



ACCOUNTABLE DELIVERY
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CLINICAL DATA INTEGRATION:

FROM CHALLENGES TO OPPORTUNITIES

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EXECUTIVE SUMMARY

Clinical Data Integration: From Challenges to Opportunities

Why isn't health care as technologically advanced as other industries? Shouldn't your doctors know what medications you are taking or what diseases you have, without you reminding them? In this whitepaper, we explore four major roadblocks that must be solved to move clinical data integration forward. Until these are successfully resolved, health care will continue to lag behind other industries.

TABLE OF CONTENTS

Clinical data integration: From challenges to opportunities	2
Which Maria Gonzales?	3
Opening up closed systems	4
Data overload	5
Bringing structure to chaos	6
From challenges to opportunities	6
About Keith Blankenship.	7
About Lumeris	7
About the Accountable Delivery System Institute	7

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CLINICAL DATA INTEGRATION: FROM CHALLENGES TO OPPORTUNITIES

While waiting for a table at a local restaurant over the weekend, I read a few pages of a new mystery novel on my iPhone. What was amazing about this is that earlier in the day, I had been reading the same book on my iPad — and my iPhone knew which page to jump to so I could pick up right where I'd left off. Examples of integration like this are all around us in everyday life, and we've come to expect our devices and applications to communicate with one another seamlessly.

Given the level of integration in something as mundane as reading a book, the lack of integration in the world of health care is surprising and even baffling to most people. Perhaps you've heard stories about Grandma Jones who brings her bag of medications with her to the emergency department so that the treating physician will know what she is taking, or seen pharmaceutical commercials encouraging patients to tell their doctors about their medications and diseases. Why is this necessary? Why isn't health care as integrated as other industries? Shouldn't your doctors know what medications you are taking or what diseases you have without you reminding them?

Unfortunately, your doctors often don't know. For decades, the health care system has rewarded volume-based care, with little or no business model to support the exchange of information among health care entities. In this environment, it is not surprising that clinical data integration has not kept pace with advances in technology, even as it's boomed in other fields. Another reason for the slow adoption of clinical data integration: The system is missing the rules and trust among organizations necessary for efficient information exchange. Countless hours have gone into developing data standards for health care, but the standards alone cannot bridge the challenges of clinical data integration. Rather, these standards have been likened to the interstate highway system: The infrastructure is an excellent way to get from point A to point B, but the system can't function without laws and good faith among its users. In health care, there are still many roadblocks preventing the free flow of information.

In this paper, we explore four of these roadblocks, which must be solved to move clinical data integration forward: Identifying patients, integrating disparate systems, managing big data, and managing unstructured data. Until these are successfully resolved, integration in health care will continue to lag behind other industries and the industry won't realize the full potential of proactively enabled health care for individuals or patient populations.

Stages of clinical data integration

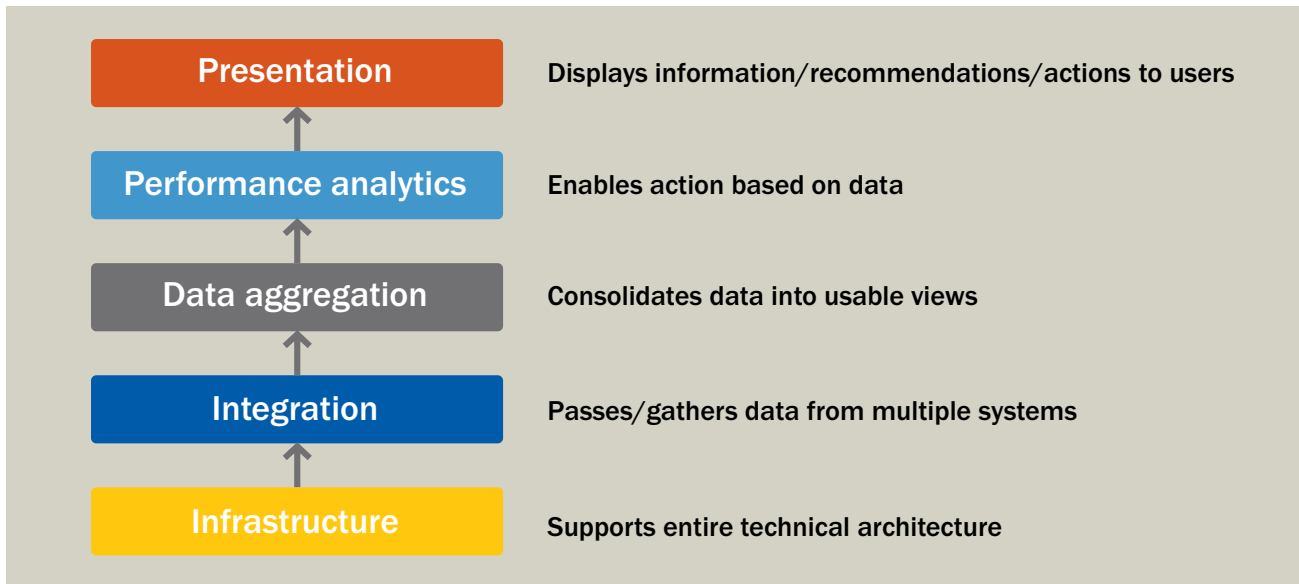


Figure 1: Many of the roadblocks to clinical data integration are in the early stages of data gathering and aggregation. These stages require significant collaboration among health care organizations that historically have not worked together, such as competing hospitals, lab providers, or electronic health record vendors.

