

ABSTRACT

Influenza mortality surveillance using a statewide electronic death registration system — Nebraska, 2009–2010

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Objective

This report describes use and evaluation of a near real time, novel electronic influenza mortality surveillance system developed in Nebraska.

Introduction

Public health surveillance using death data is critical for tracking the impact of diseases such as influenza. However, utility of such systems is compromised by delayed reporting, particularly when it is paper based. In Nebraska, funeral directors are encouraged to initiate death certificates electronically by an electronic death registration system (EDRS). Although paper-based or mixed (electronic followed by paper) registration is still accepted statewide, EDRS usage has gradually increased over time. Fact of death (FOD) data that includes time and place of death, and a deceased person's identity are usually recorded by a funeral director. Cause of death data in the medical portion are provided by physicians or medical examiners at a later date. FOD data entered into EDRS are immediately available, whereas paper-based data must first be mailed to vital records whereupon staff enter it into EDRS. Although implemented in 2006, epidemiology surveillance staff did not have real-time access to EDRS data until early 2009, when a collaboration was formed between the Office of vital records and the Office of epidemiology within the Nebraska Department of Health and Human Services. Daily electronic access by surveillance staff to death certificate data was established enabling the conductance of public health death surveillance.

Methods

Timeliness of electronically-filed versus paper-based FOD data was evaluated from 19 July 2009 to 1 May 2010. Additionally, sensitivity and specificity of an influenza-specific death surveillance system using EDRS were com-

pared with active surveillance using laboratory and provider reports also conducted from 19 July to 1 May 2010. For active surveillance, an influenza-associated death was defined as a death, with laboratory confirmation or clinical impression of influenza upon chart review. For surveillance by EDRS, funeral directors were instructed during this time period to query decedent's next-of-kin whether the death 'was in any way associated with influenza.' Responses including yes, no, or unknown were entered into a new field, created specifically in the FOD section in EDRS for purposes of influenza death surveillance. Deaths reportedly associated with influenza were investigated to ascertain cases.

Results

Of 11,598 deaths, filed in Nebraska during 19 July 2009 to 1 May 2010, registration for a total of 7,354 (63.4%) were initiated electronically by EDRS, for which FOD notice and data were available at a median of 10 days sooner than paper-based data (Table 1). Among the deaths registered by EDRS, 31 (0.4%) were reportedly influenza associated. The remaining 7,323 (99.6%) were classified as 'no,' 'unknown,' or had missing data. Active surveillance identified 21 influenza-associated deaths that met the case definition. Of these, 16 (76.2%) were initiated electronically, and were included in the analysis; approximately half being reported by funeral directors as influenza associated

Table 1 Time interval in days from date of death to date when death registration was initiated

Initiation method	N	Mean (days)	Median (days)	Range (days)
Electronic	7354	2.0	1.0	0–113
Paper based	4244	13.8	11.0	1–221

Table 2 Influenza-associated death notification, with EDRS, compared with active surveillance

Surveillance by EDRS	Active surveillance		Total
	Case	Not a case	
Case	7	24	31
Not a case	9 ^a	7314	7323
	16	7338	7354

Abbreviation: EDRS, electronic death registration system. ^aFive 'no,' three 'unknown,' and one missing. Sensitivity = 43.8% (95% confidence interval, 19.4–68.1). Specificity = 99.7% (95% confidence interval, 99.5–99.8). Positive predictive value = 22.6% (95% confidence interval, 7.9–37.3). Negative predictive value = 99.9% (95% confidence interval, 99.8–100.0).

(sensitivity, 43.8%). Overall, few false positives as a proportion of all deaths (specificity, 99.7%) were reported (Table 2).

Conclusion

Nebraska’s EDRS substantially enhances timeliness of FOD data availability. Although sensitivity and positive predictive values were limited, disease-specific death notification by funeral directors by EDRS holds promise

as an early detection tool for emergent public health problems such as influenza-associated mortality. Additional training and refinement are needed to improve utility. Further study is needed to evaluate its utility during future influenza seasons when heightened public awareness attributable to 2009–2010 pandemic H1N1 has waned, and for mortality surveillance applied to other public health conditions.

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Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention. Likewise, the authors’ findings and conclusions do not necessarily represent the views of the Nebraska Department of Health and Human Services.