



**Healthcare IT:
A Principled Approach**



Healthcare providers have an unprecedented number and variety of information technology (IT) initiatives underway. A few—like demonstrating “meaningful use” of standardized electronic health records and participating in regional health information exchanges—are critical. Many are moving forward at an uncomfortable speed, driven not only by government-imposed deadlines but also by the cost and competitive pressures of an industry in transition.

In the past, precious investment dollars were directed more toward clinical technologies and less on getting ahead of the curve on information management and use. However, healthcare providers must now become more proactive in this area. They must move quickly and with purpose, recognizing that electronic information about patients, processes, and outcomes is the most basic clinical technology. They have about three to four years to accomplish what took a decade in other industries, such as financial services and telecommunications, when their delivery models were profoundly changing.

Under these conditions, it isn’t enough to just make a few additions or adjustments to the patchwork of information systems in place. That approach may earn you some stimulus dollars, but it will leave you rapidly falling behind more aggressive competitors who are taking the opportunity to dramatically improve clinical and cost performance, and keep pace with, and in some cases lead, the industry’s transition to collaborative delivery and business models.

The good news is that this challenge can be met. The stimulus injects funding. Technological advances enable you to add capabilities and reduce costs simultaneously. You can learn how other industries have digitized, standardized, networked, and collaborated. However, you can’t really succeed or thrive in the long term if you think small. This is about far more than the implementation of Electronic Health Record (EHR). It’s about a new foundation of information for providing clinical services, managing the business, and connecting with the healthcare ecosystem—from individual patient to the Federal Government.

The purpose of this paper is to enable you as a healthcare provider executive to step back and take an in-depth look at your organization’s IT capabilities and direction. We hope this paper serves as a catalyst for productive discussion among your institution’s leadership team members.

A principled approach

You're all too familiar with the challenges faced by healthcare providers today:

- **Cost pressures** from lower admissions, fewer profitable elective procedures, more uncompensated care because unemployment is high, shrunken endowments, and the rising prices of many inputs.
- **Government mandates** providing stimulus dollars and support services for achieving meaningful use of electronic health record technology—along with looming penalties for failure to do so.
- **Industry changes** including consolidation, disintermediation, and the inexorable march toward more distributed healthcare delivery to more informed patient-consumers.
- **Healthcare reforms** that dramatically expand access to insurance, potentially driving up patient volume when clinical staff is shorthanded; and lower Medicare reimbursements that increase pressure on financial management and delivery process efficiency.

In complex situations in healthcare today, the place to start is not with the specifications for all the things you need to do (e.g., EHR) or the various self-styled solutions offered by technology vendors. Rather, you first need to build a foundation comprising a set of business principles that will guide how you will decide and act.

These reference points articulate your ambitions, values, and preferences. They capture key working assumptions, ground rules to keep in mind, and realities that must be faced. These aren't technical points. They're the kind of guidelines that the executive team, the CEO, chief medical officer, chief financial officer, and others, should formulate to enable the CIO and IT organization to establish a clear course of action. With effective principles, you can make real progress. Without them, too many of your organization's local decisions and actions will work at cross purposes.

Guiding principles for healthcare IT

| Category | Principle |
|-----------------|-----------------------------------------------------------|
| Ambition | Pursue far more than stimulus money |
| Key objectives | Excel at information integration and exchange |
| Strategy | Leverage technology for growth |
| Customers | Focus on the customer experience |
| Employees | Put information to work on the front lines |
| Management | Meaningful use means measurable use |
| Success factors | Flexibility wins |
| Finances | Information technology initiatives should be self-funding |
| Timing | Hasten with care |

Each healthcare provider institution's principles for IT will, of course, be different. However, we invite you to consider these nine "starter" principles.

1. Pursue far more than stimulus money

Don't fixate on the stimulus dollars. The stimulus dollars are only one measure of success, signaling progress in the key areas of EHR usage and Health Information Exchange (HIE) participation. If you're going to the trouble of supplementing or overhauling your information systems and technology, you should be after far bigger game. With a push from the stimulus and its standardization mandates, it's time to address longstanding performance problems and inefficiencies, to seize new opportunities, and to realize the benefits.

To really capitalize on your new capabilities in managing and moving information, you should be pursuing specific objectives in clinical performance, operational and cost efficiency, revenue realization, and enhanced relationships with patients, families, physicians, and employees.

