Pulse on the Industry: Interoperability and Population Health Management

INTRODUCTION

Over the years, the healthcare industry has moved from paper-based records to electronic records. While there have been significant investments in electronic health record (EHR) systems, the lack of interoperability between EHRs limits accuracy and efficiency when exchanging patient data across the continuum of care. In the current transition from fee-for-service models of reimbursement to value-based care, access to comprehensive patient information is increasingly important. In its quest for optimal patient outcomes, the healthcare industry is trying to improve the quality and availability of data and are using analytics as a catalyst to improve performance.

eHealth Initiative (eHI) interviewed nine executives from provider organizations and Health Information Exchanges (HIEs) to gain insight on the current state of interoperability, population health, and their future potential. In November and December 2017, executives answered questions on the types of data they collect, how it is shared and analyzed, and the successes and challenges in using data analytics for population health management. The organizational affiliation of each respondent is listed at the end of this report.

EXCHANGING DATA

INTEROPERABILITY

The architecture or standards that make it possible for diverse electronic health record (EHR) systems to work compatibly in a true information network.

--Office of the National Coordinator for Health Information Technology (ONC)

Provider organizations vary in how their systems connect. Some providers use one EHR vendor system-wide, others use different EHR systems within their organizations, while some providers do not have an EHR at all. Ultimately, provider organizations need accessible, quality data that is easily exchanged, regardless of their EHR status.

Two providers stated that they used the same vendor for their patient record exchange platforms, which is their primary means of dispensing patient information to other clinical partners. In addition to internal data exchanges between EHRs, insurance divisions, and billing, respondents also have data sharing agreements with their statewide HIEs, payers, and medical technology organizations.

Providers that do not have their own EHR systems in place are often reliant on means created by providers seeking to share patient information. For example, to share information on a patient, a provider with an EHR may offer the use of a portal to providers that do not have an EHR or to providers with an EHR that is not interoperable. However, according to one respondent, many providers prefer to use email style end-point mailboxes, called direct addresses, over the use of such portals. The respondent stated that this process was made possible by a partnership with a small company. Direct addresses use protocols that can connect to any Health Information Service Provider (HISP), including Surescripts.

The providers interviewed were using the HISP model with Direct Messaging to exchange Continuity of Care Documents (CCDs) at patient discharge and transfer. Two respondents noted that a barrier to Direct Messaging was a lack of provider directories in their states, while one respondent had a directory but did not see the value

in Direct Messaging. Another respondent worked with their HISP to develop a directory, which has an 80% success rate when sending records to acute care providers and a 50% success rate with ambulatory providers.

Direct Messaging
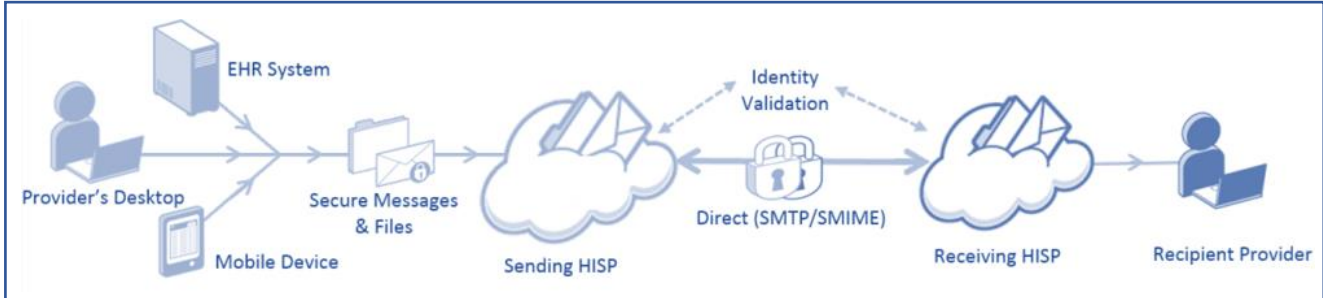
One provider suggested it would be easier to connect if all vendors used Fast Healthcare Interoperability Resources (FHIR) standards. This respondent is a member of SMART on FHIR, a set of open specifications to integrate apps with EHRs, portals, HIEs, and other health IT systems. Another respondent had considerable interaction with patients through the patient application programming interfaces (API) of their EHR vendor and expect that data will be exchanged through the APIs, in due time.

