



HEALTHCARE INTEROPERABILITY TO CONNECT THE CARE TEAMS ACROSS THE US

***Providing data transparency in
healthcare a new meaning***



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EXECUTIVE SUMMARY

Healthcare data sources are multiple ranging from EHRs, claims, billing systems, practice management systems to financial systems to other hundreds of devices. Ever since its advent, data in healthcare has become an important entity; revealing over six million letters of genome sequences, to making precision medicine a reality. Yet the most fundamental and long-term goal remains out of reach: interoperability between healthcare organizations. A scenario where information flows seamlessly between healthcare organizations and every provider, payer, patient, and system has access to relevant information when they need it.

Electronic health records have been around for more than 30 years, and as of 2008, only 38% of office-based physicians were using them.¹ The number rose to 78% in 2013, showing how healthcare has lagged in its adoption of digitization. Achieving true interoperability in healthcare has become a complicated endeavor. Although data exchange standards and regulatory incentives such as Meaningful Use have encouraged healthcare organizations to improve interoperability and ensure data sharing, inconsistencies and data quality issues persist.

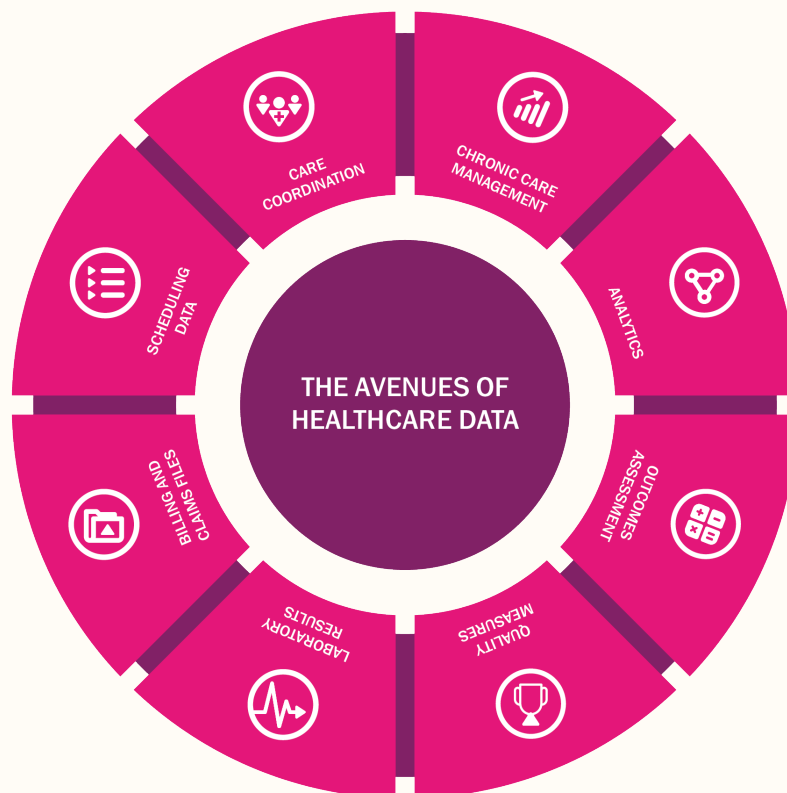
This whitepaper discusses the importance of interoperability in advancing patient-centric care, the challenges of distributed healthcare data, and a framework to enable secure health data sharing that empowers healthcare organizations to move forward with their goals of efficient care and enhanced outcomes.

DISTRIBUTED DATA IN HEALTHCARE AND ITS IMPLICATIONS

In an evolving data-oriented healthcare system, patients receive care across multiple avenues. The patient's medical information, visit history, events of admissions or discharge, and the likes are distributed across the care continuum and stored in multiple disparate data systems. Even during a single hospital stay, one patient has many contact points and crucial patient data is available from multiple systems- from medical devices to imaging systems to wearables.

HOW DID DATA CONNECTIVITY GO OUT OF HAND?

