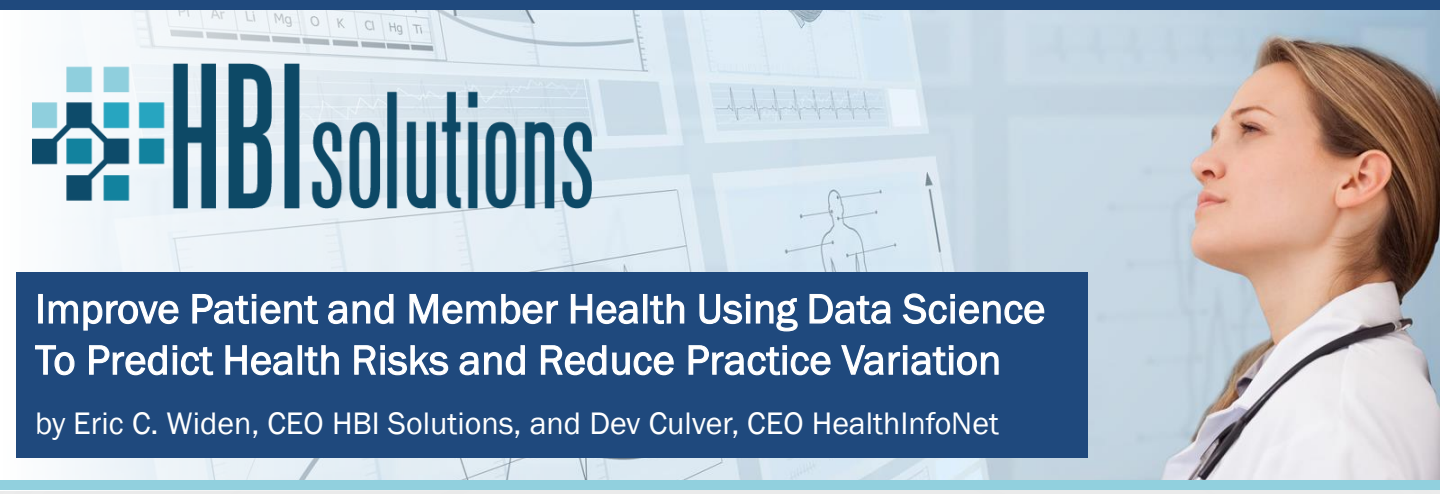


Improve Patient and Member Health Using Data Science To Predict Health Risks and Reduce Practice Variation

by Eric C. Widen, CEO HBI Solutions, and Dev Culver, CEO HealthInfoNet

Introduction

The primary purpose of a health information exchange (HIE) organization is to deliver a central source for providers to access real-time clinical profiles for their patients. To do this, HIEs aggregate patient data from all member healthcare organizations' electronic medical record systems. This data can include admission and visit history, laboratory orders and results, radiology orders, outpatient medication prescriptions, diagnostic and procedure codes, and clinical notes and documents. The accessibility of these clinical profiles is intended to enable higher quality and more cost conscience and effective care. This timely, longitudinal clinical data is the most valuable component of an HIE. It also makes the data set ripe for analysis. These analyses for providers include forecasts, risks, trends, performance measures and benchmarking. HIEs that are able to provide this level of analytic information can facilitate better care coordination and lower population health costs by 10-40% for their members. Strategically, HIEs with advanced analytic capabilities will likely experience better long-term sustainability.

HIE Requirements

Prior to implementing an analytic platform, there are several core requirements an HIE must have in place to provide analytic value to their member organizations (see Figure 1). This includes: 1) interoperable health information exchange transaction system, 2) centralized transaction data store, 3) clinical terminology management software, and 4) enterprise master person index (EMPI) software. Once these requirements are in place, an HIE can implement an enterprise analytic platform.

HIE Requirement 2 – Centralized Transaction Data Store

HIEs are generally built on one of two types of models: federated or centralized. In a federated model, the data resides with the source systems and is queried on demand to generate patient information for a provider. A federated model issometimes referred to as a post office model – delivering information from point A to B without storing the information centrally. A centralized model pulls data periodically (real-time, hourly, or nightly) and stores it in a centralized repository for providers to view, generate alerts, and aggregate for analysis. To support analytics, a centralized model has several distinct advantages over a federated model. The first is data standardization. A centralized data set can be mapped to standard nomenclature. To provide rules, alerts, and analysis, the data needs to conform to standard nomenclature. In a federated model, the data remains mapped to the local values.