WHICH MARIA GONZALES?

The first challenge in clinical data integration is knowing who's who. Any platform that supports clinical data integration must have a way to know if the Maria Gonzales who went to the emergency department last night is the same as the Mary Gonzales who picked up her prescription at the neighborhood pharmacy last week.

That sounds simple enough, but it's often a struggle to identify patients across the continuum of care because health care organizations don't use a common identification number for each person. When patient information was first converted from paper to computers, most organizations used the social security number as an identifier, making it easy to track patients across the system. Due to privacy concerns, social security numbers were replaced by unique and random identifiers in the early 1990s — with each organization creating its own system for generating and assigning the numbers. This means two organizations treating the same patient have no common way to identify that patient for easy information-sharing.

The government recognized this issue and included provisions for a national patient identification number in the 1996 Health Insurance Portability and Accountability Act (HIPAA) regulations, but Congress reversed itself only two years later and removed the provision. Most law experts now agree there's little chance the government will create national patient identification numbers to solve this challenge, so health care organizations and technology vendors must find a fix.

Some health care organizations are now collaborating to develop unique common identifiers for patients. While these efforts will help with the problem, they will only be as widespread as the organizations involved in the effort. When a patient moves outside those organizations, the same issues will exist.

A more comprehensive solution is electronic master patient indexes, or eMPIs. An eMPI uses algorithms to compare records and determine the probability that they belong to the same patient, using data like name, social security number, home address, phone number and so on. The algorithms in most common use were first developed in the 1990s to support the census-taking process. Although eMPIs are a highly accurate and efficient solution to identifying patients, this remains an area of concern in clinical data integration. Any mistakes can result in inaccurate medical records, and an incomplete or improper course of treatment.

There's also a growing grassroots effort toward voluntary identification numbers — a unique national identifier that patients can obtain at their own initiative, then communicate to their health care providers. The voluntary identifier is included in eMPIs to minimize the risk of record-matching errors in algorithm-only systems.

OPENING UP CLOSED SYSTEMS

For clinical data integration to succeed, health care organizations must open their data ecosystem to other organizations for data-sharing. This presents a major challenge, as each organization has a unique infrastructure and IT policies. Historically, many of them are also competitors, loathe to freely share their data with one another — but in the new era of value-based care, this approach no longer works. Instead, it requires health care organizations to leverage data inside and outside their walls to maximize quality and care, as well as associated capitation payments.

Both large and small organizations today are extremely tech-savvy and view their IT systems and data as strategic resources. They tightly control access to these systems, with restrictions on who can touch and modify data, as well as entire departments devoted to monitoring and protecting these systems. Given these investments, most companies are reluctant to allow outsiders access to their data — and especially opposed to combining their data with outside sources. Patients are now challenging this view as they bear more and more of the financial burden for their care and grow more engaged in the health care system. Many now assert that they own the data generated from their care but consent to allow providers and health care organizations to use it on a need-to-know basis.

On the opposite side of the spectrum are small physician offices with little IT savvy. Many of these physicians have adopted electronic health records in response to the Health Information Technology for Economic and Clinical Health (HITECH) Act, which offers incentive payments to providers who establish connectivity within certain guidelines. In these offices, some of the most important information for clinical data integration is housed in the servers running these physicians' electronic health records, but chances are the docs do not have an IT staff and may even have had a friend or relative help install the system. Most of these physicians know very little about the IT requirements for data sharing or how these changes might affect their practices.

One solution to this connectivity challenge is the establishment of Health Information Exchanges (HIEs), which act as intermediaries between health care organizations that wish to exchange data. Most HIEs are either state sponsored or created through a consortium, so no single organization can hold a monopoly on the movement of data. While some HIEs have been successful at a regional level, it is still not clear what their overall impact will be in solving the clinical data integration issues.

As with identification numbers, however, patients can choose to take action to solve this problem at an individual level. One of the most transformational sections of the second-stage Meaningful Use requirements is the one requiring certified electronic health records to support viewing, downloading and transmitting patient summary information as directed by a patient or their designee.

The patient can send the data to anyone they like: themselves or a family member in the form of a personal health record application; a primary care physician or specialist; a medical home, accountable care organization, disease registry or clinical research project; and so on. This capability effectively allows patients to act as an “HIE of one,” taking control of their data and its distribution.

DATA OVERLOAD

There is a wealth of data available in the health care space — an estimate of 150 exabytes, growing by up to 2.4 exabytes every year. (One exabyte is one quintillion bytes, and is written as a one followed by 18 zeros.) This data lives in electronic health records at hospitals and physician offices, lab systems, pharmacy systems, picture archiving and communication systems (PACS), payer systems and so forth. Even with all that’s available, we are on the verge of an exponential explosion of additional data as a byproduct of new health technologies like implanted and work “body signal devices” and genomic-based personal medicine.

