INTEROPERABILITY 2.0:
HOW TO CONSUME, ORGANIZE AND SHARE HEALTH DATA TO ACHIEVE GREATER VALUE

For nearly ten years, the health care industry has largely exchanged paper medical record silos for digital ones we call electronic health records (EHRs). Interoperability follows a similar storyline. Although initial attempts at interoperability were designed to offer baseline standards for exchanging health care data, in reality we have mostly traded floods of faxes for floods of Health Level 7 (HL7) transactions and Continuity of Care Documents (CCDs).

How do we move toward a new generation of interoperability, where better patient outcomes, improved clinician workflows, and overall cost reductions can be realized?

This perspective paper will investigate some ways to apply "interoperability 2.0" concepts. We will explore how data is:

1) consumed by a health care data platform;

2) organized and put into context once it's within the platform; and ultimately

3) shared with external applications and end users.

Even as the industry remains committed to improving existing, tried-and-true standards, interoperability is a concept that must continually evolve in the interest of better patient care.

STEP 1: DATA CONSUMPTION

In recent years, industry standards such as HL7 and Integrating the Healthcare Enterprise (IHE) have generally provided mechanisms to enable organizations to push and/or query-and-retrieve clinical data. Often, however, these standards are not so standard at all. Therefore, as we move toward a new generation of interoperability, we first need to consider how we actually ingest data into our networks.

It's surprising how many health care IT solutions today merely pass data from the left hand to the right, without consuming the data at all. In many cases, that's intentional; those who choose to capture data must take on appropriate security and privacy responsibilities. Yet failing to ingest the data also means you forfeit any opportunity to do anything of value with it later.

That's why data consumption is vital, along with providing some level of validation as part of the ingest process. Doing so helps to ensure the presence and syntax of certain data elements needed to properly file the transaction or document. The "garbage in, garbage out" concept applies here; it doesn't do anybody any good to store junk information.

Another important consideration is flexibility in terms of data acquisition. For example, consider the standards we previously referenced. A system might support IHE in general, but only certain profiles. What happens if the requesting system only supports XCA and XCPD, for instance, and the system in which the data resides only supports XDS? The answer: Nothing.

New interoperability platforms need to be able to bridge such standards, allowing otherwise disparate systems to communicate. The same goes for transport mechanisms – TCP/IP, Direct, SFTP, APIs; flexibility is key.

STEP 2: DATA ORGANIZATION

Once data is within a platform, health care organizations need to consider how it can be organized to add value.

Traditionally, if data platforms stored health care transactions and documents at all, they did so exactly as they were received. The content was simply indexed to a specific patient, similar to how the Dewey Decimal System works for filing books in a library. The primary purpose of this storage method is to create a history or longitudinal record for each individual patient.

As the industry moves forward, however, our focus should shift to using all the

data collected to create actual patient intelligence. We need ways to make data more useful and easier to interpret. Enter one of the bigger buzzwords in health care IT: "aggregation."

In its framework for population health management, KLAS designates "aggregation" as its first vertical, defining it as "compiling disparate clinical/administrative data sources to support population health."[1] It's certainly no coincidence that KLAS labeled "aggregation" as vertical #1, given how foundational it is for population health management. However, one could take issue with their definition. Is merely "compiling" data really enough?

Many systems already compile data. What's needed now is to take aggregation further to help create useful intelligence. A first step might be to incorporate technology such as semantic resolution, where code sets are normalized into a standard terminology. Then, duplicate medications, procedures, results and other clinical data elements should be consolidated to create a cleaner, more simplified view of the patient record. Ultimately, data elements should be stored discretely in a standard object model — whether contributed via HL7 transactions or CCD documents, as examples. That's the definition of "aggregation" the industry should be striving for in this new generation of interoperability.

> **One of the most critical aspects of putting patient data into context is identifying the exact patient with whom incoming data should be associated**

[1]https://klasresearch.com/images/pages/events/Keystone_White_Paper_2016.pdf

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Of course, one of the most critical aspects of putting patient data into context is identifying the exact patient with whom incoming data should be associated. Mistakes matching patients accurately with their data can negatively impact patient care, patient safety and administrative costs. Yet the process has become increasingly complicated as patients receive care in multiple settings, and organizations use different systems to share records. The challenge will only increase with the current movement toward removing social security numbers — even the last four digits — from the equation. The importance of patient matching — coupled with the difficulty to do so effectively, efficiently and at scale — requires continuous and concentrated investment in a patient management strategy.

STEP 3: DATA SHARING

Although application programming interfaces (APIs) such as Fast Healthcare Interoperability Resources (FHIR) must be recognized, their current use is still fairly limited in production environments. For now, there are two conventional methods for sharing health care data:

1) Leverage basic industry standards such as HL7 and IHE to push and/or query-and-retrieve data.

2) Use an interface (e.g., portal, inbox, worklist) to allow end-users to access information.

Each of these methods has shortcomings. One is that end users always see the original transactions or documents distinctly. Even if they are appended to each other, they are still separate objects. Another — and arguably more fundamental — challenge is that these methods don't easily enable information to be presented in a way that allows end users to remain in their native workflows.

As we evolve interoperability, our collective aim should be an end user experience in which data is presented in a single view — one consisting of both transaction-based and document-based elements that are aggregated and intermingled side-by-side. To maximize user adoption, that single view must be presented in a way that's consistent with the user's workflow. Requiring users to navigate to separate applications, log-ins, searches, etc., is not acceptable.

To make it one step better: the single view of normalized and de-duplicated data really should be customizable by the end user. As another example, include the ability to customize how much history to include in a particular section. For instance, perhaps only the last year of data is relevant to the user as opposed to the patient's entire history. Ultimately, it should be about enabling users to find the "needle in the data haystack" faster. How data is organized, as well as how content is formatted when presented, contribute to that objective.

Today's focus on value-based care and population health management adds yet another layer of complexity. A comprehensive data platform should be expected to publish its data assets in a way that can be consumed by external applications across the spectrum of population health management – analytics, care management and patient engagement, for example.

This business driver has given rise to a new dimension of interoperability that some have termed "analytic interoperability." To achieve it, some solutions create "extracts" in which data sets are packaged to be consistent with the unique specifications and requirements

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of the consuming application. Alternatively, APIs can be developed for standardizing data publication to third parties.

But no matter how valuable our population health data insights might be, they won't matter unless they're seen by those in a position to act on them. Analytics can help us identify gaps in care, for example. Analytics can tell us that certain patients are at-risk for substance abuse, or that others lack transportation to a primary care provider. But these insights are only the start. It all goes back to workflow. To successfully manage patient populations, we must enable data-driven insights to be injected into care team workflows — whether through a customized view of CCDs, Direct Secure Messaging, a notifications platform, or other means.

A comprehensive health care data platform must drive innovation at every phase

IN SUMMARY

It's time for health care to move into a new generation of interoperability – interoperability 2.0 – where truly meaningful, useful data is incorporated into workflows. To get there, a comprehensive health care data platform must drive innovation at every phase. That includes how data is consumed by the platform, how data is organized and put into context once it's within the platform, and how it is ultimately shared with the external applications and the end users who need it.

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