In a survey, 95% of the healthcare providers said interoperability challenges limit their ability to transfer data from one medical center to another.¹ As a result of this, healthcare in the U.S. stands at an estimated worth of over \$3 trillion² and produces about 30% of the world's data. The amount of data generated- in lab tests, medical images, patient profiles, genome sequences, electrocardiograms, biopsies, to name a few- is in itself overwhelming. Add that to the data from EHRs, claims, billings, prescriptions, research- and we have a data yield around some 750 quadrillion bytes every day.³



EHRs and other data systems over time have been created with different architectures and data schema. On a small scale, when the information had to be exchanged within an organization, data from different brands of EHRs was easier to put together. Today, even though more than 78% office-based physicians use a certified EHR to collect and store data about patients and 9 out of every 10 physicians have an EHR, only 41% of them are able to share this information across organizations.⁵ Several physicians using an EHR still use localized, server-based platforms with no connectivity. Reworking EHR implementation is not possible, as setting them up is a cost-prohibitive initiative, taking up almost \$33,000 per physician in mere implementation, with an additional \$17,000 per physician annually.⁶

In addition to these electronic systems, there are several challenges posed by manual paperwork processes as well. Patients often hand-deliver a copy of their records or test results to another physician, or the physician may have to fax records. Running through these transcripts and ensuring they reach the destination in time is an added task. Also, healthcare organizations refrain from using mediums such as emails or text messages to exchange healthcare data to avoid the risk of cyber attacks. Connecting the plethora of data systems and ensuring a seamless data flow is a roadblock healthcare is yet to address on its way to delivering quality care.

HOW DISTRIBUTED AND DISPARATE DATA SYSTEMS HINDER PATIENT-CENTRIC CARE



MISSING OR BROKEN PATIENT INFORMATION

It's a chilling reality, but more than 1000 people are killed and 10,000 are injured every day due to medical errors largely because of technology mistakes. About 40% of these errors are directly related to information gaps and miscommunication.⁷ The lack of complete patient information possibly causes the most harm to patients, as well as takes up physicians' time. And with fragmented data across the network, patients repeatedly face challeng-



INEFFICIENT TRANSCRIBING AND IMPUTING

Physicians are only able to spend 27% of their office day on direct interactions with their patients, trying to understand their concerns and addressing them. On an average, doctors spend 49%, almost half their day, on EHRs and other desk work such as reviewing test results, logging patient information and updates, writing medication prescriptions and the like.⁸



REDUNDANT TESTS AND PROCEDURES

Nearly 32% of patients end up repeating tests and procedures because of lack of proper information at the right time.⁹ Repeated tests result in higher expenditure, one of the significant reasons hindering the quality of care in the United States. Just with a decrease in redundant testing by improving the accessibility of information, healthcare can save up to \$3 billion.¹⁰

THE BARRIERS TO ALIGNING MULTIPLE STAKEHOLDERS AND SYSTEMS

Healthcare has been exploring methods of interoperability for years now. The passage of the HITECH Act 2009, which provided billions of dollars as an incentive for providers to implement EHRs witnessed an increase in physician adoption of EHRs. Even health IT solution providers switched from legacy, server-based systems to cloud-based, opening doors to incremental success in interoperability. However, there are some significant challenges yet to be resolved:

- Different interfaces for different systems combined with lack of standards and basic schema of EHRs results in every EHR being tackled separately.
- The growing number of healthcare data systems for care management, population health management, and others used in a hospital setting have created challenges in reconciling the
- Lack of a uniform data exchange standard and getting everyone to agree on one means to send and receive data hinders its flow and can lead to unforeseen consequences.
- Manual and Excel-based workflows that reduce the efficiency of physicians as they hunt for useful information across multiple screens and systems, hindering patient care.
- An increase in cyber attacks in healthcare has warranted a security and confidentiality overhaul to protect the patient health information.
- Several providers, mainly the large, enterprise solutions, either willfully block the exchange of data to withhold crucial health information or charge sky-high rates

THE AIM TO ADVOCATE PATIENT-CENTRIC CARE

Data should be following the patient, not the other way round. Even if the patient was seen in different medical settings, data from lab results, medication history, along with personal information should be something that supports patient care, and not become an additional burden. Conveying and interpreting patient information is a significant task and not something that should be disconnected from patient care.

THE THREE LEVELS OF INTEROPERABILITY

According to HIMSS, healthcare interoperability can be defined at three levels¹¹:



FOUNDATIONAL INTEROPERABILITY

- The most basic level of interoperability
- Exchange of basic data from one data system to another
- Does not require the receiving system to interpret and understand data



