Technology’s role in integrated delivery models: transforming health care
The health care industry is undergoing a transformation—spurred by an unsustainable reimbursement model that rewards volume rather than outcome. Many alternatives are being considered, including pay for performance, accountable care organizations (ACOs), medical homes and bundled payments. Although the destination is not certain, it’s clear that providers, payers, employers and patients are interested in a health care ecosystem that is connected, intelligent and aligned. Such sustainable health communities represent an innovative yet practical target for the industry’s transformational journey. And as new health delivery models mature, the technology infrastructure upon which those systems rely becomes even more critical.

The government, as well as private industry, is implementing a number of initiatives aimed at fixing a system characterized by fragmented and disconnected care. In April 2011 the Office of the National Coordinator for Health Information Technology released its Federal Health IT Strategic Plan, which spells out the strategy for meeting health information technology (IT) goals through 2015. The release of those guidelines coincided with the announcement of the Centers for Medicare & Medicaid Services’ (CMS) proposed rules for ACOs and was followed by the disbursement of Medicare incentive payments to providers who qualified as meaningful users of electronic health records (EHRs). CMS’ regulatory framework for ACOs emphasizes a strong health IT base—a key component for many market-led collaborative care models, as well.

With these initiatives in place and others on the horizon, it is clear that health IT will play a pivotal role in the transformation of health care.

The underlying framework for reform

As delivery system reforms roll out over the coming months and years—and as health systems increasingly form partnerships to evolve from fee-for-service to value-driven payment models—organizations will look for new ways to engage with patients, analyze and report data, and electronically connect with other providers. To be successful, we must continue to build a robust infrastructure to support technological advances, such as EHRs, that facilitate truly coordinated care and reduce the currently unsustainable cost of care. In fact, this technology will enable collaborative and interconnected processes and capabilities, which will form the basis for new models of care. So at its core, the infrastructure should enable information exchange and address redundancies in the system.

All of this will require a platform for collaboration. This will offer the means to manage population wellness and develop mechanisms for exchanging population-level data. Such an exchange will identify patterns of care across populations, target fraud and abuse, identify variations in care and develop powerful learning tools that will deliver better and more personalized care. Of course, this all hinges on data that is anonymous, secure and private. And recent government actions, including the implementation of the Health Information Technology for Economic and Clinical Health (HITECH), underscore the importance of data privacy and security.

To reduce redundancies, technologies would address breakdowns in the system—ranging from multiple collections of the same patient data to duplicate testing or imaging, which can be costly as well as dangerous. Moreover, technologies would enable data analysis of population health and health care practices, leading to improved care as high-risk cases get singled out for treatment. Such data analytics also would help determine and define new standards of care. Finally, this infrastructure would promote physicians’ adherence to basic evidence-based protocols while real-time applications cross-reference patient records to avoid errors in treatment, such as harmful drug interactions.
Sustainability of such a transformed system of health delivery requires that participants and trading partners be connected, intelligent and aligned (see Table 1).

- **Being connected** requires the ability to share relevant portions of a patient’s medical record with authorized providers in a timely, secure and efficient manner. Meaningful use helps establish the platform with incentives so that more and more providers come to use certified electronic medical record (EMR) applications. But this is just a starting point. Even the largest integrated delivery network with the most fully evolved implementation of the most sophisticated EHR vendor product will need to integrate with other providers who are not on the same platform. This includes skilled nursing facilities, home care, specialty physicians, state or local government agencies or other hospitals. Health information exchanges (HIEs)—the software that provides connectivity of disparate clinical systems and interoperability of clinical information captured by those systems—address the need to share selected components of a patient’s medical record with other authorized providers within a secure framework. Even with HIEs and EHRs, gaps remain, including the need for automation of long-term-care providers, home health, long-term-acute-care hospitals, hospice providers, pharmacies/pharmacists and personal health records.

- **Being intelligent** suggests the skillful application of information during the process of delivering health care so that the information is simultaneously safe, efficient and accessible. Intelligence involves the ability to focus on what is most important now while identifying factors that merit focus in the near term so adverse health events can be avoided in the future. Business intelligence has been an unattainable goal in health care due to a combination of factors, including fragmentation of the delivery system, standard definitions, privacy concerns and the limits of market-available tools for reporting and data warehousing. Quality reporting requirements in the reform regulations incent compliance. Over time, those requirements will include the application of evidence-based medicine (EBM) standards. Although ACOs aren’t perfect, they do offer benefits for measuring trading partners’ performance in a consistent and credible way.

