THE NEW YORK CITY MACROSCOPE:
Developing an Electronic Health Record-Based Population Health Surveillance System

Electronic Health Records (EHRs) are increasingly being adopted to improve clinical care, but they also have great potential to monitor health at the population level.

To date, there has been relatively little focus on using EHRs for population health surveillance. Improved surveillance allows health officials to strategically target resources, and provides data to guide and evaluate public health initiatives and policies. Individuals ultimately benefit as a result of new funding for programs to improve health, changes to make the environment healthier, and public awareness campaigns about critical health issues.

EHRs OFFER RAPID ACCESS TO STANDARDIZED HEALTH DATA

EHRs are rapidly becoming the standard of care for office-based medical practices, as federal incentive programs encourage EHR adoption by health care professionals and institutions. As of 2012, 72% of office-based medical practices nationwide were using some kind of EHR system.

With their increasing reach, EHRs can provide rapid access to large volumes of real-time standardized health data, such as body mass index and blood pressure, as well as information on delivery of clinical preventive services and chronic disease management. EHRs that have been constructed with population health management in mind can complement and expand the capacity of existing data collection systems by capturing interactions between physicians and patients economically and with relative completeness. Local, regional, and national governments, large health care organizations, insurance companies, and academic research centers are in the early stages of learning how to use aggregated data from EHRs to monitor health, and inform health care policies and programs.

New York City is developing the **NYC Macroscope**, a system that uses primary care practice EHRs to track conditions that are important to public health, with a focus on chronic conditions. The NYC Macroscope will be validated by comparing outpatient EHR data with data obtained from the 2013 New York City Health and Nutrition Examination Survey (NYC HANES 2013), a gold-standard, population-based examination survey lead by the CUNY School of Public Health (SPH) in partnership with the NYC Health Department.

DATA AGGREGATED FROM MANY PATIENTS WILL INFORM THE NYC MACROSCOPE

The NYC Macroscope will rely on the NYC Health Department's Primary Care Information Project (PCIP), which in 2012 received data from more than 600 ambulatory practices and 2,500 providers, representing 1.5 million patients.

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PCIP retrieves data with flexible, modifiable queries using the Hub Population Health Network ("the Hub"), winner of the HIMSS-Davies award. The Hub allows PCIP to ask questions such as "Of women ages 30-40 who had a visit in the past year, how many had a body mass index $\geq$30?" Practices on the Hub return total aggregate counts to a secure, centralized site without transmitting any patient-identifiable data. This allows PCIP to monitor the health of New York City patients while protecting privacy and complying with HIPAA requirements.

The Hub will be the technology behind the NYC Macroscope, and more PCIP practices are being added each year.

THE NYC MACROSCOPE WILL EVOLVE IN 3 PHASES

As part of the first phase of this project, the New York City Health Department, with support from CUNY SPH, has developed a planning document, *Developing an Electronic Health Record-Based Population Health Surveillance System*, which describes the approach we are taking to operationalize the NYC Macroscope and the methods we will use to assess the validity of NYC Macroscope estimates. The report also discusses many important factors that other jurisdictions planning to undertake such work should consider.

In the second phase of this project, we will pilot data collection on select health indicators proposed for the NYC Macroscope and potentially available in EHR networks across the country. These include:

1. Chronic disease risk factors (e.g., high cholesterol, body mass index, blood sugar)

2. Chronic disease prevalence and management (e.g., prevalence, treatment and control of hypertension, high cholesterol and diabetes)

3. Behavioral health (e.g., tobacco use, depression prevalence)

4. Receipt of clinical preventive services (e.g., immunization)

In the third phase of the project, we will conduct analyses to validate NYC Macroscope prevalence estimates, and issue a companion report presenting findings and lessons learned.

The lessons learned in developing the NYC Macroscope will be useful to other agencies and researchers interested in using electronic health records to monitor population health. These lessons can also inform national efforts to interpret and use EHR data, to apply standards to EHR data, and to capitalize on the exchange of public health-oriented data incentivized by meaningful use.

> **"OF WOMEN AGES 30-40 WHO HAD A VISIT IN THE PAST YEAR, HOW MANY HAD A BODY MASS INDEX > 30?"** *SAMPLE HUB QUERY*

INNOVATIONS IN MONITORING POPULATION HEALTH

The NYC Macroscope is part of a larger project, Innovations in Monitoring Population Health, conducted by the New York City Department of Health and Mental Hygiene and the CUNY School of Public Health in partnership with the Fund for Public Health in New York and the Research Foundation of the City University of New York.

Support for the larger project is primarily provided by the de Beaumont Foundation with additional support from the Robert Wood Johnson Foundation, Robin Hood, and the New York State Health Foundation.

For more information about this project, please visit www.nyc.gov and search for nycmacroscope or email nycmacroscope@health.nyc.gov.

SOURCES:

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