

The Regenrief Notifiable Condition Detector – Automated Public Health Reporting using Routine Electronic Laboratory Data

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Abstract

Meaningful use criteria are driving the adoption and use of routine electronic laboratory reporting (ELR) to electronic health record (EHR) systems as well as public health agencies. While certified EHR systems and components enable provider organizations to manually route ELR cases reportable under state laws, none have the capacity to automatically detect and route positive cases of notifiable disease. In this demonstration, a novel operational system developed at Regenrief to detect positive cases of notifiable disease using routine ELR message content will be presented. System developers and researchers will highlight how others can use the open source system to improve public health reporting within their own organizations.

Introduction

In its final rule for the second stage of the meaningful use (MU) incentive program, the Centers for Medicaid and Medicare Services (CMS) required eligible hospitals to electronically transmit reportable laboratory results to a public health agency. While certified electronic health record (EHR) systems and components have enabled health professionals to manually press a button to electronically forward lab information to public health, none have the capability to automatically detect notifiable disease cases and route them. In fact, few health information exchange (HIE) organizations have this capability. Such functionality could, if widely implemented, significantly improve reporting while minimizing burden on front line clinical staff responsible for identifying and routing disease case information to public health agencies.

System Overview

Investigators at the Regenrief Institute have spent over a decade building and optimizing an operational system to detect cases of notifiable disease using routinely collected laboratory data. The Notifiable Condition Detector (NCD) identifies reportable conditions and automatically transmits them to both local and state health departments. Data sources (hospital labs, public health labs, and referral labs) transmit routine laboratory results (ELR messages for observations including CBCs, HIV tests, and bacterial cultures) to the Indiana Network for Patient Care, an operational HIE. The NCD uses LOINC codes, ICD9 diagnoses, and natural language processing to determine if a result is potentially reportable. The NCD uses the CDC reportable condition mapping table to verify reportable conditions. Final results are shared with health agencies in a variety of formats including Health Level 7 (HL7) and comma delimited files (CSV) based on the jurisdiction's technical capacity. Regenrief has made the NCD freely available as a component of the Open Medical Record System (OpenMRS) platform (www.openmrs.org), which enables implementation by health care providers in over 40 nations around the world.

Demonstration

We will present an overview of the NCD, describing how the system inspects incoming ELR messages within the HIE, detects those that are positive for a notifiable disease, and then transmits the message to a public health agency. We will describe the architecture that enables integration with incoming lab system interfaces and the HIE core infrastructure. The NCD uses a variety of 'critics' or intelligent agents to examine incoming ELR data using NLP and standard business rules. We will demonstrate how critics function, their performance characteristics, and how they are configured using administrative tools available in OpenMRS. We will further highlight how we are currently using the NCD to enhance incoming ELR messages using matched patient demographic information, provider location data, and clinical EHR data to improve public health reporting processes in Indiana. By demonstrating our novel, innovative system to automatically detecting notifiable disease cases using routine ELR message data, we will describe how others can implement the NCD and use lessons learned from this system to develop equivalent capability to support improved public health reporting across the nation, as well as the globe.