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THE 5 CRITICAL INFORMATION SYSTEMS NEEDED TO DRIVE ACOs

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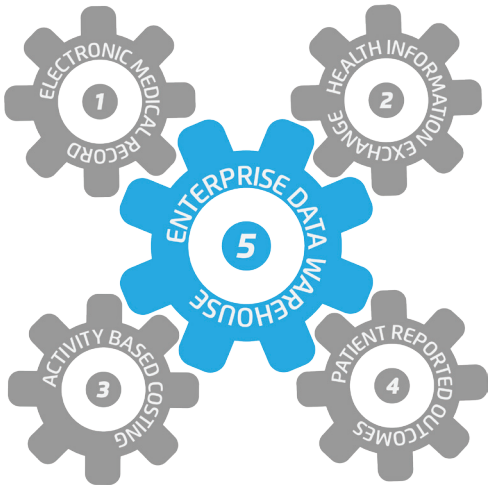
At the center of these data collection systems is the EDW—the platform that enables the analysis of clinical, financial, and patient reported data in a single database repository. The EDW is the system that drives the Return in the ROI of healthcare IT for the ACO.

Executive Summary

More and more, healthcare is molded and critically impacted by the software and information technology that surrounds and supports the industry. As a consequence, the C-level suite beyond the CIO must actively participate in the evolution of their organization's IT strategy, particularly at the layer of technology where software directly supports workflows and business processes.

There are five information systems that are indispensable to the success of an ACO. Those five critical information systems are listed below.



1. An Electronic Medical Record (EMR) used in a consistent and meaningful way across the accountable care enterprise to document patients' healthcare status and treatment and support safe, evidence based care.
2. A Health Information Exchange (HIE) to enable the sharing of patients' clinical data across disparate EMRs in the accountable care enterprise.
3. An Activity Based Costing (ABC) system to enable detailed, patient-specific collection of cost data that in turn enables the accountable care organization to precisely understand cost of production and revenue margins in capitated payment models.
4. A Patient Reported Outcomes (PRO) system to enable the complete understanding of clinical outcomes and quality, from the patient's perspective. This is not a patient satisfaction system—it is a clinical outcomes assessment system, tailored to the patient and their protocols of treatment.
5. An Enterprise Data Warehouse (EDW), which is central to enabling the analysis of data collected in the information systems described above—and more. Without the EDW, the data collection systems described above are relegated to small or non-existent ROI. It is the exposure and integration of the data in the EDW that liberates the ROI from those systems. It is common for EDWs to realize an ROI as high as 450% in two years.

> The federal policy and financial incentives for increasing the adoption of EMRs and HIEs was nearsighted. Without an investment in the software and technology of an EDW, the healthcare industry will not reap any worthy benefits from the investment in EMRs and HIEs.

Over the past seven years, significant national policy and strategy attention was focused on EMR and HIE adoption, but very little attention has been paid to the other three components of ACO IT described above. As evidenced by the recent departure of several organizations from the Pioneer ACO program, the inability to integrate and analyze data in an EDW is "the single most frustrating issue" those organizations face. Even less national attention is being paid to the development and adoption of systems to collect detailed cost accounting data—Activity Based Costing and Patient Reported Outcomes data. Without the former, C-levels cannot accurately measure the true cost of care and the risks of capitated payments. Without the latter—Patient Reported Outcomes data—C-levels cannot accurately understand patient- and protocol-specific clinical quality. Also, precise predictive analytics and patient risk stratification is unachievable without patient reported outcomes.

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Background

The term ACO is used here in a broader sense, beyond the burdensome federal definition. In this context, the term ACO implies very simply to the shift in reimbursement from procedure-based, fee-for-service towards fee-for-quality, disease, or condition-based reimbursement with capitated payments to healthcare delivery organizations on a per-case and per-capita basis. I also imply strongly that the governance structure of the accountable organization offers an insurance plan alongside healthcare delivery services, under a single CEO and Board. A quick assessment of the most successful U.S. healthcare systems, such as Intermountain Healthcare, reveals one very simple common trait: They offer health insurance plans and health delivery services under a single CEO who balances the economics of care with access to care and quality of care.

Federal funding has essentially guaranteed the industry's adoption of EMRs and HIEs. One could argue that the quality of the products underwritten by federal incentives (e.g., Meaningful Use) and grants is mediocre at best, but, nonetheless, some version of these products is necessary to electronically collect and share patient care data. There is little argument in opposition to that concept. But, despite the investment in EMRs and HIEs, our national health strategy has not gone far enough in its encouragement of IT adoption. The EDW is the most important link in the chain of IT products required for accountable care.

In the past six years, the U.S. healthcare industry experienced an unprecedented investment in software and technology, particularly EMRs and HIEs. Conservative estimates place that investment at over $100 billion. Despite those massive investments, there is no compelling or defendable evidence of any notable return on investment. The needle is not moving on the dashboard of U.S. quality of care nor per capita cost of care. To worsen the bleak picture, physician satisfaction with the EMR products stimulated by these federal incentives is only 39% and declining—six out of 10 physicians are dissatisfied with the EMR they must use to support the treatment of their patients. Seventy-eight percent of public HIEs fail due to financial

Deep Background

There are three principles of information technology that are common across industries. As healthcare becomes a more tech-savvy, computerized industry, it's important for healthcare executives beyond the CIO to understand these principles and their impact on the business.

Principle #1: Business Moves at the Speed of Software

Information technology—specifically software—is now the dominant variable in business agility and adaptability. In the past, the dominant variables were the culture and skills of the people of the organization. But even the best, most talented employees can perform their jobs no better and no faster than the functionality of the software and information technology that surrounds them. The best software and information technology can drive unprecedented business insight and business models. The worst software can drive a business into the ground. Accepting this principle implies that business leaders in the C-level must engage themselves in the strategy and decisions about their organization's software acquisitions and configurations to an unprecedented level of detail.

