USING HIOS FOR PROSPECTIVE CARE MANAGEMENT:

PATIENT RISK SCORE ASSIGNMENT

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Table of Contents

Tactical Issue Brief Series

The tactical issue brief series was created by Audacious Inquiry, LLC under a contract with the Office of the National Coordinator for Health Information Technology (ONC). Each brief will provide an overview of a value-add service health information organizations (HIOs) can provide to their stakeholders utilizing existing infrastructure, such as a master patient index or provider directory. Each brief profiles an HIO that has successfully implemented the service and provides practical real-world information to HIOs. The content, views, and opinions do not necessarily reflect those of the Department of Health and Human Services or ONC.

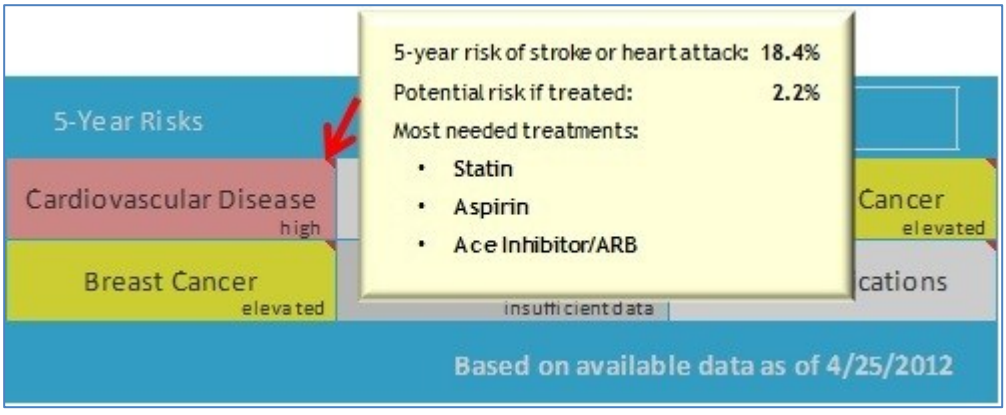
1. MyHealth Access Network Profile

1.1 Use Case

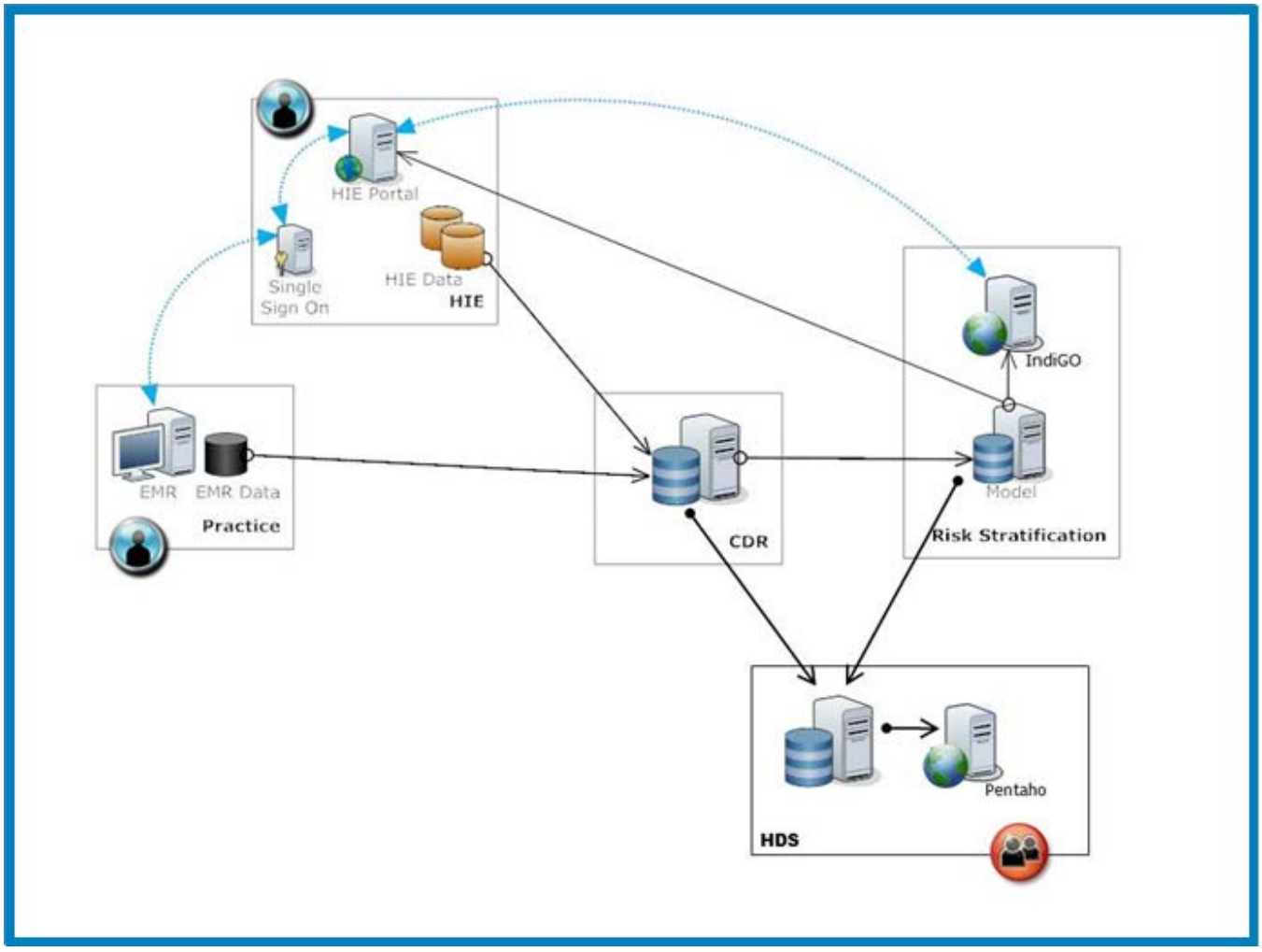
The healthcare industry has used risk stratification and risk scores for a few years, in order to proactively manage the care of patients with the highest needs. Risk scores can be used, for instance, to identify patients at risk for developing specific diseases, at risk for a worsening of a disease they already have, or the risk of hospital readmission. Typically scoring has been developed by payers utilizing claims data, which is limited in detail and may not be available when patients face the highest risk—after a prior medical encounter—due to the delay in submission and processing of claims. Some health information organizations (HIOs) are also developing risk assessment services that complement other offerings and enhance their value proposition to participants.

MyHealth Access Network is an HIO in Oklahoma. It has connected a number of hospitals and ambulatory practices, which are exchanging structured clinical data. When data is received it passes through a master patient index (MPI) to be matched with an existing patient identity or to have a new identity created and assigned a unique ID. Each day, de-identified Continuity of Care Documents (CCDs) consisting of all of the known clinical information for each patient are shared with a clinical decision support tool called IndiGO (Individualized Guidelines and Outcomes), developed by a company called Archimedes. IndiGO uses proprietary algorithms to assign risk scores to each record across multiple risk categories. In order for the scoring to be accurate, IndiGO needs as much discreet data as possible; in particular, its algorithm utilizes lab results, problem lists, medication lists, and vital signs such as age, height, weight, blood pressure. IndiGO projects a patient's risk for developing a number of disease complications, including cardiovascular disease, progression to renal disease, various types of cancer, and diabetes. Additionally, for patients who are deemed at high risk for a particular complication or likely readmission, IndiGO will then dynamically generate intervention information specific to the patient. Risk scoring data is regularly sent back to MyHealth Access Network, which then re-identifies and displays it alongside the patient's clinical information in its patient look-up portal.