### Table 1

**Requirements for a sustainable health delivery system**

<table>
<thead>
<tr>
<th>Connected</th>
<th>Intelligent</th>
<th>Aligned</th>
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<tbody>
<tr>
<td><strong>Connectivity community</strong></td>
<td><strong>Informatics platform</strong></td>
<td><strong>Helps sustainable health communities measure performance and create aligned incentives</strong></td>
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<tr>
<td>Hospital</td>
<td>Longitudinal clinical analytics + Revenue and payment cycle + Compliance + Health informatics</td>
<td>Reimbursement models + Quality, cost and satisfaction metrics</td>
</tr>
<tr>
<td>Physician</td>
<td>Capture and exchange data</td>
<td></td>
</tr>
<tr>
<td>Pharmacy</td>
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<tr>
<td>Sponsor</td>
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<tr>
<td>Consumer</td>
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**Actionable intelligence** is about delivering the right knowledge to the right constituencies in a timely fashion.

- Broad point-of-decision delivery (PCs, tablets, smartphones, etc.)
- Real-time, interconnected, secured, cloud-based software services
• **Being aligned** includes new relationships among owned, affiliated and disparate provider organizations. Critical to the strategy on alignment is the achievement of influence, if not control, over the standards of care delivery, including administrative and clinical protocols as well as measures of performance. Cooperation at this level requires alignment of incentives, which involves equitable strategies for sharing cost, revenue and potential bonus payments.

To become connected, intelligent and aligned, organizations will need to focus their IT investments and operational priorities on a holistic view of coordinated care, partnering with patients through technology and analytics.

Ultimately, the goal for new models of care will be to apply health IT in ways that improve patient care and save lives while also lowering costs. To reach that goal, providers need to prepare themselves in a number of areas by developing:

- Deep clinical expertise, strong solution sets and revenue cycle leadership
- Clinical informatics and applied business intelligence
- Distributed and networked technology architecture and applications
- Real-time, interactive, point-of-care applications with integrated workflow
- Superior risk management and the ability to go “at risk” to deliver outcomes
- Distribution models in both clinical/revenue cycle sets and ambulatory/acute settings

### Table 2
**High-impact capabilities for an ACO**

![Decision-making process diagram]

Winning provider organizations will have mature capabilities in these key levers of the business (orange boxes)

**The decision-making process**

ACOs will need a broad range of new capabilities, including new analytic, clinical workflow, administrative and communication functions, as capabilities needed to reduce costs and improve care. Prevention, decision support, error reduction, revenue cycle optimization and disease management will all be investments that will need to be made for collaborative care models to succeed. But not all of these functions or activities are currently performed by existing electronic health records, health information exchange, or traditional hospital IT systems. And where the functions may exist, they are not currently carried out at the required scale in an integrated fashion across multiple care organizations.

So where to start?

Understanding the IT requirements for a health organization is possible only in the context of those high-impact capabilities that will support an ACO. With the 80/20 rule as a guide, these are the defined levers of the business that drive the realization of income, reduced cost or both. The following diagram illustrates the capabilities necessary to improve performance across a variety of measures that help ensure success in any number of future payment reform scenarios.

While organizations are defining where their investments would result in significant change to their business, they should be mapping where the specific application of technologies can transform care delivery practices. A general decision-making model for delivery covers what happens prior to the moment of care (before care), what happens when a caregiver is with the
patient (during care) and what happens subsequent to the delivery of care (after care).

Table 3 highlights specific aspects of a provider organization that are enabled by new or existing technologies. Note the confluence of regulations that affect these elements, from ICD-10 to meaningful use and ACOs.

### Moving forward

The HITECH Act provides the U.S. Department of Health and Human Services with the authority to establish programs that improve health care quality, safety and efficiency through the promotion of health IT, including EHRs and private, secure HIEs. Under HITECH, eligible health care professionals and hospitals can qualify for Medicare and Medicaid incentive payments when they adopt certified EHR technology and use it to achieve specified objectives (meaningful use).

