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Leveraging Health Information Exchange to Create Neighborhood Health Records for Public Health Agencies

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Abstract

Assessment is a core function of public health. Traditional methods leverage surveys, vital records, and paper-based disease reporting. Increased adoption of electronic health records and health information exchange present an opportunity to enhance health assessment activities by enabling access to up-to-date data on disease burden and outcomes, with sufficient geographic density to allow small area analyses. Furthermore, when combined with community-level data relevant to social determinants, HIE has the capacity to create a neighborhood health profile that measures and tracks health risks and disparities at a community level. In this demonstration, we will present how we've leveraged routinely collected and geospatially-enhanced EHR data available from a regional health information exchange to create neighborhood health profiles for a county health department. The discussion will highlight neighborhood level indicators developed for the project, data visualizations, and issues of representativeness or bias in the data.

Introduction

Public health authorities monitor population health to identify burden of disease, manage health assets, establish policy, and evaluate interventions. This assessment usually relies on information available through surveys, vital records, and paper-based disease reporting. These sources capture sparse data at the community level. Electronic health record (EHR) systems may provide more timely and dense data for geographic areas of interest. Yet there exist a number of challenges to routine use of EHR data, including linking them to social determinant data, and adjusting them so they reflect the general population rather than those most likely to use health care services.

Description of the System Demonstration

In this demonstration, we will describe how we developed and implemented neighborhood health profiles for use by a local health department. We will show the profiles created and discuss how we calculated health indicators using EHR data. Furthermore, we will describe the tools (e.g., Web-based Analysis and Visualization Environment: Weave) used to enable custom visualizations of the health indicator data joined with population level data.

Neighborhood health profiles consist of community-level indicators using EHR data integrated with a community information system (CIS). These indicators represent geographic units smaller than a county, the traditional unit extrapolated from large population-based surveys and datasets. The neighborhood health profiles were created using a large health information exchange with over 5 billion clinical observations from heterogeneous EHR systems. Patient level data were geocoded and aggregated then integrated with data from the CIS, which possesses data on transportation, crime, education, poverty, and other social determinants of health. Neighborhood level indicators include the prevalence of diseases of public health interest (e.g., diabetes mellitus type 2, depression, chlamydia infection) and several HEDIS-like clinical quality indicators (e.g., number of eligible patients screened for chlamydia, number of diabetics receiving annual HbA1c testing). Indicators were calculated at various levels of geographic granularity (e.g., ZIP code, census tract, census block group, neighborhood, city-county council district).

Once generated, neighborhood health profiles were shared with the local health department for review and feedback, and were compared to results from a random population sample survey. Geospatial visualization as well as statistical models were developed in partnership with the health department to aid interpretation and application to public health practice as well as policy. Such uses for EHR and HIE infrastructure are novel and address gaps identified by recent Institute of Medicine as well as Robert Wood Johnson Foundation expert panels which published recommendations for strengthening public health surveillance and research.