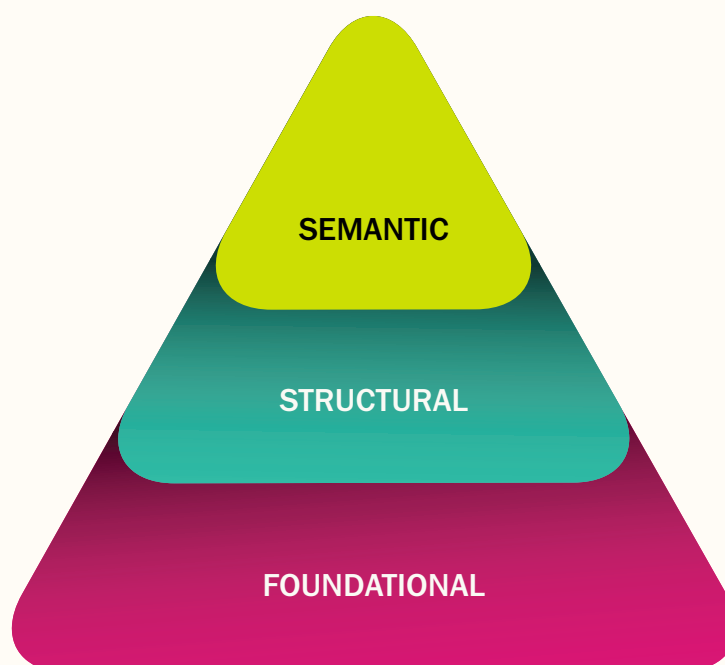
STRUCTURAL INTEROPERABILITY

- The intermediate level of interoperability
- Exchange of a defined structure of data from one data system to another
- Requires the receiving system to interpret the incoming data field
- Example: message format standards such as HL7 FHIR



SEMANTIC INTEROPERABILITY

- The highest level of interoperability
- Enables exchange, use, and reuse of acquired data
- Requires the receiving system to interpret the incoming data field
- Example: SNOMED CT



THE CURRENT ADVANCEMENTS FOR INTEROPERABILITY

One can assume how the efforts for interoperability for the next several years will be shaped by pursuing the existing efforts: defining data standards, advancing the reimbursement incentives that encourage exchange, ensuring security, certifying EHR capabilities, and eliminating data blocking.

The HITECH Act 2009 called for the meaningful use of interoperable electronic health records, leading to CMS' initiative of offering incentives for accelerated adoption of EHRs. The Office of National Coordinator for Health IT (ONC) has been explicit in its push towards interoperability, right from providing a roadmap to interoperability¹² to offering grant fundings to entities involved in the governance of health information exchange. Even the Food and Drug Administration (FDA) has stepped into ensuring interoperability by publishing guidelines on device interoperability. Additionally, the adoption of interoperability standards by organizations such as HL7, NCPDP, and ASC X12 has improved across healthcare organizations. The new initiatives such as the 21st Century Cures Act and the latest BlueButton initiative by the CMS are an affirmative push in the direction of interoperability.

Collective industry actions, too, are tackling various aspects of interoperability. The CommonWell Health Alliance, a bunch of more than 50 health IT solution vendors, is working collectively on improving patient identification and locator services. The Sequoia Project is advancing the development of interoperability frameworks. Amidst all these efforts, healthcare opened up opportunities for application programming interfaces (APIs) to enhance its data exchange and sharing capabilities. The Argonaut Project, backed by several solution providers, is advocating API development based on the emerging Fast Healthcare Interoperability Resources (FHIR) standards. If the advances pick up, interoperability can save healthcare more than \$30 billion.¹⁰

POTENTIAL SAVINGS



2 BILLION \$

Decrease adverse events by increasing safety interlocks



3 BILLION \$

Decreasing redundant testing by increasing accessibility of information



12 BILLION \$

Increase clinician productivity by decreasing manual input of information



18 BILLION \$

Decrease lengths of stay by decreasing delay of information

API-BASED CONNECTIVITY IN HEALTHCARE

Healthcare organizations are increasingly turning to APIs to enhance interoperability between EHRs, internal apps, and other data exchange tools. APIs are interfaces that allow disconnected programs or systems to communicate with each other, acting as bridges that allow the flow of information. APIs are being looked at as ways to reduce development time, save storage space on devices and systems, and overcome any differences in the standards or formats in data at either end of the bridge.

ONC proposed three technical outcomes for healthcare APIs in its 2015 Edition of Certified EHR Technology¹³:



DATA SECURITY

The APIs need to establish a trusted connection with the application requesting patient data. This includes a means for requesting the application to register with the data sources, become authorized to request data, and log all the interactions taking place between the application and the data source.



PATIENT SELECTION

The APIs should have enough measures for the application to query for an ID or any other identifier in a patient's record in order to execute the subsequent data requests.