To promote a systemic improvement in cost and quality, the services that enable clinical practice technological changes are necessary. Meaningful use provides a framework to engage patients in the technology dialogue and have them take a more active role in their health and that of their families. EHR solutions that provide information to consumers regarding treatment, the cost of care and adherence to treatment plans are just some of the ways to provide value to consumers.

Although the ways in which EHRs support the goals of the ACO are generally understood, a variety of significant challenges remain. Chief among them are digitization of patient medical data and slow adoption of EHRs. According to the 2010 Federal Health IT Strategic Plan, only 25 percent of physician offices and 15 percent of acute care hospitals use EHRs.¹

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¹ Federal Health IT Strategic Plan 2011–2015, Office of the National Coordinator for Health Information Technology.
Overcoming financial and practical concerns
The HITECH Act promotes EHR adoption through attractive financial incentives: $27 billion. These incentives are available to Medicare and Medicaid providers who deploy EHRs and meet guidelines for the meaningful use of electronic patient data. The positive incentives end in 2015 for Medicare and 2016 for Medicaid.

Carrots aside, some providers remain skeptical of EHRs’ benefits despite evidence that such technology can help improve care and outcomes. Others worry they will invest in new technology that doesn’t qualify them for financial incentives. Furthermore, certain providers, such as those in behavioral health, are not eligible for incentives under the Act’s rules. Regardless, providers should adopt EHRs because the data therein is the foundation for all health IT goals—and for the sustainability of health care overall.

Sharing data effectively and securely
While EHRs are vehicles for electronically collecting and storing patient data, their true value lies in enabling the data to be shared and applied. This is especially true for ACOs, whose very mission hinges on secure, efficient sharing of data among stakeholders—physicians, specialists, surgeons, labs, pharmacies, imaging facilities, public health agencies, schools and others—and then reporting quality measures and outcomes.

Building the system
Data sharing depends on infrastructure that can accommodate the many levels of compatibility and interoperability inherent in an organization with different types of practitioners and multiple IT systems. For instance, within a single hospital, many separate systems—and sometimes hundreds of interfaces—are required to gather and unite data from across the organization. Furthermore, different systems handling the same type of data often use unique standards, causing compatibility issues.

Beyond connecting systems internally, provider organizations will need to connect their systems with those of outside partners and providers within the region. Moreover, regional data networks will need to connect on the state level. Building these layers of infrastructure in the form of HIEs will enable providers to share and use data—the real enabler of the ACO. Consider EHR data the raw material and HIE the conduit that facilitates meaningful use as well as improved quality of care and outcomes for an ACO’s population.

While Recovery Act incentives have spurred some growth in EHR adoption, HIE adoption lags well behind (see Table 5 on the next page). This may be attributed, in part, to funding. A 2010 report by KLAS Enterprises found that among 89 sites examined, more than 70 percent had funding from state or federal grants. II

Health plans will provide another option for assistance. Payers will have an active leadership role in providing all the information, intelligence, connectivity, work flow and support services that will lead to improved and sustained outcomes in the local health care community.

To successfully support the physician, the payer, through an HIE, will need to ensure not only that best-practice data reaches the point of care, but also that the physician can better communicate with and engage patients during and after a visit. This means doing everything from supplying tools, such as EMRs, to extending the physician’s reach through email, video, social media, etc.

Payers also will need to empower patients by facilitating health programs and disseminating information that reaches patients and makes them act on their own behalf. Easier access to information can help patients across the board—from better management of chronic illnesses to understanding which diagnostic tests or preventative measures may be the most appropriate to which providers have the best outcomes.


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Table 4
Meaningful use: key dates for the Medicare EHR incentive program

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<tbody>
<tr>
<td>Federal fiscal year 2011 payment year ends at midnight for eligible hospitals and critical access hospitals</td>
<td>Last day for eligible professionals to begin their 90-day reporting period for calendar year 2011 to demonstrate meaningful use of the Medicare EHR incentive program</td>
<td>Last day for eligible hospitals and critical access hospitals to register and attest to receive incentive payments for federal fiscal year 2011</td>
<td>Calendar year 2011 payment year ends for eligible professionals</td>
<td>Last day for eligible professionals to register and attest to receive incentive payments for calendar year 2011</td>
</tr>
</tbody>
</table>
Connecting systems to create a longitudinal view

The most fundamental element necessary for the success of the ACO model is a shift toward a broad and all-encompassing view of patient health. Most of the current models focus on individual episodes of treatment or consultation because providers are paid for the services they provide. Under evolving care delivery models, however, providers will be paid based on overall population health and reward will be based on the ability to see and show how a population’s health progresses over time.