Illustration: New York-Presbyterian Hospital is implementing far more than vanilla EHR. Its mynyp.org portal enables patients to manage their medical, insurance, and personal information, setting a new standard for patient control and physician efficiency. The aggregate information can be mined to improve in-hospital and post-discharge quality of care.

IT implications: You need to articulate your range of objectives. Then you need a roadmap of how your major technology initiatives—applications, interfaces, databases, infrastructure, portals—are going to work together in pursuit of those objectives.

The power of principles

What makes for an effective set of guiding principles? They involve or precipitate choices; they put stakes in the ground; they help you prioritize your objectives; they look to the long term as well as the short. Together they cover your most difficult and important decisions.

Your principles will not make decisions for you. In fact, for a given decision, you may have principles pulling you in different directions. But your principles can help ensure that all of the really important considerations are put on the table. When you check a potential action against all of your principles, you'll anticipate obstacles, make adjustments to plans, and find the right places for compromise. Once an executive team has agreed on the principles, it becomes easier to get behind agreed-upon actions. Once the stakeholders have agreed on the principles and their implications, it's much harder to disagree about specific decisions and actions. As a result, the organization as a whole can progress faster.

The process of developing and applying principles proves valuable any time a complex organization is in flux and has competing priorities—as it is in healthcare today. It is especially important within IT where executives may vary widely in familiarity and experience. Principles provide a common vocabulary, a common set of discussion criteria.

How many principles do you need? To guide the business management of IT, organizations typically need 8 to 12 principles. They cover a predictable and necessary set of bases, so it helps to start with a list of categories and a set of candidate principles for reference.

How are they developed? This is achieved through a quick and iterative cycle of drafting (by a team representing business strategy, business operations, and IT) and discussion (by the executive team that will endorse and apply the principles). It helps to have a facilitator throughout the process, and to revisit and refine the principles after they have been in use for a few months.

How are they documented? This is best approached through an explanation of what the principle says and the major implications in applying it. Ideally, you will include some example, including decisions and discussion, regarding how the principle applies. It is also very useful to state clearly what the principle tells you not to do (or to stop doing).

What to watch out for. In the IT domain, be careful not to confuse guiding principles with technology standards. A principle would not, for example, state an absolute preference for "technology A" or "vendor B." Your principles would, however, shape your technology standards and preferences at any given time.

2. Excel at information integration and exchange

Don't fixate only on electronic health records. Of course, you will want to digitize clinical information, provide a complete and up-to-date view of the patient, and encourage widespread and consistent use of EHR, but that's only one (albeit important) facet of the larger process of integrating and sharing your information.

For long-term success, you need to focus on the larger process including:

- Integrating clinical, operational, and financial information to drive revenue
- Improving efficiency and optimizing more broadly
- Incorporating medical images as extensions of EHRs to speed diagnoses and improve outcomes
- Sharing information not only in the form of HIEs, but also as a means of participating more effectively in the electronically informed and mediated healthcare marketplace

Because the fast-emerging healthcare delivery model centers as much on communication and collaboration outside the provider facility as on coordination within it, you also need to focus on physician systems and networking, health information exchanges, patient and physician portals, community relations, clinic networks, distance medicine, and virtual practices—and you need the backbone information capability to do so. The technological challenge is not only to digitize and standardize information, but also to enable its controlled and secure exchange, with due regard for privacy laws.

Illustration: At the Swedish American Health System, physicians and authorized employees have secure remote access to clinical systems including EHR, electronic orders, and physician reference and decision support. This improves performance and quality in its clinic network and home health agency. The infrastructure also sets the stage for leadership in the regional HIE.

IT implications: Your approach to information management should assume that tomorrow's information and its uses will differ from today's, and that you may need to integrate and exchange any and all information. Today's challenge is as much about infrastructure design as EHR implementation. The EHR software you use cannot restrict your broader information integration and exchange capabilities. You need a center of excellence in information integration and exchange.

Security and compliance, collaboration and transparency

When it comes to information management, healthcare providers (more than most organizations) are being pulled in several directions. Safeguarding the privacy of patient information and other sensitive data stands as a legal and ethical requirement. However, more collaborative delivery models, including HIEs, physician and clinic networks, and patient control over information, demand an unprecedented volume of information exchange. Demonstrating meaningful use, complying with business disclosure laws, and meeting patient demand for information all require more transparency, starting with information about provider performance.

