

## Surveillance of laboratory-confirmed influenza hospitalizations using a health information exchange

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### Objective

To evaluate the sensitivity, positive predictive value (PPV), timeliness, completeness and representativeness of laboratory-confirmed influenza hospitalization data from a health information exchange with respect to traditional notifiable condition (NC) reporting.

### Introduction

During the 2009 H1N1 influenza pandemic, the Washington State Department of Health (DOH) temporarily made laboratory-confirmed influenza hospitalizations reportable. Reporting of influenza hospitalizations is resource intensive for hospitals and local health jurisdictions. As a result, electronic sources of influenza hospitalization data are being explored. A Regional Health Information Exchange (HIE) in Washington currently sends DOH ICD9 coded discharge diagnoses and microbiology laboratory orders and results for all patients admitted to 17 hospitals throughout Washington, including 4 of the 5 hospitals in Spokane County. The HIE hospitalization and laboratory data may be a valuable replacement for mandatory notifiable condition reporting to monitor the basic epidemiology and severity of influenza in Washington.

### Methods

For the 2010–2011 influenza season, Spokane Regional Health District required hospitals to report any admissions with laboratory-confirmed influenza using traditional NC surveillance methods. Simultaneously, HIE records from four Spokane facilities were monitored for flu diagnoses (i.e., records with ICD9 487–488 listed in the working or final diagnoses) and positive flu laboratory test results (including rapid antigen, DFA, culture or PCR). Records from the NC system and the HIE were matched using facility name, age, gender, county and admission date. The medical records of cases detected by the HIE but not reported through the NC system were evaluated to determine true case status. Sensitivity and PPV were calculated for each surveillance system. Timeliness, completeness and representativeness of records received through the HIE were evaluated against NC reporting.

### Results

One hundred forty-six true laboratory-confirmed influenza cases were identified (Fig. 1). By including records with a flu diagnosis or a positive flu lab result (excluding records with a negative flu lab), the sensitivity of the HIE was 90% and the PPV was 94%. In comparison, the sensitivity of NC reporting was 91%. HIE cases were detected a median of 5 days after admission versus 2 days through the NC system. Data for influenza hospitalizations from the HIE did not differ signifi-

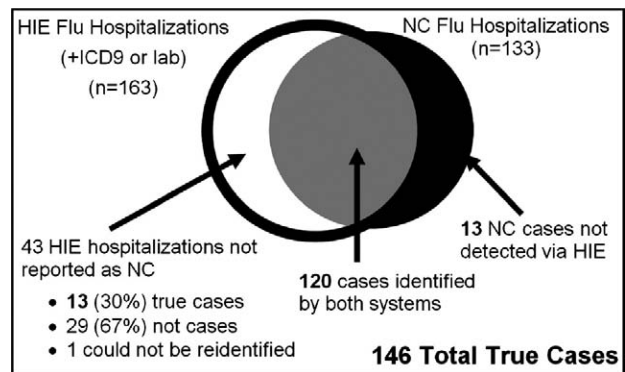


Fig. 1. Case identification

cantly from data collected through the NC system with regard to sex, age, pregnancy status and mortality. The time series of influenza-related hospital admissions from the HIE and NC system were highly correlated ( $r = 0.99$ ).

### Conclusions

HIE data are a useful resource for influenza hospitalization surveillance. They are sensitive, specific and representative of the true population of laboratory-confirmed influenza patients admitted to the hospital. It also provided data that were adequately timely and complete. Microbiology laboratory data improved the sensitivity and PPV of the Public Health Surveillance HIE feed to levels near that of NC reporting when used in combination with discharge diagnoses. Thus, for influenza, this enhanced syndromic data feed is comparable to traditional clinical surveillance.

### Keywords

Health information exchange; influenza; surveillance

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