While numerous technology companies are focused on how to deal with and process these massive quantities of big data, there are also practical challenges in everyday use of the data. These include:

Identifying relevant information: Given the vast amount of data, it’s vital to rapidly identify the data that is needed to treat a patient — and exclude the data that is not. There are key data elements that are obviously crucial, including medications, lab results, problem lists, diagnoses, vital signs, and procedures. But what additional data is relevant and needed? For example, consider a health plan that tracks clinical measures to improve the cost and quality of health care. These require specific data from insurance claims, labs, medications and electronic health records. The key is selecting the data relevant to those measures, without getting overwhelmed by everything else available.

Handling duplicate data: A second challenge with big data is duplicated information. For example, lab results may be available from a lab vendor and also from an electronic health record or a personal health record. When multiple lab values are available for the same test on the same day, how do you determine which value is correct? This usually requires a flexible set of rules that can judge the reliability of a source and merge data appropriately. Using the lab example, it’s obvious that a value from the lab vendor is more reliable than a value entered manually by a physician into an EHR, since a physician may introduce typos.

Removing incorrect data: Finally, some of the data available is certainly inaccurate as a result of mistyping, miscommunication from a patient and even preconceived notions of the physician or nurse entering the information (for example, health care workers may default to “normal” values through force of habit). Incorrect information is possibly more harmful than no information at all, as it can lead to inadequate or incomplete treatment. As anyone who has dealt with an incorrect entry on their credit report knows, getting incorrect data removed from a record is time consuming, if not impossible. Allowing patients to inspect and correct their data is crucial to successful integration — as is logic to identify and remove inaccurate data from a health record.

BRINGING STRUCTURE TO CHAOS

Part of the reason big data is overwhelming is its format: As much as 80 percent of it is unstructured, meaning it is not associated with a predefined data model. Without this model, information systems can't read or use the data. Instead, it's added to a patient's health record as free text (such as a doctor's notes or radiologist's interpretations) or images (such as x-rays). Experts say about 60 percent of the 1.2 billion-plus existing clinical documents contain this sort of valuable clinical information that is not available for the treatment of patients or population management. Recent advances in computer-assisted text mining are making this data more accessible with the addition of searchable metadata. As this technology advances and providers move to electronic health records, the percentage of unstructured data will decrease — but in the near term this will continue to be a time-consuming process, requiring new solutions to handle existing unstructured data.

FROM CHALLENGES TO OPPORTUNITIES

Clinical data integration alone will not end the U.S. health care crisis, but it is a vital component to the overall solution. Emerging payment models are enabling technology's promise to improve information-sharing among payers and providers, helping increase collaboration, lower costs, improve quality, and boost patient and physician satisfaction. There are complex challenges to achieving integration — but countless other industries have shown it's possible, and it's absolutely vital to the transformation of the U.S. health care system.

Health care organizations that proactively tackle the challenges of technology and data position themselves to deliver not only on the Triple Aim Plus One (better health outcomes, lower costs and improved patient *plus* physician satisfaction) and maximize their population-based contracts, but also to create their next generation of market-differentiating value-based products and services.

ABOUT KEITH BLANKENSHIP

Keith Blankenship is a consummate software development and technology executive, with more than 24 years of development and engineering experience. In his role as Vice President of Technical Solutions at Lumeris, he is responsible for the development of various technology solutions that improve health care coordination, collaboration, and overall accountability. He also serves on the faculty of the Accountable Delivery System Institute®. Previously, Mr. Blankenship was Director of Application Development at Coventry Health Care and held various management positions at Blue Cross and Blue Shield of Missouri.

ABOUT LUMERIS

Lumeris is an accountable care delivery innovation company offering health systems, payers and providers operational support, technology and consulting services. Our technology-enabled solutions and services help health care organizations design, build, operate, measure and optimize any accountable care model to accomplish the Triple Aim *Plus One*: better health outcomes, lower costs and improved patient *plus* physician satisfaction. The depth and breadth of Lumeris' solutions—combined with its near decade of experience in accountable care—make the company an ideal partner for any health care organization seeking the benefits of a better connected, aligned and informed accountable delivery system. For more information, 1.888.586.3747 or Lumeris.com.

ABOUT THE ACCOUNTABLE DELIVERY SYSTEM INSTITUTE

The Accountable Delivery System Institute (ADSI) is the premier resource for hospitals, health plans, and large physician groups seeking proven solutions and practical guidance on establishing successful models of accountable care.

ADSI is led by the seasoned experts who established one of the nation's first successful accountable delivery systems — long before “accountability” was an industry buzzword or there was an acronym to describe it. Through their efforts, they improved the management and delivery of health care by instituting rational economics, new operational processes, and innovative technology to enable value-driven health care decision-making throughout the enterprise. The result: improved revenue, lower per-capita costs and better patient outcomes.

The ADSI faculty's years of refining this accountable delivery system have yielded valuable insights into what does and does not produce accountable health care. Through ADSI, these insights and solutions are now available to others seeking help in building their own accountable delivery system.

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