The hospitals and clinics within the health system of one respondent uses at least six different EHR vendors. This provider has an affiliate structure and has mapped all the data from the various EHR systems into a common HIE database. Rather than having one portal per hospital or clinic, all patients within the system use the same portal. The portal pulls data from the HIE and patients can view, download, print, or transmit their records via a user-friendly interface. Creating a successful patient dashboard required a complete understanding of each vendor's EHR data model, and mapping the data required a considerable amount of time and money. The respondent has no preference of which EHR is used, their concern is that all entities use the same enterprise master patient index (eMPI,) determined permissions, and semantic standards.

HIEs act as secure repositories for critical elements of patients' medical records across multiple providers. Using HL7 international standards for transfer of clinical and administrative data between software applications, HIEs collect diagnoses, lab results, pathology labs, demographics, transcriptions, CCDs, notes, discharge summaries, radiology reports, and admission, discharge, and transfer (ADT) information from various organizations. ADT is the most commonly used HL7 messaging type, with most clinical applications enabled to receive key ADT messages.

One respondent is offering the ability to query and view CCDs using Integrating the Healthcare Enterprise (IHE) profiles, an initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information. Another respondent stated that IHE is their preferred method of integration with any EHR system, and are finding that more EHR vendors support it. One of IHE's primary benefits is the ability to support workflow by automatically populating the patient's chart. The clinician does not need to go to another portal. Another HIE respondent is still working toward automating integration into the provider's EHR. In their current model, after an ADT trigger is received, a CCD is generated and then pushed back to the provider through direct message.

PERSPECTIVES ON THE CONTINUITY OF CARE DOCUMENT (CCD)

Continuity of Care Documents (CCD) and HL7 messages are two methods for sharing clinical data elements. Determining how to convert clinical data is the first step in data migration. With HL7 messages, data elements can be converted discretely and entered directly into a patient's chart without reconciliation. With CCDs, certain data elements can be discretely converted, and some become viewable as read-only reports once converted. CCDs also require end-users to reconcile the information prior to entry in a patient's chart.

Information is often sent to the HIE in an HL7 message with a CCD attached. The CCD is usually a structured Extensible Markup Language (XML) document and can contain attachments of unstructured documents in the form of encapsulated data. A provider discussed the dichotomy of structured and unstructured data. It is a challenge to extract clinical terminology from unstructured data. With structured data, the choices for data elements are limited and do not provide nuance for point of care interactions.

The consensus among HIE respondents was that CCDs are cumbersome and problematic. One respondent stated that CCDs are not as valuable as they appear. CCDs provide a substantial amount of information in addition to the demographic, diagnosis codes, and medication data contained in the ADT/HL7. This vast amount of data can be problematic. Unless the CCD is parsed, it may be difficult for providers to find specific items. As they onboard new participants, one HIE respondent said their goal is to expand the kinds of structured data received and decrease their reliance on CCDs. This sentiment was echoed by providers who stated, "CCDs contain too much information," and that CCDs are "messy" and do not typically include items of the greatest interest.

When asked about the feasibility of using CCDs as a replacement for costly HL7 interfacing, some HIEs responded that there is potential, but it is dependent on use case. One respondent explained that there will always be a need for ADT/HL7 feeds because CCDs are only launched after a patient is discharged. This does not present a problem in an ambulatory setting. However, in acute settings, when patients are admitted to the hospital, the information in a CCD will arrive too late. This HIE believes that both options, the ADT/HL7 feed and CCDs, will provide the greatest amount of information.

The amount of data included in CCDs can be problematic.