Principle #2: Big Value Comes From Big Data

The software and underlying technology that enables the analysis of patterns in large data sets is also enabling extraordinary new ability for businesses to identify opportunities for greater efficiency, higher quality, lower overhead, higher margins, and new products. Big data, business intelligence, analytics—these are all buzzword synonyms used to describe the same underlying combination of software and technology—that is, the EDW.

insolvency after federal and state grant monies are removed from the model. One-third of the organizations in the CMS Pioneer ACO Program are dropping out because, despite their investments in EMRs and HIEs, these organizations are unable to adequately quantify the quality of care and financial risk for managing patients in the ACO.

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Unlike the ROI track record of EMRs and HIEs, EDWs have consistently shown GAAP-certified, double and triple digit ROI in under two years. In other industries, the average ROI from an EDW is 431% over five years. At Intermountain Healthcare, the EDW that my team and I designed and implemented with a late binding architecture, was assessed in 2004 by a GAAP-certified 3rd party and the results were amazing—1,468% ROI in less than two years. Allina Healthcare's EDW was recently assessed for ROI and that very conservative case study revealed a 52% ROI in 18 months.

Surprisingly, and despite these impressive ROI results, our national strategy for the computerization of healthcare stopped one step short of effective. It's not enough for us to invest in EMRs and HIEs. Less than 25% of healthcare organizations have any type of EDW and less than 10% of those few organizations are operating consistently at Level 5 of the Healthcare Analytic Adoption Model, summarized in the figure below. C-level executives need to invest in EDWs on their own, and those healthcare organizations that do so will soon be in a position to distance themselves from competitors and the mediocrity of the current U.S. healthcare market.

Healthcare Analytic Adoption Model

Level 8	Cost per Unit of Health Reimbursement & Prescriptive Analytics	Contracting for & managing health
Level 7	Cost per Capita Reimbursement & Predictive Analytics	Taking more financial risk & managing it proactively
Level 6	Cost per Case Reimbursement & Data Driven Culture	Taking financial risk and preparing your culture for the next levels of analytics
Level 5	Clinical Effectiveness & Population Management	Measuring & managing evidence based care
Level 4	Automated External Reporting	Efficient, consistent production & agility
Level 3	Automated Internal Reporting	Efficient, consistent production
Level 2	Standardized Vocabulary & Patient Registries	Relating and organizing the core data
Level 1	Data Integration – Enterprise Data Warehouse	Foundation of data and technology
Level 0	Fragmented Point Solutions	Inefficient, inconsistent versions of the truth

Principle #3: Data Management Evolves Predictably

Every industry passes through three phases of data management maturity. Phase 1 is the Data Collection Phase. Data is collected in a transaction workflow system, such as a point-of-sale system, to support a particular workflow (i.e., a purchase). Phase 2 is the Data Sharing Phase. The data that is collected in the transaction systems of Phase 1 is shared with other downstream data collection systems and workflows, such as a general ledger or supply chain management system. Phase 3 is the Data Analysis Phase. In this Phase, the data that is collected and shared to support specific transactions and workflows in Phases 1 and 2 is aggregated across thousands and millions of those individual transactions to analyze macroscopic patterns in the data. In healthcare, Phase 1 is characterized by registration, scheduling, laboratory, and electronic medical record (EMR) systems. Phase 2 is characterized by the implementation of health information exchanges. Phase 3, barely underway, is characterized by the implementation of the EDW.

Organizations like Intermountain Healthcare and Allina have been operating on their own as accountable care organizations for decades, without federal incentives for IT investments and without the complicated business model and administrative overhead of a CMS ACO. They understand the value of an EDW in maximizing the quality-cost ratio of healthcare delivery. If you want to be an ACO—federal or otherwise—follow their role model.

Summary

Although the healthcare industry is progressing in its adoption of information technology to enable healthcare that is accessible, affordable, and measurable, we are overlooking three of the five most important IT investments necessary for accountable care—i.e., the EDW, activity based cost accounting systems, and patient reported outcomes systems. Vendors are not yet offering products that support activity based costing or patient reported outcomes. The lack of these products is a significant gap in our national health data strategy, but also an opportunity for entrepreneurs to develop highly valued products.

The EDW will enable a deep understanding of care quality, variations in care, and costs of care. The EDW market is emerging, with over 40 vendors offering various products in this segment. In the next three years, we will see major market consolidation and shakeout, similar to that seen with EMR vendors. At the end of this consolidation period, I predict six vendors will remain standing that are capable of supporting analytics up to Level 8 in the Analytic Adoption Model. Unfortunately, healthcare executives cannot wait three years for the market to consolidate. Market forces are accelerating the need for analytics as a tool to survive, first, and thrive, second. C-levels must choose a partner now and hope that the partner they choose can provide a solution that will survive the shakeout.

Dale Sanders is the Sr. Vice President of Health Catalyst. Prior to his healthcare experience, Dale Sanders worked for fourteen years in the military, national-intelligence, and manufacturing sectors, specializing in analytics and decision support.

In addition to his role at Health Catalyst, he continues to serve as the senior technology advisor and CIO for the National Health System in the Cayman Islands. Previously, he was CIO with the Northwestern University Medical Center, and regional director of Medical Informatics at Intermountain Healthcare where he served in a number of capacities, including chief architect of Intermountain's enterprise data warehouse. Dale is a founder of the Healthcare Data Warehousing Association.

He holds Bachelor of Science degrees in Chemistry and in Biology from Ft. Lewis College, Durango Colorado, and is a graduate of the U.S. Air Force Information Systems Engineering program.