This structure requires an overall picture of each patient’s health. An EHR is only the beginning. Equally important is the infrastructure that allows disparate EHR data to be combined and selectively shared with various authorized providers in a secure and efficient manner. The complexity of this task is considerable given how many different providers are involved in any one patient’s care. According to a study published in *Annals of Internal Medicine*, primary care practices that treat Medicare patients who have at least four chronic conditions had to coordinate, on average, with 86 physicians in 36 practices (see Table 6 on the next page). The possibility for redundancy is significant, as is the potential for lost records and errors in diagnosis and treatment.

Applying clinical informatics and business intelligence

Although a patient can benefit from a physician’s ability to electronically access and share his or her individual medical record, the system as a whole can benefit from an examination of aggregate patient data. This is no longer a task limited solely to payers. In the ACO model, data analytics are essential to providers, as well. With all data in one place, providers can take advantage of clinical informatics and business intelligence tools to look at the health of an entire population. Just as important, they can examine their own performance and practices and draw conclusions that improve care and lower costs.

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Table 5
HIE implementation across the nation

<table>
<thead>
<tr>
<th>Top states</th>
<th>Number of HIEs</th>
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<tbody>
<tr>
<td>New York</td>
<td>16</td>
</tr>
<tr>
<td>Michigan</td>
<td>12</td>
</tr>
<tr>
<td>Florida</td>
<td>11</td>
</tr>
<tr>
<td>California</td>
<td>9</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>9</td>
</tr>
</tbody>
</table>

Source: Healthcare Information and Management Systems Society (HIMSS)

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Identifying high-risk cases

By using algorithms to combine and analyze patient records and claims data—just as payers and employers have long done/providers can identify high-risk patients, proactively identify care opportunities and better understand population health as a whole. Those providers can use that predictive modeling to prioritize various care management interventions or institute programs aimed at improving patient behavior. From a patient engagement standpoint, this approach helps providers deliver more personalized care.

That is exactly what happened when OptumHealth helped two state agencies in Michigan aggregate and analyze data from 16 health-related programs and 41 sources to prevent cases of lead poisoning in children, among other goals. OptumHealth worked with the Michigan Department of Community Health and the Michigan Department of Information Technology to develop and implement a data warehousing and analytics strategy that would identify high-risk cases. The strategy helped reduce the number of children with lead poisoning by 35 percent from 2003 to 2007. It also increased the percentage of Medicaid-enrolled 3-year-olds screened for lead to 72 percent as of January 2009. In addition, it identified the 14 Michigan communities that represent nearly 80 percent of all child lead-poisoning cases so it could target lead-poisoning prevention efforts.

Benchmarking performance and risk evaluation

Clinical and claims data aggregation can also facilitate performance benchmarking, which can compare performance against national and internal standards.
For example, the Rochester RHIO (see sidebar) can provide physicians with regular reports about their clinical performance so they can actively apply practices that improve care and outcomes. The RHIO bases its performance benchmarking on national standards for diabetes, cardiovascular conditions, cancer screenings and more. This has helped its physicians perform at the 90th percentile—well above national performance levels. In addition, integrated claims data in the Rochester RHIO make it possible to furnish cost data to physicians so they can better understand the financial ramifications of their decisions.

Other advantages can result from using actuarial analytic tools to study and look for ways to balance risk. Furthermore, aggregate data will allow for performance reporting for regulatory compliance.

**Strengthening point-of-care decision support**

Looking at data in aggregate enables providers to design strategies for treating patients in more clinically effective and financially efficient ways. Aggregate data can be applied to create clinical models that develop evidence-based guidelines. Initially, ACOs can consult existing national standards for evidence-based medicine. As data for an entire community of patients accumulates, however, providers will eventually be able to identify and implement new evidence-based practices.

