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ABSTRACT

Emergency department diagnosis code data for surveillance of vaccine adverse events: comparison with the national vaccine adverse event reporting system

E Lamb[1], H Vaughan-Batten[1], NJM Dailey[1,2], J-M Maillard[1], L Johns[1], AT Fleischauer[1,2], Z Moore[1], and M Davies[1]

[1]*Division of Public Health, North Carolina DHHS, Raleigh, NC, USA; and* [2]*Center for Disease Control and Prevention, Atlanta, GA, USA*
E-mail: emilie.lamb@dhhs.nc.gov

Objective
The objectives of this study were: (1) to compare trends in vaccine adverse events identified through emergency department (ED) diagnosis codes and reports from the Vaccine Adverse Event Reporting System (VAERS), and (2) to determine whether 2009 H1N1 vaccine adverse events identified through VAERS could also be identified using ED diagnosis codes.

Introduction
Nationally, vaccine safety is monitored through several systems including Vaccine Adverse Event Reporting System (VAERS), a passive reporting system designed to detect potential vaccine safety concerns.[1] Healthcare providers are encouraged to report adverse events after vaccination to VAERS, whether or not they believe that the vaccine caused the adverse event.[1] The 2009 Pandemic H1N1 influenza vaccine became available in the United States in October 2009. By January 2010, Center for Disease Control and Prevention (Atlanta, GA, USA) estimated that 61 million persons across the United States had received the vaccine.[2] As of January 2010, an estimated 28% of the North Carolina population greater than or equal to six months of age had been vaccinated against 2009 H1N1.[3]

Methods
Vaccine adverse events among North Carolina residents with symptom onset during 1 January 2008–31 December 2009 were identified using VAERS reports and emergency department (ED) diagnosis codes. The ED diagnosis codes for bacterial and other vaccines causing adverse effects in therapeutic use (ICD-9-CM codes E948–E949.9) were obtained from the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT) that collects data from 99% of EDs statewide.[4] We used Pearson's correlation coefficient to compare trends in the weekly number of VAERS vaccine adverse event reports with events identified using ED diagnosis codes. We identified adverse events from 2009 H1N1 vaccination during 1 October 2009–31 January 2010 using VAERS reports, and attempted to match reports that indicated that the patient had visited either an ED, or physician's office to ED visits with diagnosis codes possibly related to influenza vaccination (E949.6, E949.7, and E949.9). Events were matched by age, sex, date of birth, county of residence, and vaccine administration.

Results
We identified 1793 vaccine adverse event reports using VAERS and 782 events through ED diagnosis codes among North Carolina residents with symptom onset or visit date during 1 January 2008–31 December 2009. We detected a moderate temporal correlation between vaccine adverse events identified from ED diagnosis codes and VAERS reports ($r = 0.47413$) Figure 1. Of two hundred and seventy two 2009 H1N1 vaccine adverse event reports sent to VAERS regarding North Carolina residents with onset during 1 October 2009–31 January 2010, 100 indicated that the patient visited the ED or a physician's office. Of these, only 8% could be matched to cases identified by ED diagnosis codes.

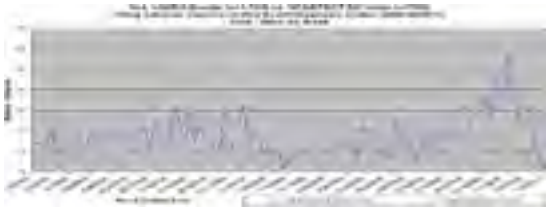

Figure 1 Weekly number of VAERS reports and NC DETECT–ED visits with symptom onset or visit dates during 1 January 2008–31 December 2009.

Conclusion

Temporal trends in ED visits for vaccine adverse events correlate moderately well with trends in VAERS reports. However, the small number of 2009 H1N1 vaccine adverse event, VAERS reports, identified by ED diagnosis codes indicate that different patient populations or types of events are captured by these systems. Further prospective study is required to determine if ED diagnosis code surveillance could prove useful for monitoring trends in vaccine adverse events.

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