DATA REQUESTS, RESPONSE SCOPE, AND RETURN FORMAT

The APIs need to include a means to support two major kinds of data requests and responses: "by data category," and "all." In both cases, the scope required for certification may be limited to the specified data sets in the Common Clinical Data Set, but additional data is allowed.

There are several advantages of using APIs, some of which are listed below:

- Real-time access to crucial patient information
- Autonomous processing and customized data governance
- Little delay in receiving or extracting information
- Better clinical decision-making and integrated workflows for providers

This is only the tip of the iceberg and through an API-first approach, healthcare organizations can simplify interoperability by enabling seamless data flow backed by a robust infrastructure. However, creating a one-stop solution to access important data and applications is a necessary step in making healthcare data intensive.

NEED FOR A UNIFIED DATA ACTIVATION PLATFORM

Often, a healthcare organization's initiatives for integrated data, care management, population health management, and the likes are disconnected. The data may be flowing seamlessly across the network but the applications end up using different data sets for different purposes.

Consider an example of a provider network in a value-based contract with a payer. The payer would require structured data that allows them to have a holistic view of the population, and the provider would require something that pulls out the care gaps for every patient. Essentially, the data they both need are quite similar- EHRs, claims data, ADT feeds, ambulatory data- to begin with.

The difference lies in how both these groups leverage their data. The providers may want to understand how their patients traverse in and out of the network to ensure the patients get the best care and remain within the network. The payer, on the other hand, would want to ensure the patients are being referred to the best providers within the network. Ultimately, payers and providers end up working on the same set of data, however the lack of ability to reconcile their outcomes and interoperability ends up creating huge gaps in care and an even longer gap on the road to successful outcomes.

A unified data activation platform can incorporate multiple data sources to deliver clean, structured datasets and can grow as the amount and types of data increase. Different entities can leverage analytics to learn about their network, identify gaps in care, study the state of population health, learn about the growth opportunities in their network and tap into them.

INNOVACER'S DATA ACTIVATION PLATFORM

Innovaccer's leading data activation platform has been purpose-built for true interoperability across the network. With its 200+ pre-built connectors to widely used healthcare data systems and applications, the platform enables quick data ingestion and integration to create a unified healthcare data layer. The data activation platform pieces together disparate data sources into unique, longitudinal Patient-360 records which are exchanged via industry-governed standards such as TCP/IP, SFTP, FTP, HL7, HISP, FHIR. Making healthcare data integrity a priority, InData enables data sharing by means compliant with HIPAA. The platform ensures providers don't spend valuable time hunting for data by providing them with real-time access and point-of-care insights—letting providers do what they do best.



Smart, AI-assisted
Care Management Solution



Industry's Most Powerful Analytics Tool for
Population Health Management



Point-of-care Assistant for
Physician Engagement



One-stop
Patient Engagement Solution

The following solutions are built on Innovaccer's Data Activation Platform:

**INCARE**

Smart, AI-assisted care management solution, with PCMH level care delivery, hardcoded into the workflow. InCare streamlines the care management process enabling systems to scale care management programs at lower costs, and with higher quality.

**INGRAPH**

State-of-the-art analytics and reporting solution with over 800+ measures to track network performance and outcomes, customizable measures and dashboards accessible across the network, and automated reporting on quality measures.

**INNOTE**

A smart, lightweight physician's digital assistant that surfaces critical system and population health insights derived from multiple data sources, at the point of care. Using InNote, insights such as care gaps, dropped codes, process measures and referrals information can be shared with the clinician - without their having to leave the EHR experience.

**INCONNECT**

An automated analytics-driven patient engagement solution to scale patient outreach workflow, and bring patients closer to the care team.

ABOUT INNOVACER


Innovaccer Inc. is a leading healthcare data activation company making a powerful and enduring difference in the way care is delivered. Innovaccer's aim is to make full use of all the data our industry has worked so hard to collect by righting the wrongs, doing away with long-standing problems and replacing them with ideal solutions. The Gartner and KLAS-recognized products have been deployed all over the US across more than 500 locations, letting over 10,000 providers transform care delivery and work as one. The data activation platform (DAP)™ has been delivering value to several institutions, governmental organizations, and several corporate enterprises such as Mercy ACO, StratiFi Health, UniNet Healthcare Network, Catalyst Health Network, Hartford Healthcare, and Osler Health Network. Innovaccer is based in San Francisco and has offices all over the United States and Asia.

For more updates, visit www.innovaccer.com.


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 team@innovaccer.com

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 213-618-3678

 Suite 1829, 18th Floor,
535 Mission St,
San Francisco, CA 94105
United States