

Google flu trends: correlation with emergency department influenza rates and crowding metrics

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Objective

Google flu trends (GFT) is a novel internet-based influenza surveillance system that uses search engine query data to estimate influenza activity. This study assesses the temporal correlation of city GFT data to both confirmed cases of influenza and standard crowding indices from one inner-city emergency department (ED).

Introduction

EDs supply critical infrastructure to provide medical care in the event of a disaster or disease outbreak, including seasonal and pandemic influenza (1). Already overcrowded and stretched to near-capacity, influenza activity augments patient volumes and increases ED crowding (2, 3); high ED patient volumes expected during a true influenza pandemic represents a significant threat to the nation's healthcare infrastructure (4). EDs ability to manage both seasonal and pandemic influenza surges is dependent on coupling early detection with graded rapid response. While practical use of traditional surveillance systems has been limited due to the several week lag associated with reporting, new internet-based surveillance tools, such as GFT, report surveillance data in near-real time, thus allowing rapid integration into healthcare response planning (5).

Methods

This study was performed over 21 months (January 2009–October 2010) at an urban academic hospital with physically and administratively separate adult and pediatric EDs. We collected weekly data from GFT for the city of Baltimore, ED CDC reported standardized influenza-like illness (ILI) data, laboratory-confirmed influenza data and ED crowding indices (including patient volume, number of elopements, waiting room time and length of stay for admitted and discharged patients). Pediatric and adult data were analyzed separately using cross-correlation with GFT.

Results

GFT correlated with both number of positive influenza tests as seen in Figure 1 (adult ED $r=0.876$, pediatric ED $r=0.718$) and number of ED patients presenting with ILI (adult ED $r=0.885$, pediatric ED $r=0.652$). Pediatric but not adult crowding measures such as total ED volume ($r=0.649$) and left without being seen ($r=0.641$) also had good correlation with GFT. Adult crowding measures for low acuity patients such as waiting room time ($r=0.421$) and length of stay in discharged patients ($r=0.548$) had moderate correlation with GFT.

Conclusions

City-level GFT shows strong correlation with local influenza cases and ED ILI visits, providing first time evidence of its

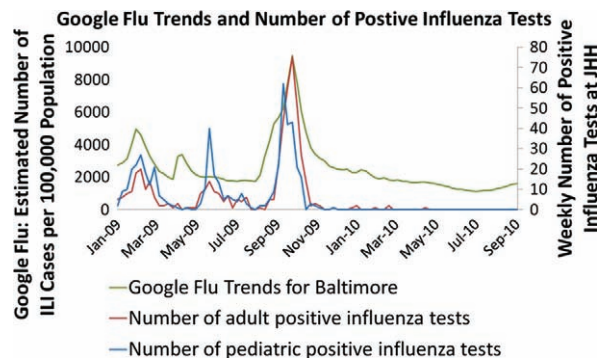


Fig. 1. Temporal comparison of GFTs and hospital wide positive influenza tests.

utility for local ED surveillance and, potentially, response planning. Importantly, GFT correlated with several pediatric ED crowding measures as well as those for low acuity adult patients.

Keywords

Influenza, Google flu trends, emergency department, crowding

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