Another HIE stated a preference for HL7 feeds because CCDs are difficult for providers to use in a clinical setting. This HIE finds medication reconciliation to be especially problematic with CCDs and prefers direct physician notification when changes are made within a patient's record. One respondent did not view CCDs as a replacement for HL7, but noted that exchanging CCDs is easier to achieve and maintain than mapped interfaces.

PERSPECTIVES ON DATA QUALITY

All respondents stated that data quality is a challenge. As the health industry continues to collect large amounts of data, it is increasingly important to examine the quality of that data. This sentiment was echoed by several respondents who opined that quality data is necessary for everything to work. Both providers and HIEs mentioned data quality issues such as incorrect coding and extreme documentation variation at the point of care, including dictation, voice recognition, and structured forms, which affect reporting of quality measures.

Data quality is a challenge.

Improper coding leads to poor data quality and causes problems for both providers and HIEs. An HIE found that when working with providers interested in examining certain conditions, it is valuable to structure their analytic technology to pull the specific codes related to the condition. This method is only effective if data is coded correctly. Data quality tools have proved useful for some providers in identifying coding issues. With the use of a data quality tool, one provider was able to identify a hospital in their system that mapped a specific measurement incorrectly, leading them to report 100% of the tests for that measurement as abnormal. Another provider concerned with semantics stated that language meaning has worked out reasonably for medications and medication allergies, but not for anything else. Quality data is necessary to achieve meaningful results.

Depending on the provider, HIEs often receive incomplete information when items do not make it into CCDs. One HIE noted that important information often ends up in transcribed notes. This data is hard to extract, especially because Natural Language Processing (NLP) is in its infancy. As CMS and the Joint Commission move toward electronic clinical quality measures (eCQMs,) a provider discovered that pilot elements extracted about half the amount as chart extractors were able to find.

Variation in the structure of data is also problematic. One HIE performs user acceptance testing when onboarding new organizations but has found that the data in their repository has changed over the many years they have been in business. The historical data was dispensed through interfaces that have changed over time and may be structured differently from current data, especially in terms of cleanliness. Another HIE is pushing their data sources to comply with the ONC standards for CCDs. They feel that many vendors are not ready, and those who meet the technical standards do not have high quality data. The different approaches EHR vendors use to input data into CCDs was also mentioned as an issue.

POPULATION HEALTH MANAGEMENT

Although there is a sense of uncertainty in the direction of the Department of Health and Human Services (HHS,) which is creating ambiguity around value-based care investments, respondents acknowledged that investing in population health management offers providers a means to find care gaps, heighten decision making, improve patient outcomes, and reduce costs. The technology used for these initiatives vary among providers, with multiple respondents leveraging tools offered by vendors.
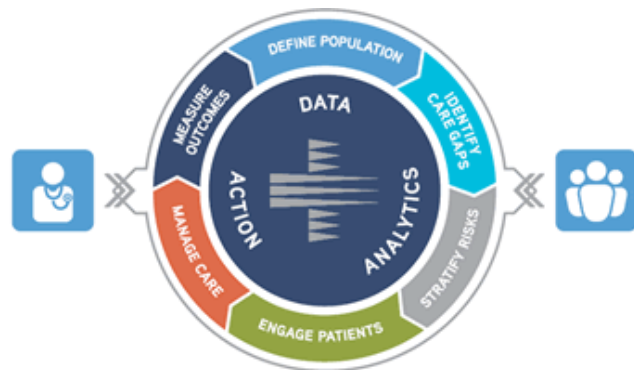
One respondent uses their EHR vendor to create dashboards for clinicians, which provide information about the process of their practice and quality metrics. This respondent can make visualizations in their provider's workflows by using accountable care and population management system modules; claims data; outside clinical data; and information from their internal enterprise data warehouse project. At the time of the interview, a provider using these tools had two dozen operating registries integrated within their EHR, allowing them to run analytics, perform risk stratification, and find the areas where the greatest opportunities for care exist. They focus on high-risk patients and offer intensive improvement programs for chronic diseases such as diabetes, hypertension and congestive heart failure. This provider would like to implement a program for childhood asthma soon. Another provider also relies heavily on their vendor for population health management, including

reporting for MACRA/MIPS. This provider uses a variety of tools from third parties, in addition to technologies such as machine learning and self-developed algorithms. They noted they do not see one population health management vendor offering the ultimate service. Some do well on either the payer or provider side, but none have the "secret magic sauce." This provider would like the ability to offer physicians actionable micro-steps for discovered insights. They see too much emphasis on documenting the care plan instead of creating an action plan.