The old default was to lock information down, and communication and collaboration were sacrificed to security. That approach is no longer feasible, and this tradeoff is no longer necessary. Today's approach is to rigorously classify information, develop rules for access and use, and employ technology that enforces those rules. Fortunately, today's information management technology enables controlled transparency and collaboration while actually enhancing, not compromising, information and systems security.

3. Leverage technology for growth

The healthcare provider industry is consolidating in both ownership and management structure. The overall demand for healthcare services continues to grow rapidly, and the pressure is on small and mid-size hospitals and systems to grow and gain efficiencies of scale and expertise if they want to remain independent. Large institutions may be in the position to grow by acquisition, but they then face the challenge of rationalizing and consolidating operations and facilities to reap the benefits of larger size. Meanwhile, the delivery model is becoming more distributed, opening new growth opportunities for those who can deliver more community-based services or become regional providers of specialized clinical and business services for other institutions.

It is important to recognize that growth is no longer defined in traditional terms of bricks and mortar and beds, but more in terms of services volume, market share by specialty, and revenue.

Illustration: Community Health Systems' growth strategy is to build a thriving network of community hospitals and regional systems in non-urban areas where capital investment and physician recruitment are difficult. Key to the success of this portfolio approach is CHS' ability to rapidly deploy up-to-date clinical and business systems, common processes, and management methods in acquired hospitals.

IT implications: All of these growth options depend upon information and technology management. If you want to grow through alliances, you have to be able to share information seamlessly. If you want to become a services provider, you will also have to be a technology provider. If you want to grow by acquisition, you will need the infrastructure and methods to rapidly connect with or incorporate each acquired organization's systems to gain the benefits of synergy and scale.

Strategic options for healthcare providers

The industry is in the throes of consolidation, which includes standardization, commoditization, and disintermediation. Healthcare delivery is becoming increasingly electronically mediated and coordinated, distributed, and collaborative.

We see institutions with very different business models:

- Full Service—Very large institutions with regional or national draw, offering diverse resources to meet patient needs, depend on large-scale delivery process excellence.
- Specialty—Institutions such as the Hospital for Special Surgery fill specific niches and must innovate continuously to stay on the leading edge.
- Local Acute Care—The traditional local hospital has the most difficult model to sustain in the face of industry consolidation. Viability may depend upon distributing services extensively within the communities they serve.
- Platform—Some institutions provide clinical (e.g., radiology) or business (e.g., billing) services to other hospitals in their areas, usually in addition to the patient market directly served.

And of course there are common hybrids. Local community hospitals may offer selected specialties regionally, provide services to other local hospitals, and act as efficient gateways to physicians and institutions for needs they don't fill. Each of these models employs its computing platform differently, and each entails different forms of collaboration in the healthcare "ecosystem."

Thus, the strategy becomes: where, how, and with whom to collaborate? Avoid trying to do too much on your own. Figure out who is capable, and who has services you can use. It takes practice, but all institutions must become more tactical in determining what to outsource. At the same time, play to your strengths. What is your institution really good at? Where do you have the clinical or business capability and information infrastructure to offer services to others? Keep in mind that "others" may potentially include other hospitals as well as customers or stakeholders.

To optimally position your organization, you must pay closer attention than ever to the whole ecosystem. You need to know what is happening in the industry, your region, and your local markets. How is consolidation playing out, and what opportunities to provide or consume platform services does that present? Study your customers, and in the case of your customers' customers—physicians and other institutions—examine their emerging preferences in consuming healthcare services.

The implications of these strategic options and collaborative models on IT are clear and profound. It is fast becoming a platform world. Ready or not, starting with how you work with physician practice systems, your organization is now in the role of IT provider as well as consumer. Your technology platform must be capable and flexible enough to not only exchange data but also work with the platforms of others, leverage one another's services, and keep your institution agile enough to be compatible with the future.

4. Focus on the customer experience

As healthcare markets become more competitive and informed and patients exercise greater freedom of choice, the experience of consuming medical services becomes more influential. Are the services quick and convenient? Are they “painless” both literally and figuratively? Do they engender confidence in the consumer? The answers influence where and by whom patients choose to be treated, whether they choose to return, and if they decide to establish long-term relationships with preferred providers. As in consumer markets of all kinds, today’s individual consumer is better informed (often through online information and discussion), and that information equals the power to explore options and exercise choice. EHR and HIE spell greater portability, adding to the force of consumerism in healthcare.

