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Using Big Healthcare Data for ILI Situational Awareness in Georgia

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Objective

This paper describes how high-volume electronic healthcare (HC) reimbursement claims (eHRCs) from providers' offices and retail pharmacies can be used to provide timely and accurate influenza-like illness (ILI) situational awareness at state and CBSA levels.

Introduction

The 2012 National Strategy for Biosurveillance (BSV) recognizes that a well-integrated national BSV enterprise must provide essential information for better decision making at all levels. Submitting an electronic bill following HC services is the most mature and widely used form of eHealth. HIPAA-compliant eHRCs captured in e-commerce can be consolidated into big HC data centers and used for many purposes including BSV. eHRCs are standardized and each claim contains pertinent person, place, and time information that can be leveraged for BSV. IMS Health (IMS) is a global HC information company and maintains one of world's largest eHealth data centers that processed information including eHRCs on >260M unique U.S. patients in 2012.

Methods

This study focused on the 2006-2010 influenza seasons (including the influenza A H1N1 pandemic year of 2009-10) and the 39 metro- and micropolitan statistical areas (known collectively as core based statistical areas (CBSAs)) in the State of GA. Data were aggregated by age group and provider specialty for each geographic area. Results are based on eHRCs obtained by IMS for 85+M patients visiting providers' offices and 213+M dispensed retail pharmacy prescriptions. We created an ILI case definition from ICD-9 codes and used NCD codes for anti-influenza drugs. Principal metrics were % ILI (# ILI cases/total visits) and % antivirals (# anti-influenza drugs/total prescriptions (RXs)). To examine timeliness of claims submission, for any given week of service we observed the cumulative % of claims arriving at the data center daily from the end of a service week through 28 days of claims accumulation. We compared % ILI and % antiviral metrics from partially accumulated claims at the end of 7-day service periods with comparable metrics after 28 days of claims accumulation. We observed % ILI and % antiviral trends at weekly and moving 7-day average periods at the state and CBSA levels.

Results

By the end of any 7-day service week, ~35-40% of all eHRCs generated by office-based providers for services administered that week and ~90% of eHRCs for RXs dispensed in retail pharmacies have reached the IMS data center. At the state level over the observation period, % ILI and % antiviral metrics calculated from the partial accumulation of eHRCs at service week end had a correlation of 0.997 and 0.999, respectively, compared with metrics generated after ~28 days of claims accumulation. The correlation between % ILI and % antivirals during the study period was 0.968. Primary care providers (PCPs) made 91.5% of all ILI diagnoses and prescribed 79.1% of all anti-influenza drugs. Regardless of CBSA size, a clear general population ILI pattern can be seen when there are a minimum of 2000-4000 weekly visits for all reasons to PCPs or 3000-5000 total RXs available for analysis at the end of any 7-day service period. We observed that the second wave of the 2009-2010 pandemic began in GA CBSAs at different times depending on the first day on which public schools opened in August/September 2009.

Conclusions

The electronic reimbursement process is standard practice throughout the U.S. HC system. A sufficient proportion of claims for services within any 7-day service period can be accumulated from both providers' offices and retail pharmacies to generate useful community ILI metrics even in small CBSAs, dispelling the common perception that claims data accumulate too slowly to be useful for public health decision making. Compared with ILINet in which data are accumulated over a Sunday-through-Saturday period and reported once a week, office-based and retail pharmacy eHRCs are submitted daily soon after the patient encounter and ILI metrics can be calculated daily from claims accumulating after any moving 7-day service period. eHRCs contain highly informative basic epidemiologic data also contained in EHRs. In contrast to EHR data, eHRC resources representing a large proportion of U.S. HC encounters are readily available now for use in the public health and BSV communities, especially in small public health jurisdictions where reliable data for decision making are often absent.

Keywords

big data; healthcare claims; ILI; situational awareness; local public health

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