A different provider is investing in data science and decisional analytics and will be building the front end of their EHR into the physician's workflow. What drives most of their involvement in population health are the changes experienced by their partners during the evolution of MACRA and MIPS, not the management of risks as a large ambulatory practice. This provider is using analytics to predict, with a high degree of certainty, the patients with whom case managers should work with, those who are likely to answer a follow-up phone call, and those who fall into the diagnosis related groups (DRGs) that would eventually qualify for expensive procedures. An HIE shared this sentiment. It is using analytics to identify at-risk populations and predict which patients are most likely to be readmitted, or die, within 30 days after discharge.

These insights allow providers and HIEs to know where to put their focus and resources. Most of their information comes from inside the walls of their hospitals, but they desire access to more semantically interoperable data. This access would allow them to partner with bundle payment groups, to reduce readmissions, and limit excess testing by physicians.

HIE SUPPORT FOR POPULATION HEALTH MANAGEMENT

HIEs are resources for population health management.

In addition to acting as repositories, HIEs can serve as a resource to track population health. Some HIEs supply community level data to platforms, while some use sophisticated data analytics platforms. Interviews revealed that HIEs played a role in collecting data, helping practices achieve their goals, utilizing analytic tools, and offering population health management services.

One HIE builds its own population health tools, offering near-real-time dashboards with identification for high-risk patients. This respondent does not believe claims data is an effective population health tool and prefers the near-real time data they are able to generate. Additionally, the HIE focuses on preventive care and metrics that have not been met; identifies quality metrics; and ensures metrics are coded correctly. For population health management to be effective, the data must arrive within 24 hours, instead of 30 to 90 days after a claim has been submitted and adjudicated. The HIE acknowledged that their efforts require a great deal of financial resources and time. They have a team of analysts and physicians and purchase tools for data visualization. They must also manage an enterprise data warehouse, data marts, and the data itself.

To identify care gaps, one HIE uses a tool that integrates CCDs and compares them to 2014 ONC guidelines. Their new medical director is especially focused on working with their informatics team on this tool. The role of some HIEs in MACRA/MIPS reporting has been to fill in the gaps for Accountable Care Organizations (ACOs) wanting to do MACRA/MIPS reporting themselves. HIEs act as resources for ACOs by supplying out of network data to population health platforms, if they meet certain criteria. One of the HIEs interviewed is a qualified clinical data repository and helps doctors report on quality metrics, such as hospital and other readmission rates that

physicians track for Medicare purposes. Another HIE offers tools such as actionable lists, and other items, to help physicians review and increase their reporting scores and reach those who need services.

Through the collection of less traditional types of data, such as social determinants of health and behavioral health information, HIEs can aid provider organizations with their population health management efforts. The HIEs interviewed range in the scope of their efforts to collect and offer tools related to this type of information. Many expressed the desire to affect whole health, rather than just medical outcomes, and know this information is helpful.

One HIE discussed the large focus on social determinants of health they have witnessed in their community and are interested in aligning their efforts to match this focus. Their region wants more from a whole-health perspective and would like better integration with Community Business Organizations (CBOs). They have had some success in receiving enrollment information, including the dates in which patients enroll/disenroll in the services of the CBOs. In the future, they hope to add contact information for providers at the CBOs to support referrals and transitions of care.

