive value (NPV), and positive predictive value (PPV).

Study Design: This is a retrospective cohort study, conducted at two campuses of The Ottawa Hospital (TOH). Four hundred and one consecutive patients presenting to the emergency room between October 2nd and December 29th, 2009 were included in the study. Patients in the cohort were over the age of 18, had a screening tool completed at presentation and were discharged with a diagnosis that was cardiac, respiratory or infectious in nature. This cohort of patients was identified through TOH Data Warehouse. All patients underwent electronic chart review to determine their screening tool status, final diagnosis, and additional baseline characteristics. The primary outcome of the study was a microbiological diagnosis of influenza. The secondary outcome was a clinical diagnosis of influenza, identified by the most responsible diagnosis on the hospital discharge summary.

Results: There was a 50% nasopharyngeal swab rate for patients presenting to the emergency room during the second phase of the H1N1 influenza pandemic. Using a microbiologic diagnosis of influenza as the outcome (n=201), the FRI screening tool has a sensitivity of 75% (CI 61 - 85), specificity of 32.7% (CI 26 - 41), NPV of 80.6%, and PPV of 25.9%. The ILI has a sensitivity of 39% (CI 26.4 - 53.5), specificity of 71.4% (CI 63.5-78.3), NPV of 78.1%, and PPV of 31%.
Using the clinical diagnosis of influenza as the outcome (n=401), the FRI screening tool has a sensitivity of 72.7% (CI 59 - 83), specificity of 61.6% (CI 56 - 67), NPV of 93.4%, and PPV of 23.1%. The ILI has a sensitivity of 73.1% (CI 59 - 83), specificity of 72.6% (CI 67 - 77), NPV of 94.4%, and PPV of 29.9%.

Conclusions: The FRI and ILI screening tools demonstrate poor sensitivity and specificity at our institution. Neither screening tool is accurate in triaging patients to appropriate isolation. These data suggest that 25% of active influenza cases are screened negative at presentation and therefore would not be triaged to isolation. This represents a potential source for serious infectious outbreaks. The results of this study will provide the foundation for further work in development of clinical decision aids and algorithms to safely triage patients with infectious respiratory illness in Ontario's health care institutions.