Photo Credit: Chris Ford

The New York City Macroscope

Using Data from Electronic Health Records for Population Health Surveillance

Electronic health records (EHRs) have the potential to offer **rapid** and **cost-effective** access to large volumes of real-time health data, such as body mass index and blood pressure.

The New York City (NYC) Macroscope – developed in 2013 by a team of government and academic public health professionals – makes use of data from primary care EHRs throughout NYC to track the prevalence of chronic conditions and risk factors, such as hypertension, smoking, obesity and diabetes. The NYC Macroscope offers timely, reliable information about New Yorkers' health, which can be used to help make the city a healthier place to live, work and play.

How It Works

The NYC Macroscope is based on data from approximately 700,000 New Yorkers aged 20 and older who in the past year visited a primary care practice that transmitted aggregate data to the NYC Health Department's Primary Care Information Project (PCIP). PCIP helps ambulatory practices in NYC adopt and use EHRs to increase delivery of preventative care services, address chronic disease risk factors and improve disease management.

PCIP retrieves data using the Hub Population Health System ("the Hub"), which enables researchers to ask targeted questions such as, "How many women aged 20 to 39 had a primary care visit in the past year and a body mass index over 30?" Practices on the Hub return total aggregate counts to a secure, centralized site without transmitting any patient-identifiable information. The EHR-based counts are then compiled and statistically weighted to the demographic characteristics of adults in NYC who have seen a primary care provider in the last year. This allows researchers to use NYC Macroscope data to estimate the health of NYC residents.

Testing the NYC Macroscope

In 2013, the NYC Macroscope planning document, *Developing an Electronic Health Record-Based Population Health Surveillance System*, described a selection of health indicators with high public health importance: hypertension,

NYC Health

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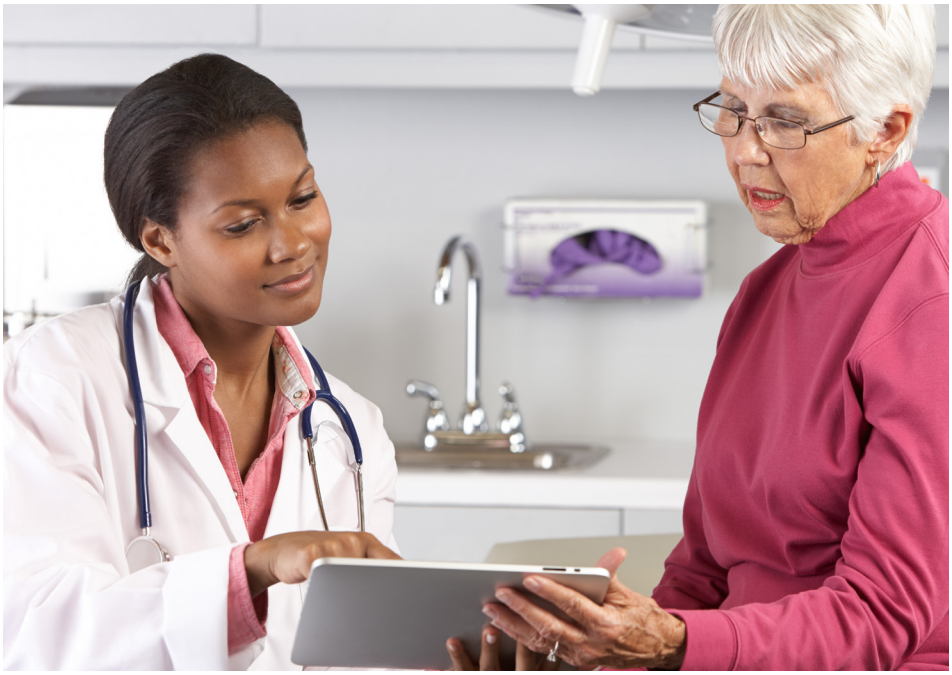

diabetes, cholesterol, obesity, smoking, depression and influenza vaccination. The NYC Macroscope team then obtained EHR-based estimates for these indicators and compared them to the 2013-14 New York City Health and Nutrition Examination Survey (NYC HANES 2013-14), a "gold-standard," population-based examination survey led by the City University of New York School of Public Health and the NYC Health Department.

The findings indicate that certain NYC Macroscope indicators – including the prevalence of obesity, smoking, hypertension and diabetes – are similar to NYC HANES estimates using a range of statistical tests. Indicators that performed less well included influenza vaccination and depression diagnosis. Possible explanations are that influenza vaccination often occurs in pharmacies and workplaces (instead of medical practices), and that depression screening is not routinely carried out by primary care providers.

The team further assessed the validity of the NYC Macroscope health indicators by reviewing the medical records from consenting NYC HANES participants who have a primary care doctor with an EHR system. The team then analyzed EHR-based medical charts maintained by nearly 200 primary care providers to assess the accuracy of EHR indicators across multiple EHR platforms. Findings from these analyses are forthcoming.

Next Steps

The NYC Health Department plans to use well-performing indicators for future surveillance in the city. Additionally, NYC Macroscope data will be publicly available so that this valuable surveillance tool can be used by researchers and public health practitioners across the U.S.

The NYC Macroscope team has also partnered with AcademyHealth to create a Community of Practice, bringing together members of the public health community to share knowledge and expertise in this emerging field of EHR-based population health surveillance.

The NYC Macroscope team plans to share results via peer reviewed articles, conferences and social media. The lessons learned in developing the system may be useful to other agencies and researchers interested in using EHRs to monitor population health.

The NYC Macroscope is part of a larger project, Innovations in Monitoring Population Health, conducted by the NYC 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.

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