IndiGO also provides a way for patients to view their risk score and targeted interventions. CCDs shared with IndiGO are stripped of patient identifying information other than a unique code known only to the HIO. Providers can give patients a unique web link during an office visit. Patients can then utilize that web link to access the IndiGO Web application and view their risk score information. Patients can "play" with their



scores and see how various behavior changes could decrease or increase their risk score to engage the patient to take action. They can also review their scores over time to observe changes based on information from new clinical visits. Below is a high-level diagram of MyHealth Access Network's infrastructure. Providers send structured clinical data to MyHealth Access Network's clinical data repository. The data is de-identified and sent to IndiGO's risk stratification system. IndiGO includes the user interface accessed by providers for clinical decision support; it enables providers to evaluate the expected adjustment to a patient's individual risk adjustment based on adherence to one or more proposed interventions. Access to IndiGO is made available through the MyHealth Access Network provider portal.



1.2 Infrastructure Components

Component	MyHealth Access Network Product
Inbound Network Connection – Discreet Clinical Data, typically a CCD	Covisint – part of the core HIE product
Master Patient Index	Covisint - part of the core HIE product
De-identified Patient Data Files - CCDs	Covisint – custom built
IndiGO Risk Score Engine	Archimedes
Outbound and Inbound Network Connection to Risk Score Engine	Secure channel with Covisint
De-identified User Interface for IndiGO	Archimedes

1.3 Cost

The majority of the costs involved were related to transforming clinical data into standard formats, building interfaces between the HIE vendor and IndiGO, and inserting the customized initial display of the information into the HIO's dashboard. The cost will vary based on the level of work necessary to standardize the data and the fees relevant vendors charge for building user and data interfaces.

1.4 Return on Investment

MyHealth Access Network believes that potential exists for significant ROI in the future and aims during a later phase of the project to gather additional data about the way providers are utilizing the tool that can be useful in estimating ROI, though that calculation is also highly dependent on the revenue models where it is applied. The tool's dashboard interface was guided by area clinicians. The HIO expects that providers, patients, and payers will find the tool very valuable in managing patient care, particularly preventative care to lower the risk of heart attacks, diabetes, lung cancer, etc. Based on the success of the pilot, MyHealth plans to assess the value of pricing the tool as a value-added, paid product in their community service offerings.

1.5 Challenges

Integrating the tool requires handling of some common challenges in health information exchange. Two of those challenges include data standardization and properly matching patients together. IndiGO must be able to receive and correctly interpret key clinical data, usually in some standardized format, in order to calculate a patient's risk levels. The system makes calculations on dozens of input data points, but in some cases, such as when lab values come from many different sources, input values that do not get properly mapped, may not be recognized. Consequently, MyHealth must work with IndiGO and technology vendors to agree on standards and map the data as needed to those standards, a problem which is well known to many working with complex health data. Additionally, ensuring that patients are correctly matched in the master patient index is critical to ensure that each patient has information from all sources considered in the evaluation.

2. Risk Score Assignment Service

2.1 Use Case

An HIO that receives real-time encounter data has the ability to support patient risk scoring. Clinical data can support the sophistication of the scoring approach. An HIO could either choose to build the capability itself or partner with one of a number of existing companies that perform risk stratification. One of the easiest types of risk scoring for an HIO to support technically is hospital readmission risk. An HIO that receives ADT feeds from hospitals can process the data through an engine that uses an algorithm to evaluate the patient's risk for future readmission. There are a number of models an HIO can base the algorithm on, including the LACE index[1] or Project BOOST,[2] which identify high risk patients based on simple data that can be received in an ADT feed, or more advanced models, such as D2S2,[3] which uses more advanced data during a hospital stay to identify high risk patients prior to discharge. This risk score can then be displayed with the patient in hospital readmission reports, pushed to interested parties such as primary care providers or care managers in an electronic notification, or presented in a patient look-up portal.