Real-time decision support with actionable guidelines at the patient level is one particularly powerful application of evidence-based guidelines to help physicians improve outcomes. For example, any time a physician sees a diabetic patient or a high-risk candidate for diabetes, the system can prompt the physician to conduct exams or order tests supported by evidence-based medicine. By promoting such best-practice information at the point of care, ACOs will be able to make greater strides toward delivering proven, standardized care that can improve outcomes.

Michigan used this technique to fight flu among children. The state’s data analytics program identified children who were at high risk and then alerted participating physicians via pop-up messages as they accessed medical records for those children, thereby encouraging them to administer flu shots.

**Managing workflows for greater efficiency**

Providers also can use data to prioritize tasks according to the best use of their time, creating effective work flows for themselves and their support staff. In real time, a doctor can be prompted to pass responsibilities to other staff and move on to another patient and a higher-priority task. This enables physicians to spend their time with patients more effectively—from both the clinical and financial points of view.

Interoperability between systems and access to all data also allow providers to call on other tools that can cross-reference data in real time—such as compliance support—to send orders and to check a patient’s record for drug interactions and other clinical issues.

**Engaging and empowering patients**

Under ACOs and other emerging collaborative care models, the patient is not only just a patient but also a partner in care delivery. This means providers will need to build new kinds of relationships that extend well beyond exam rooms or hospital beds and that create better engagement, activation and satisfaction as well as increased accountability for health. To make the relationship—and the engagement—work, providers will again find themselves in territory that once belonged to payers. Technology will play a critical role in informing and educating patients, but to be effective, it must do so in ways that are familiar and convenient.

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The obstacles to health IT adoption extend beyond the technical. In addition, there are legal, economic and political barriers as well as privacy issues.

Despite these complexities, HIEs are possible, and some highly sophisticated examples are currently in use. The Rochester Regional Health Information Organization (RHIO)—a nonprofit, community-run organization in Rochester, N.Y.—gives providers instant access to the medical records of 1.2 million patients. This regional HIE is powered by Axolotl’s Elysium Exchange and connects more than 20 health care organizations in the region, including hospitals, reference labs, insurance providers and radiology practices. To date, 105 separate interfaces make information available. And currently, the Rochester RHIO is financially sustainable, with a revenue base that covers 100 percent of its $3 million annual budget.

When separate practices aggregate their data, standards issues quickly arise. They emerge from variations on how data gets handled within each system and from individual physicians’ idiosyncratic methods of notation and record keeping. The Rochester RHIO, which accommodates five different EHR systems, relies on an outside vendor for a single set of standard specifications.
Portals and social media
Many of the tools physicians use can be adapted to allow patients to access their own information. For example, health information can be repackaged for patients via online health portals or social media tools. By providing a consumer-centric experience that engages patients, portals can encourage and support healthier behavior. They also represent a way of deploying account-based solutions that involve patients in the financial aspects of their health care.

Wellness programs
Using data analytics, providers also will be able to reach out to patients and promote healthier decisions through wellness programs. By identifying patients with chronic conditions such as diabetes, asthma or heart disease, providers can design on-site programs that encourage participants to actively manage their own conditions.

Telehealth
For situations involving a chronic illness or high-risk condition, some providers will benefit from software and equipment that allow health to be monitored from the home. This could be particularly useful in dealing with elderly patients and might include blood pressure or weight-monitoring equipment that transmits results to the provider. For some patients, additional tactics may include video chats and the use of other technologies that could lower costs while improving efficiency and patient health.

Home delivery of health products
Providers also will appreciate programs designed to deliver health products to a patient's home. This could include transporting durable medical equipment to patients anticipating a major operation or even delivering healthy foods through partnerships with online grocery/food delivery companies and weight loss/dietary supplement companies.

Conclusion
The health care industry is undergoing another period of transformational change. While the end-stage operating model is not certain, directional characteristics are irrefutable: First, the payment system will align more closely with outcomes. And second, the winners will be those organizations that demonstrate the ability to be connected, intelligent and aligned.

ACOs are just another chapter in the evolutionary journey of health care. Organizations should consider how they can reach a position to do more than just survive the challenge. From an IT perspective, what’s good for ACOs is also good for most delivery models. And by aligning investments with the high-impact capabilities of the business, an organization can reduce the risk of overinvesting in technology that could become obsolete with a legislative mandate. Everything does not need to be fully automated at the launch. Instead, companies should recognize the concept of now/next/later to mitigate risk.