

ABSTRACT

Influenza surveillance using inpatient health information exchange data

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Objective

To evaluate the timeliness, completeness, and representativeness of influenza hospitalization data from an inpatient health information exchange.

Introduction

During the 2009 H1N1 influenza pandemic, the Washington State Department of Health (DOH) temporarily made lab-confirmed influenza hospitalizations and deaths reportable. As reporting influenza hospitalizations is resource intensive for hospitals, electronic sources of inpatient influenza surveillance data are being explored. A large Health Information Exchange (WA-HIE) currently sends DOH the following data elements on patients admitted to 14 hospitals throughout eastern Washington: hospital, admission date, age, gender, patient zip code, chief complaint, final diagnoses, discharge disposition, and unique identifiers. WA-HIE inpatient data may be valuable for monitoring influenza activity, influenza morbidity, and the basic epidemiology of hospitalized influenza cases in Washington.

Methods

Timeliness and completeness of records received through the WA-HIE were evaluated. Basic characteristics and time trends of WA-HIE influenza hospitalizations (that is, records with ICD9 487–488 listed in the final diagnoses) between April 27, 2009–May 15, 2010 were compared with lab-confirmed influenza hospitalizations of eastern Washington residents reported through the WA notifiable condition reporting system (PHIMS). Overlap between the WA-HIE and PHIMS influenza cases was assessed by conducting a record-level comparison with a subset of WA-HIE and PHIMS influenza cases.

Results

For 90% of admissions into WA-HIE hospitals, the first record is transmitted 1 day after admission (range 0–26 days). One or more data elements were missing from 34% of records 28 days after admission. Of these incomplete records, 96% were missing the final diagnoses.

Data for influenza hospitalizations from the WA-HIE do not differ significantly from data collected through PHIMS with regard to sex, age, and mortality (Table 1). The time series of influenza-related hospital admissions from the WA-HIE and PHIMS are highly correlated ($r = 0.97$, Figure 1).

Table 1 Characteristics of influenza cases detected through WA-HIE and reported through PHIMS

Case characteristic	WA-HIE (N = 375) N (%)	PHIMS (N = 489) N (%)	P ^a
Sex			
Male	154 (41.1)	199 (40.7)	0.91
Female	221 (58.9)	290 (59.3)	0.91
Age group (years)			
0–4	78 (20.8)	116 (23.7)	0.32
5–24	83 (22.1)	114 (23.3)	0.69
25–49	94 (25.1)	127 (26.0)	0.76
50–64	77 (20.5)	85 (17.4)	0.24
65+	43 (11.5)	47 (9.6)	0.38
Deaths	12 (3.2)	22 (4.5)	0.33

^aP-value calculated using the χ^2 -test.

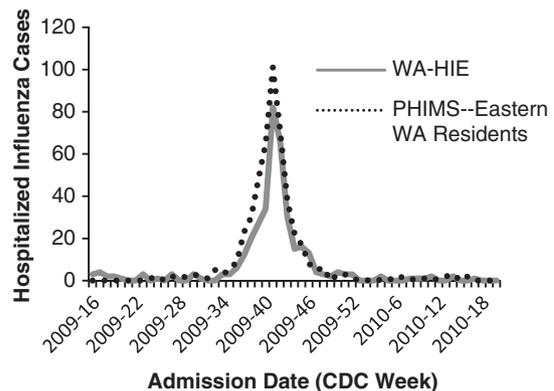


Figure 1 Time series of influenza cases detected through WA-HIE and reported through PHIMS.

Of 305 WA-HIE influenza hospitalizations during October–December 2009, 136 (44.6%) matched to a case reported in PHIMS.

Conclusions

WA-HIE data is an automated, relatively timely source of hospitalization information. Despite a lack of complete overlap between records reported through PHIMS and the WA-HIE, the WA-HIE data are representative of hospitalized influenza cases reported through PHIMS with respect to basic case characteristics and time trends.

Future directions

A prospective evaluation of hospitalized influenza cases is planned. In addition, the WA-HIE data elements are being expanded to allow for more in-depth data evaluation, detection of lab-confirmed influenza cases, assessment of illness severity, and evaluation of risk factors.

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