If an HIO is receiving discreet clinical data, it may offer even more sophisticated risk scoring. As real-time clinical data is received from data sources, it is checked against the MPI and matched to a patient. The data is then processed through a rules engine that can assign a risk score for developing a specific condition or the improvement or worsening of existing conditions. These scores can be displayed in a patient look-up portal along with the patient's clinical data, or potentially sent directly to an EHR via Direct messages or an interface/API connection. Based upon the score, an HIO may also provide patient-specific intervention resources to providers along with the risk score, making the data more actionable for providers. From a legal perspective, it should be noted tools of this nature are usually intended only to draw the provider's attention, and are not intended to be understood as medical advice.

2.2 Business Case

Payers and providers alike are increasingly being incented to proactively manage the care of their members, particularly the sickest and most costly to care for. Currently, payers identify and manage such members primarily through analysis of claims data and through an on-the-ground presence at many hospitals. Providing payers with real-time risk stratification (assuming any required patient and/or provider consent is obtained), based on up-to-date, complete, clinical information will allow them to

[1] Additional information on the LACE Index can be found at: https://files.pbworks.com/download/mkYFkzdT41/unmhospitalist/27343246/LACE%20index%20to%20predict%20readmissions.pdf

[2] Information on Project BOOST can be found at: http://www.hospitalmedicine.org/AM/Template.cfm?Section=Home&CONTENTID=27659&TEMPLATE=/CM/HTMLDisplay.cfm

[3] Additional information on Discharge Decision Support System (D2S2) can be found at: http://www.rightcaresolutions.com/#!solutions/ch6q

better manage the care of these members. In addition, payers are increasingly offering incentives to members to improve their health, and risk scoring and stratification tools can help support these types of programs. As ambulatory providers and hospitals move towards value-based care, like payers, they will need to better manage the care of the patient populations for which they are responsible. A risk score for each of their patients allows them to quickly identify opportunities for patient interventions and education and makes it easier for them to monitor their overall patient population. Providing historical risk score data allows providers and hospitals to see which interventions are working, to refine risk models and algorithms, and to potentially tailor interventions to specific patient needs.

2.3 Legal/Policy Considerations

If an HIO chooses to work with an outside company for risk scoring, it will need to ensure that appropriate business associate agreements are in place and followed. New policies and procedures may also have to be developed. HIOs should ensure that their sharing agreements with hospitals and physician practices allow for this type of data use. HIOs may choose to provide de-identified data to the outside company, as MyHealth Access Network does, in order to protect patient privacy and mitigate risk.

2.4 Infrastructure Components

Component	Function
Inbound Network Connection	Enables VPN connections and receives inbound ADTs, CCDs, lab results, or other discreet clinical data
Interface Engine	Routes inbound messages to next step (in this case MPI)
Master Patient Index (MPI)	Creates new patient identity or matches to existing identity and is associated with patients' risk scores upon assignment
Risk Score Engine	Maintains the algorithm for calculating and assigning risk scores
Outbound and Inbound Network Connection (if using a separate company for risk score engine)	An API, batch file process, or other data transfer process is necessary to send and receive the patient data from the risk score engine
Optional Components	
Real Time Risk Score Notification	Risk score sent via API or DIRECT message in real time to EMR
Record Locator Service (RLS)	Pull additional information on the patient's visit, including lab results, medications, notes, and images
Intervention and Patient Education Resources	Provides patient specific intervention and education resources to providers along with the risk score
Risk Score Graphs	Display a graphical representation of risk score changes over time.

2.5 Potential Challenges

In general, more advanced risk score assignments require discreet, structured clinical data that conforms to standard vocabulary sets, including: lab results, medications, problem lists, and vitals. Depending on which HIE vendor an HIO utilizes and the capabilities of participants' source systems, obtaining this level of discreet data may be difficult if not impossible. However, the consolidated clinical document architecture (CCDA) holds promise for standardizing clinical data in the near future. In addition, hospitals are not always consistent with the data they include in ADT feeds. HIOs will have to work closely with hospitals to ensure consistent submission of data fields in ADT fields, so that a readmission risk score can be accurately calculated.