

ABSTRACT

Automated surveillance and public health reporting for gestational diabetes incidence and care using electronic health record data

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Objective

To develop an electronic, prospective surveillance system to describe the incidence, care, and complications of gestational diabetes using live electronic health record data from a large defined population.

Introduction

Public health departments have a strong interest in monitoring the incidence, care, and complications of gestational diabetes, as it is associated with poor outcomes for infants and increased risk of diabetes type II for mothers. Gestational diabetes rates are also a possible early marker for changes in the incidence of diabetes type II in the general population. However, diabetes is not generally a reportable condition and therefore, public health surveillance is limited to periodic telephone surveys (subject to self-report inaccuracies), sponsored clinical examinations (expensive, small sample size, no information about processes of care), and occasional research studies. Automated analysis of electronic health record data is a promising method to complement existing surveillance tools with longitudinal, continually updated, clinically rich data derived from large populations. We describe a pilot project to automatically survey electronic health record data in order to identify cases of gestational diabetes, describe their patterns of care and complications, and report summary data to the state health department.

Methods

The Electronic medical record Support for Public Health (ESP) system is a generalizable public health surveillance platform that can continually extract structured data from any electronic health record system, analyze the data for conditions of public health interest, and then transmit individual case reports or summary data to designated public

health agencies. ESP was originally designed for notifiable disease detection and reporting, but modules have since been added for syndromic surveillance and vaccine adverse event detection. We created a new ESP module to detect gestational diabetes. The ESP diabetes module was developed within the ESP installation at Atrius Health, a multisite ambulatory practice based in Eastern Massachusetts with over 700,000 patients. Data spanning from June 2006 to March 2010 were queried. A case of gestational diabetes was defined as a pregnant patient with a positive oral glucose-tolerance test per American Diabetes Association standards. We also assessed the added value of ICD9 codes and suggestive prescriptions to augment case detection. The sensitivity and positive predictive value of each case detection method was assessed by full text chart review of a sample of patients. When patients met case criteria for gestational diabetes, ESP summarizes patients' age, race/ethnicity, postal code, referral for medical nutrition therapy, prescriptions for insulin, and postpartum testing for frank diabetes. Results are summarized and stratified by race, age or zip code. Summary data will be presented visually to the state health department via secured website.

Results

Screening for positive oral glucose-tolerance tests in pregnant women detected 706 cases of gestational diabetes between June 2006 and March 2010. Over 2300 patients had ICD9 codes for gestational diabetes during this same period, but on chart review the positive predictive value for this ICD9 code was only 38%. An ICD9 code for gestational diabetes and concurrent prescription for insulin test strips or lancets, however, had a positive predictive value of 91%. Adding this criterion to oral glucose-tolerance test criteria increased case yield by 38%. Analysis of care showed that 70% of patients were referred to

medical nutrition therapy, 28% were prescribed insulin, but only 25% received recommended postpartum testing for frank diabetes. Of these, 5% were found to have frank diabetes.

Conclusions

Electronic health record data can provide a comprehensive picture of the epidemiology of a chronic disease including incidence, care, and complications. This has the potential to

provide more accurate, timely, complete, and detailed information to public health practitioners compared with existing surveillance methods.

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