Those further along in their efforts related to social determinants of health discussed current initiatives, including referrals for community services. Food banks, diaper banks, housing, product usage to capture risk of domestic violence, geocoding, and associated regional risk factors, such as diseases relative to food deserts and access to other services were mentioned. One HIE has faced barriers in the collection of social determinants of health data after finding that CCDs are not equipped to handle this type of information. Other forms of social determinants of health data desired by the HIEs interviewed are home visits, transportation, and incarceration records.

Providers can access social determinants of health data from their local HIE, including data on social characterization of the neighborhood or zip code, family, living conditions, nutrition, economic and credit information, and transportation needs. Providers can also collect some of this data from chronic disease registries. One provider has recently started looking at social media data for consumer efforts.

Some of the HIEs are working with behavioral health information, which can reduce fragmented and inconsistent episodic care, while others are just beginning to onboard behavioral health practices. HIEs working with behavioral health information are tracking adults and children with severe or persistent mental illnesses, suicide assessments, A1C levels, uncontrolled blood pressure, and tobacco use. Also tracked is a patient's utilization of the emergency room and emergency department and whether he or she has had a follow-up visit five days post-discharge. An HIE even created a dashboard to provide physicians a list of controlled substances that have been prescribed and the name of the prescriber. Their belief is this information informs decision making at the point of care, before physicians check the prescription drug monitoring program.

Both providers and HIEs expressed a desire for more ambulatory claims and clinical data. Several providers expressed frustration in gathering claims data, stating that, unless they are in a risk relationship, they do not see interest on the part of third-party payers to share data. An HIE experiences resistance from physicians who do not want to share ambulatory data and posits that incentives may be necessary to encourage more physicians to share this information. The interviewee feels that physicians see sharing their data with the HIE as another line item, instead of recognizing a business value. In addition, there may be concern that access to an

overwhelming amount of data has the potential to obscure critical information, possibly leading to issues of liability. Another HIE suggests, for smaller ambulatory practices, interfaces from EHR vendors are too expensive, even though it is "what they really need."

Other salient points from interviewees:

- Some HIEs are receiving mortality data, however, others find it difficult to collect because they must purchase the data from their state and the price is too expensive.
- There is a range in access to immunization data for HIEs. Some are connected to the state's public health database that houses the immunization registry, while others are unable to get immunization data. One HIE is unsure why the state is unwilling to share.
- Medication fill data is another common desire for HIEs. Many perceive Surescripts to have a monopoly in this space and reported their services as too expensive. They also find the flat files containing information on prescription and dispensed medication from pharmacies do not move into EHR systems. Although claims data from pharmacy benefits managers or payers can be used, this information is not complete, especially if a patient pays for their medications out of pocket.
- One HIE would like to add images, various assessment results (such as PHQ-9 and PAM,) and EKGs. Another is working toward using images in the next few months, through the provision of a link, allowing the user to access an image.

PARTNERSHIPS TO EXCHANGE DATA

Carequality is a framework that provides a governance structure, legal foundation, and technical standards for network-to-network exchange. **All provider respondents reported participation in Carequality**, which defines itself as "a public-private, multi-stakeholder collaborative that draws from all parts of the healthcare ecosystem, and uses a consensus-based process to enable seamless connectivity across all participating networks." Most healthcare providers use data sharing networks that only allow for sharing with members on the network. Carequality allows providers to share data, regardless of the network that houses the data. One respondent believes their ability to retrieve records from outside their system will be even greater once Cerner accomplishes the technical work needed to connect to Carequality.

CommonWell Health Alliance is a network that provides a record locator service (RLS) and query/retrieve capability among participating vendors/providers. Although providers are interested in CommonWell's record locator services, eMPI, and potential to connect to outside CCDs through their agreement with Carequality, they are still evaluating whether these features will help save time when connecting to other practices in the future. Participating in CommonWell was not a key tactic for one provider, as they are already making strategic connections through the state HIE.