This raises the question: who is the customer? In healthcare delivery, the answer is complex. Customers include individual patients, their families, affiliated physicians, and payers including the government, regulators, and partners in the industry. When affiliated physicians hold the primary relationships with patients, the provider institution needs to know its customers’ customers. With all of these customers, the experience delivered should be intentional, not random. By communicating and collaborating with them, you learn from them. Only then can you design and deliver the experiences that they want and you want them to have.

Illustration: Moffitt Cancer Center’s Total Cancer Care™ program incorporates highly personalized medical care and unprecedented patient and family involvement in ongoing research to develop treatments and cures. Patients collaborate with the institution to advance care for all.

IT implications: Technology is a growing part of the healthcare customer experience as more interactions happen online, and momentum builds for home monitoring and other forms of telehealth. An institution is judged on the quality of its information systems, communications, and web presence, including patient, physician, and partner portals. All must be designed around the customer experience, not just the functionality provided, and you must be assembling the underlying technology infrastructure for telehealth.

Serving your stakeholder-customers

In times of rapid and complicated change, you need to be constantly attuned to how your decisions and actions affect all your stakeholders—and for a provider organization, there are many. Stakeholder analysis is an indispensable management tool.

The overarching goal, of course, is improving healthcare delivery processes and outcomes. As you make technology plans and come to decisions, test them both against your guiding principles and your stakeholders’ interests. That way, you are always looking outside-in as well as inside-out. For each action you take with IT, anticipate whether and how much progress it makes toward the objectives of your stakeholders.

Meeting these objectives is a challenge. You want processes to be both standardized (for efficiency, scale, and predictability) and personalized (for patients, families, and practitioners). Therefore, you need a technology platform that supports mass customization and continuous evolution of delivery processes.

Technology’s effects on healthcare stakeholders

| Stakeholder | Common current state | Desired future state |
|--------------|----------------------|----------------------|
| Patient | Faceless | Personalized |
| Family | Ignored | Included |
| Practitioner | Inconvenienced | Informed and enabled |
| Payer | Bureaucratic | Efficient |
| Regulator | Wary | Confident |
| Industry | Fragmented | Coordinated |

5. Put information to work on the front lines

In an interview on Bill Moyers Journal, Dr. Jim Yong Kim, co-founder of Partners in Health, and now president of Dartmouth College, described the real “rocket science” in healthcare delivery. It lies not in new drugs and treatments, but in “the human science of how you transfer simple information from one person to the next.” Medical schools don’t research or teach this, but they should.

We agree. The key to greater consistency, productivity, and innovation in delivery processes is getting information out to the “front lines,” not just into the management reports. That is why so many successful institutions are adopting techniques from the total quality movement and LEAN process management.

The front lines, both clinical and business, are where information makes a difference. It is where physicians, nurses, and other employees interpret situations and act; discover patterns and self-optimize; and teach and learn from one another. This entails more than EHR implementation. Those on the front lines need information about work processes, starting with basic patient-view metrics such as “door-to-doc” time. They need communication and coordination tools that save them time and effort. They need information and analytics to support day-in, day-out decision making.

Illustration: Virginia Mason Medical Center takes a “production system” approach to eliminating waste and delay, leading to dramatic improvements in patient wait and treatment times, nurse-to-patient contact time, and end-of-shift handoffs of patient information. Front-line people regularly participate in rapid process improvement workshops.

IT implications: The employee experience shapes the customer experience, and information and technology are big parts of the healthcare employee’s work experience. As with customer-facing systems, the systems for the front lines must be designed from the perspective of user experience and workflow. Devices should be physically ergonomic, and information should be mentally ergonomic. Develop “dashboards” for key front-line people with realtime information and click-through viewing to facilitate quick access to details related to the patient’s clinical or administrative status.

“Run a practice, not an obstacle course”

That’s how athenahealth, Inc. puts it, and it’s an appropriate motto when it comes to equipping physicians and group practices with information technology and business services. You encourage meaningful use of EHR by making it part of a package of capabilities that helps physicians become more productive and their businesses more successful. Some of these capabilities are basic, such as electronic orders on the clinical side and prompt billing and payment on the business side. However, it is important to look beyond your day-to-day interactions with physicians and align with their broader goals. For example, what kinds of information about clinical results can assist them in patient recruiting? What kinds of information about practice performance can assist them in physician recruiting? How can you work together to package and communicate that information, and ultimately, how can you work together with physicians to ease their transitions to new telehealth delivery and payment models?

