Could Outpatient Visits Enhance Our Ability of Early Detecting Influenza-Like Illness Outbreaks?

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OBJECTIVE

This paper describes HHC outpatient data and evaluates the performance for early influenza-like illness (ILI) outbreak detection. We compare its detection ability to that of the emergency department (ED) data and of the two data sources simultaneously.

BACKGROUND

Outpatient visits have different demographic characteristics compared to ED visits [1]. The New York City (NYC) Community Health Survey (CHS) results suggest that New Yorkers prefer visiting physicians over ED for ILI. Along with adding a large number of visits with more clinician and patient information, outpatient data might be a useful data source in detecting ILI outbreaks. We evaluated the detection ability with individual outpatient data and ED data, as well as with the two data streams simultaneously.

METHODS

The NYC Health and Hospitals Corporation (HHC) center started sending outpatient and ED visits data to NYC department of health and mental hygiene (DOHMH) via Health Level Seven (HL7) transactions on October 1, 2004, which transfers approximately 3468 outpatient records on weekdays and 945 ED records daily. There are very few outpatient visits on weekends and holidays. We coded ILI syndrome category according to ICD-9 code for outpatient visits and chief complaint for ED visits. We compared the temporal trends of ILI/None ratio which were adjusted by day-of-week and by age groups. We detected the temporal clusters with a 14-day baseline period using temporal SaTScan. Multiple data streams method was used to analyze simultaneously with two data sources. The Activity Monitor Operating Characteristic (AMOC) analysis was employed to compare the timeliness, sensitivity and specificity of outbreak detection of three approaches with the weekly influenza virus isolates as the gold standard.

RESULTS

Only 47.1% of the outpatient records were received on the same day as patients were admitted and 22.7% of records had a data lag greater than 3 weeks. These two groups differ significantly by age, race and most frequent ICD-9. Flu vaccine-related visits appear most likely to have a data lag more than 3 weeks.

Figure 1 compares the 7-day moving average of ILI/None Ratio for each age group. The average ratio is higher for ED visits and the peak came earlier for outpatient than that for ED.

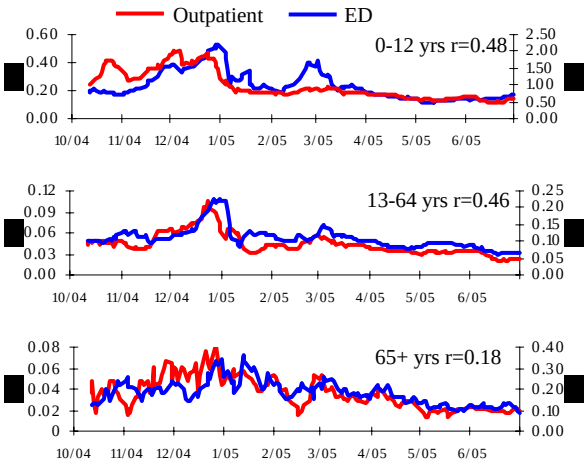

Figure 1 – 7-day moving average of ILI/None Ratio for October 2004 – June 2005 by each age group

The trends of day-of-week adjusted ILI/None ratio are similar for two data sources (Figure2). At the 95% confident level, outpatient data generated earlier first alarm and had more true alarms identified by the laboratory influenza isolates compared to ED data. AMOC results suggest that monitoring the two data sources simultaneously can generate earlier, more, and stronger alarms than monitoring individual data source.

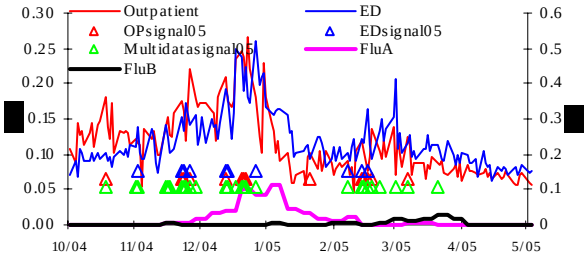

Figure 2 – ILI ratio adjusted by day-of week and the alarms at 95% confident level during 2004 flu season.

CONCLUSIONS

Monitoring both outpatient and ED data can enhance our detection ability for ILI outbreaks.

REFERENCES

[1] Metzger KB, Mostashari F, Kendall M. Comparison of Outpatient Visit and Emergency Department Data for Use in Syndromic Surveillance — New York City, 2001–2004. MMWR Supplement 2005 in press

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