Most HIEs reported participation in the national trade association of health information exchanges, Strategic Health Information Exchange Collaborative (SHIEC.) Several HIEs reported being members of eHealth Exchange, or working towards membership. One respondent clarified that interfacing with the Veterans Administration (VA) was their only reason for membership in eHealth Exchange. Another was concerned with the match rate of its patient identifier. Some HIEs are working with DirectTrust. Others prefer to keep their focus local, while others are undecided about participation. The HIEs

that have not joined Carequality and CommonWell suggested they may do so in the future. In anticipation of joining the network, one HIE included Carequality's agreements into their own.

TRENDS & THE PATH FORWARD

The collection and storage of patient data by providers and HIEs is critical to improving patient care and outcomes. When more information is available about a patient, clinicians can make more informed decisions, at the point of care, and provider organizations can benefit from insights derived through analytics for population health management.

HIE Trends

Interviews revealed that HIEs are integral to population health management efforts. HIE respondents supply community level data, including social determinants of health and behavioral health data, help clinicians monitor and report quality metrics, and offer sophisticated data analytic platforms. HIEs are secure repositories for critical elements of patients' medical records across multiple providers. Those interviewed were collecting diagnoses, lab results, pathology labs, demographics, transcriptions, CCDs, notes, discharge summaries, radiology reports, and admission, discharge, and transfer (ADT) information. Some HIEs are working toward, or have achieved, the automated integration of information into the provider's workflow. HIEs believe the potential for using CCDs as a replacement for costly HL7 interfacing is dependent on the use case and that together ADT/HL7 feeds and CCDs provide the greatest amount of necessary information to treat a patient.

Provider Trends

The providers interviewed utilize a variety of tools for population health management. Some rely heavily on their EHR vendors' technology, while others are investing in data science and decisional analytics to build their own platforms into physician workflows. Some providers have different EHR systems across their networks and have built provider portals to give clinicians access to patient information. Respondents also reported using Direct Messaging and direct addresses to share information with clinical partners who do not have the same EHR vendor (or those who do not use an EHR at all.) They also participate in data sharing agreements with HIEs, payers, and medical technology organizations.

The collection and exchange of patient information has allowed the healthcare industry to better understand a patient, but the process is not without its challenges. Key challenges included:

- **Difficulty finding relevant data.** Interviews revealed that HIEs and providers both believed that the vast amount of information found in CCDs is cumbersome and problematic. It is difficult for providers to find important information within the documents.
- **Cost and time.** Building and maintaining patient dashboards and population health management tools requires a considerable amount of time and resources.
- **Resistance from providers**. HIEs reported resistance from providers who do not want to share ambulatory data and who are hesitant to exchange data, stating that some physicians believe an overwhelming amount of data has the potential to obscure critical information, possibly leading to issues of liability.

- **Data quality issues.** All respondents reported that data quality issues such as incorrect coding, extreme documentation variation at the point of care, and evolving standards and structures of data are major challenges in collecting, storing, and analyzing patient data.

The importance of timely, quality patient data will continue to grow as provider organizations attempt to improve outcomes, lower costs, and particularly as the healthcare industry moves toward value-based care. Interviewees provided suggestions to tackle challenges related to data quality, data volume, and remaining gaps in information:

- **Use consistent standards.** Providers believe it would be easier to connect and analyze data if all EHR vendors used the same standards, such as FHIR.
- **Highlight actionable steps for providers.** Providers desire the ability to offer physicians actionable micro-steps for insights discovered through analytics. They see too much emphasis on documenting the care plan, instead of creating an action plan.
- **Share more data.** Both providers and HIEs noted their desire for more ambulatory claims and clinical data. HIEs also wanted medication fill data and immunization data to assist with analytics.

Focusing on these next steps, should be a primary strategy for population health management. In the movement toward value-based care, both providers and HIEs play a role in collecting and sharing data to improve patient outcomes. As industry begins to collect a variety of data types, the quality and use of data *at the point of care* is crucial to success.

INTERVIEWEES		
AeHN Alaska eHealth Network™	CORHIO	HASA Health Information Organization
HCA®	Intermountain Healthcare	KHIN Kansas Health Information Network
MAYO CLINIC	Ochsner Health System	ROCHESTER RHIO