Tackling the “more clicks” problem

The goal of information and technology at the front lines is, of course, to enable and empower care providers. However, when it comes to the nurse’s workflow, things have long been problematic. Much of the burden for capturing essential information falls on the nursing staff, and “more clicks” on computing devices mean less time working with patients—and often an extended period of delayed data entry at shift’s end. Capturing the information is essential, yet the fact remains that technology requirements can degrade the nurse’s, and the patient’s, experience.

There’s no easy solution. But real progress doesn’t lie in more carrots and sticks, better education, or a sales pitch about why electronic information capture is important. Your nurses know that. Instead, find ways to “return the favor” in the form of information and metrics and labor-saving technology that nurses find useful. RFID and other location technologies can, for example, enable the automation of routine tasks, and keep the entire floor better informed. Think in terms of decision support for nurses: what decisions can be largely automated, and what’s the best information to inform and advise on those that can’t? Plan ahead for how your next generation of EHR is going to enable the nursing workflow.

6. Meaningful use means measurable use

The recently published specifications on meaningful use of EHR are prescriptive. However, the drafters had to generalize to cover a range of healthcare delivery circumstances. You can meet these general standards and earn your stimulus dollars, yet still underperform. You must step back, consider your strategic direction, and interpret what “meaningful use” really means for your business and its process performance, as well as for your physicians, employees, patients, and their families. To make best use of EHR and other technologies, you should anticipate and prepare for how the organization will work differently with new information and capabilities in place. Be ready to revamp the flow of information, improve the quality of management dashboards, and put better analytics to work in service of clinical and business outcomes.

Understanding and demonstrating meaningful use necessitates expanded measuring. Measure not just usage levels and conventional productivity, but also customer experience and physician and employee engagement. Benchmark first, then measure progress toward the specific goals of your institution. Use analytics to explore the interplay between clinical processes and financial results, and to verify that your organization is learning and improving. Experiment with new methods and rigorously measure and analyze the results. Measure for the benefit of management and for the front lines, and for greater transparency with all stakeholders. Then be ready to act on the results. Your chief informatics officer might also double as your chief measurement officer, with a focus on information gathering and measurement across the institution.

Illustration: To win a Malcolm Baldrige National Quality Award, an organization must institutionalize the measurement of what really matters. The 2009 healthcare recipient, Atlanticare, is rigorous in measuring and benchmarking patient care and satisfaction, as well as employee engagement, business growth indicators, and energy and environmental performance. Its “Voice of the Customer” process regularly triggers improvements in healthcare services.

IT implications: Metrics and analysis should be integrated into every information-based initiative, and not just as an afterthought. Anticipate the decisions to be made and the information needed to make them, then incorporate that insight into both applications and user education. Build the analytical capability of IT staff, including skill in building models and simulations, and in the graphical representation of data.

Key metrics for executives

| Role | Key metrics |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chief executive officer | <ul style="list-style-type: none"> • Growth performance, including in distributed medicine • Network/services/entry points expansion and revenue capture • Physician portfolio and productivity |
| Chief medical officer | <ul style="list-style-type: none"> • Clinical process quality and consistency, including variations in practice and process • “Best care” performance, incorporating speed and accuracy of diagnosis, timeliness and efficacy of treatment, and minimization of medical errors • Digital bedside effectiveness |
| Chief financial officer | <ul style="list-style-type: none"> • End-to-end revenue cycle view and analysis • RAC readiness compliance and coding variations • Revenue risk management, including re-admissions, never events, practice patterns, insurance, and lawsuits |
| Chief operating officer | <ul style="list-style-type: none"> • Capacity utilization, incorporating distributed medicine • Supply chain efficiency • Patient, physician, and process flow analytics |
| Chief nursing officer | <ul style="list-style-type: none"> • Nurse satisfaction and engagement • Nurse recruiting effectiveness and “magnet” status • Patient care versus administrative time |
| Chief informatics officer | <ul style="list-style-type: none"> • Statistical demonstration of meaningful use • Practice/process variation • Information/analytics usage and decision consistency |
| Chief information officer | <ul style="list-style-type: none"> • IT contribution to business objectives • Services catalog and provisioning performance • Progress toward a “plug-compatible” platform |

Balanced and imbalanced scorecards

Healthcare executives are already awash in information, and a preferred device for making sense of it is the management scorecard. Some scorecards are very sophisticated and useful. For example, they provide alerts and thus capture executive attention and curiosity. However, many are glorified reports—rollups of averages that provide a false sense of understanding and control. Scorecards are “balanced” in that they include multiple categories including: clinical, operational, financial, customers, and employees. However, unless you have powerful analytics behind the data, plus experience in using and adjusting the scorecard, you won’t know how the categories interact and be able to leverage that information.

