Exploring the Role of Quest Diagnostics Corporate Data Warehouse for Timely Influenza Surveillance

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OBJECTIVE

To explore the potential of a large commercial data warehouse for influenza surveillance.

BACKGROUND

A Quest Diagnostics Incorporated – CDC collaboration in 2000 pioneered exploration of test ordering data to enhance infectious diseases surveillance[1]. This year's unexpected shortage of vaccine and reports of human illness caused by avian influenza A (H5N1) in Asia[2] heightened concern about influenza and focused attention on moving toward more complete, real time surveillance. We extended our previous collaboration to explore the use of the Quest Diagnostics Corporate Informatics Data Warehouse (QIDW) as a tool for surveillance of influenza.

METHODS

National influenza A and B antigen detection and viral culture results data (including date of service, test result, state, 5-digit zip code of both ordering physician and patient, patient age, and gender) were retrieved from the IDW for all dates of service starting 9/1/2003. A series of UNIX data conversion scripts and SAS programs were used to transform and aggregate the data by testing event (requisition) and week to produce the following results and distributions: volume of requisitions, geographic distribution, overall percentage positive and A v. B positivity. Data were transmitted electronically once a week during the 2004-05 influenza season and included most results reported by the previous day. Results were compared with CDC influenza surveillance data, including the percentage of respiratory specimens testing positive for influenza viruses (http://www.cdc.gov/flu/weekly/fluactivity.htm).

RESULTS

The Table and Figure summarize the results:

Influenza Season	**2003-04**	**2004-05**
# Requisitions for Influenza Testing	28,682	28,715
#Isolates / % Positive	5,923 / 20.7%	3,362 / 11.7%
#Isolates / % Positive for peak week	907 / 29.3% (12/27/2003)	463 / 16.8% (2/19/2005)

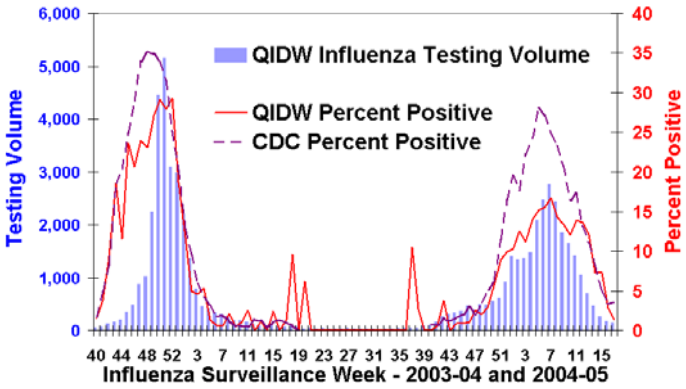

Figure: Influenza Antigen and Culture Testing and Percent Positive by Week, 9/28/2003-4/30/2005.

The QIDW and CDC virologic surveillance data both observed an earlier peak and higher overall % positive in 2003-04 than 2004-05.

CONCLUSIONS

This project demonstrates how test orders and results data from a large national warehouse of commercial laboratory testing data can be made available in near real-time for public health surveillance. Although additional analyses of the temporal, geographic and demographic features of these data are needed to refine understanding of their potential role, the general agreement of the QIDW and CDC data suggests this approach may be a cost-effective and timely complement to current influenza surveillance. This approach of near-real time evaluation of test orders and test results data on a national basis also merits further evaluation for surveillance of other infectious diseases.

REFERENCES

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[2] Hien TT, de Jong M, Farra J. Avian influenza – A challenge to global health care structures. NEJM 2004; 351(23):2363-2365.

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3.5.1 The Role of Surveillance in Risk Management. 3.5.2 Risks for the Surveillance Strategy.Â Timely surveillance information is needed for many key policy decisions, including the use of interventions such as public health measures, vaccines and antiviral medications. Surveillance data are also used in mathematical models to predict pandemic activity, pandemic impact and the need for clinical services; to monitor health care utilization; and to assess the potential impact of interventions. Comprehensive influenza surveillance involves both laboratory and disease (epidemiological) components and is based on a strong partnership between the provinces and territories (PT) and the Public