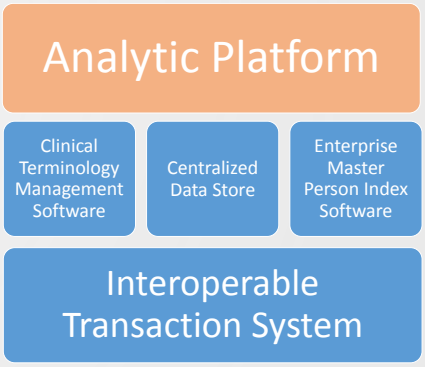


Figure 1

The second benefit to a centralized model is it provides a single, efficient and standard location to extract data into an analytic platform. To apply analytics in a federated model, additional technology must be deployed to extract the necessary information for analysis from CCD and direct transmissions.

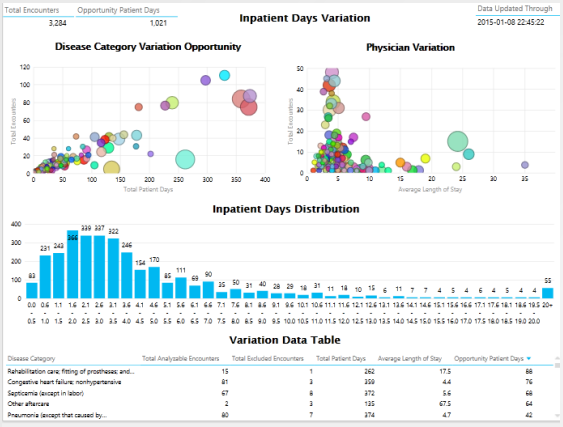
The third and final benefit of the centralized model is that it provides a better infrastructure to secure the data. Encryption, PHI separation, perimeter and penetration management tools are applied in a singular manner to secure the data. In a federated model, the security is only as strong as the weakest link.

HIE Requirement 3 – Clinical Terminology Management Software

Normalized data to a standard vocabulary including SNOMED CT, LOINC and NDC terms is a key requirement for data analysis. The utility of standardized data includes better data quality, integration, usability, communication and ability to support regulatory standards. Analysis on non-standard data is inefficient and error prone.

HIE Requirement 4 – Enterprise Master Person Index Software

The objective and value of an EMPI engine is to ensure each patient is represented once across the various systems in which the patient's data is stored. This facilitates the accurate aggregation of clinical data to the right patient, supporting better patient care and customer service.



Enterprise Analytic Platform

Once the interoperable HIE platform, central transaction data store, clinical terminology software, and EMPI engine are implemented, the data can be used to realize an enterprise analytic platform, which provides further value to HIE member healthcare organizations. The overarching purpose of an HIE is to help members achieve better health outcomes for patients. The platform is supported by a standard healthcare data model and includes analytic architecture, visualization tools and ad hoc querying capabilities. Analytic examples include predictive risk models, population health management modules, 30-day inpatient readmission management modules, real-time volume trending and forecasting, market share analysis, and performance improvement dashboards.

ACO Predictive Analytics

HIEs provide comprehensive and longitudinal clinical information on patients. Implementing predictive risk software on this real-time data set helps providers more accurately assess future utilization and disease risk for their patients. Understanding risk helps providers focus care management activities more effectively to reduce costs and improve care management. Organizations with accurate and timely risk scores combined with an effective care management program are 10-40% more cost effective in treating populations.

30-Day Inpatient Readmission Management

All inpatient hospitals have an incentive to improve readmission rates. Generating 30-day readmission risk scores upon admission allow care managers to proactively address the highest risk patients. Organizations deploying accurate risk scores upon inpatient admission combined with an effective care management program have decreased their readmission rates by 15-25%. An example of readmission improvement using real-time risk scores for a single 150 bed community hospital is shown in Figure 2.

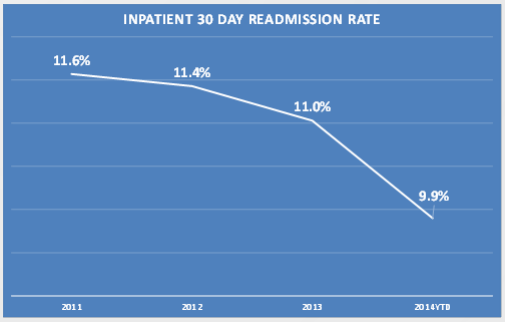


Figure 2

Performance Improvement and Variation Management

Benchmarking key performance indicators (KPIs) help organizations understand how they compare to regional or comparator hospital norms. These KPIs include market share rates by disease and geography, ordering rates, infection rates, length of stay, and readmission rates. Further, assessing clinical variation patterns within disease groups highlights areas of unnecessary utilization for organizations to address. The so solution can reduce costs by 10% to 40% in targeted areas.

About HBI Solutions

HBI is a leading health analytics and data science company based in Silicon Valley. HBI was formed through a collaboration of Stanford University researchers and performance improvement professionals to transform data into actionable insights to decrease costs, improve quality and reduce risk. Over 30 Health Systems, 400 Physician Practices and 2 ACOs use HBI Solutions to improve clinical and operational performance.