Don’t toss your scorecard, but do scrutinize it. Recognize whether you have a realtime dashboard for active management, or just a report of reports. Does your scorecard let you see the organization in motion? Does it enable you to observe operations outside-in as well as inside-out? Executives have special information needs; after all, it’s their job to see the big patterns of the enterprise. Rightly structured, managed, and analyzed, the information that serves the front line should also enable investigation and trigger insight for decision making at the senior executive level.

7. Flexibility wins

The cliché has it that the only constant these days is change, and that is especially true of the healthcare industry. Everything seems in flux, and we can’t expect things to “settle down” or “return to normal” anytime soon, or even in five years when most of the initial EHR and HIE activity is behind us.

The industry and its regulations will continue to evolve, and the technological capabilities put in place today will continue to open up new opportunities and unleash innovation in delivery practices and working relationships. Even in the short term, the targets are moving as healthcare reform legislation expands access to care and changes patterns of consumption in unforeseen ways.

No matter how hard you try to get your next generation of information, applications, and technology right, you’ll inevitably get some things wrong, or the target will have moved. The only way to thrive—your only insurance—is to build agility into your business processes and information systems so that you can continue to innovate and scale activities up or down as demanded by fluctuating markets and changing conditions.

Illustration: Beth Israel Deaconess Medical Center in Boston has deployed a flexible server and storage platform for physician practice management and electronic health records systems. The approach was, “We didn’t want to spend \$1 million building an infrastructure to support 400 physicians but only have 100 show up.” Scalability proved key when usage by physicians ramped up quickly.

IT implications: This is not about installing or upgrading your clinical information system, or any other application. It’s about building the information and technology platform for an agile enterprise. With a platform approach, resources of all kinds—applications, databases, and interfaces—are not just deployed for today’s purposes. They are also structured and managed to be modular, connectable, shared, and configurable in new ways for tomorrow’s purposes. Platforms are built over time, and there are no complete or turnkey solutions. The key to success is to avoid using inflexible components at each step of the way.

IT platforms and business agility

People too often talk about agility in abstract terms. Saying that agility involves speed, responsiveness, and flexibility doesn't do much. We believe that agility consists of specific business capabilities, all of which can be measured and purposefully improved. These include:

- Rapid information access, analysis, and decision making
- Rapid innovation
- Rapid deployment of new capabilities
- Rapid scaling of business operations up and down as needed
- Facilitating collaboration and access to resources, both physical and online
- Security, compliance, and business continuity

All of these things add up to genuine, operational business agility, and the overarching goal of your computing platform is to enable these things—not just deliver specific functionality to specific people and processes today.

8. Information technology initiatives should be self-funding

Healthcare IT always has a funding challenge: no matter how broad the clinical benefits of an IT investment may be, more direct clinical investments seem to take precedence. However, if you underfund today's technology efforts, you will lose more than stimulus dollars; you will fall behind in the industry. We believe that today's wave of information technology initiatives can and should be self-funding, and then some. The financial benefits come not only through the direct payback of stimulus dollars, but also through revenue enhancements and cost offsets that may dwarf the stimulus dollars.

You should recognize and manage all sources of financial value associated with IT initiatives. There are the stimulus dollars, guaranteed if you meet specified standards within specified timelines. Also consider high-impact applications that leverage integrated clinical and business information for improving revenue cycle, quality of care, market share, and operating efficiencies (see "High-impact financial opportunities" table). Another source of financial value may be realized through a reduction of certain IT costs and cost structures. As you configure a more capable and agile technology infrastructure, you'll find opportunities to rationalize, consolidate, and "virtualize" technological components. This, in turn, will reduce your overall technology and carbon footprints even as you expand capability and reach.

Illustration: Denver Health spends about twice the industry average on IT, and the investment has consistently paid off in terms of revenue realization (\$28M from eligibility re-verification), cost containment (\$21M from lean process improvement), and clinical performance (extraordinary results in speed of STD diagnosis and care, pediatric vaccination levels, and chronic disease management).

IT implications: Find and exploit the opportunities for rationalizing technology infrastructure, as well as applications, databases, and other resources. If you don't have one yet, charter a Program Management Office (PMO) to coordinate IT initiatives and their investments, resources, timing, and benefits realization. The PMO can also help ensure that sufficient focus and effort go to revenue-side and clinical cost-avoidance initiatives. Find ways to accelerate those initiatives.

High-impact financial opportunities

| Category | Opportunity |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reimbursement/revenue cycle | Automated enrollment, eligibility, and credit checking (and rechecking) applications raise revenue realization rates and accelerate payments to institutions and their physicians |
| Infection/“never event” avoidance | Clinical data analytics find patterns and suggest ways to anticipate and prevent infections and other “never events” that harm patients, institutional image, and profits |
| Distributed medicine | <ul style="list-style-type: none"> • Patient relationship management and post-discharge intervention reduce re-admissions • Medical home applications protect market share and revenue • Distributed medicine capabilities generally can raise market share, patient volume, capacity utilization, and revenue without a large capital investment |
| Smart assets | RFID technology that tracks the location and state of portable equipment and key supplies lowers purchasing costs (by reducing hoarding and enabling just-in-time procurement) and improves quality-related processes like sterilization management and infection control |

9. Hasten with care

On one hand, you’ve got to act and invest now to take advantage of stimulus money and participate and compete effectively in the more electronically mediated healthcare market. This is not the time for a traditionally structured and leisurely paced “spec and implement” big information systems implementation.

On the other hand, you can’t do everything at once. You need to envision how your delivery and business models are changing, and how the new pieces can fit together. You need an aggressive but controlled plan for the evolution of your computing environment and clinical and business capabilities. You need to be moving quickly yet deliberately on a path that instills confidence.

Illustration: Intermountain Healthcare is consistently rated as one of the nation’s most successful users of IT. It recognizes the correlations between information technology expertise and clinical, business, and patient satisfaction outcomes. Through an ongoing joint venture with GE Healthcare, Intermountain is continuously building and deploying the next generation of hospital systems.

IT implications: You need a roadmap, not only for application-by-application implementation, but also to guide the evolution of your information and technology infrastructure into a more capable platform for both performance and change. The timing should be aggressive, which will require commitment and effort. The roadmap must also be maintained, with the help of robust measurement, and adjusted as you go.

Though your principles will vary, chances are you will need to articulate them in each of our categories, from ambition to timing (see the “Guiding principles for healthcare IT” table). You will also want to add principles covering a few specific challenges or situations you face, for example, a “structure” principle on the intent to grow by acquisition or remain independent. Your principles will not be in perfect mutual agreement, but if they are well-conceived and rooted in the mission and strategy of your institution, you’ll find that they will pull your IT plans and decisions in a more coherent and purposeful direction.

Leveraging information technology at Denver Health

For 150 years, Denver Health and Hospital Authority has been providing compassionate, high-quality care to all, regardless of a patient's ability to pay. As Colorado's primary healthcare safety net, nearly half of those accessing care in 2008 were underinsured or uninsured. Services to the uninsured totaled \$362 million for 2009. Despite the rising number of uninsured patients seeking care, the institution continues to remain fiscally sound, serving as a model for both private facilities and other safety net institutions across the country.

Denver Health credits much of its success to the strategic use of information technology, which touches all aspects of its clinical and business activities, and makes it possible for the institution to improve the quality and expediency of care while still maintaining cost efficiencies year after year. Over the last decade, Denver Health has invested more than \$400 million in technology, building a robust infrastructure, enhancing the center's financial performance, and implementing advanced clinical, data mining, and electronic health records. Recent applications include:

- An eligibility re-verification solution that has helped put millions of dollars back into Denver Health's revenue stream and helped fund additional innovation.
- An STD clinic electronic messaging and lab reporting system that saves clinical and administrative staff over a thousand hours per year, and speeds diagnosis and delivery of care.
- Computerized provider order entry and medication administration checking, which uses barcodes on medications, employee identification badges, and patient wristbands to help reduce medication related errors.

Much of our recommended approach to healthcare IT is evident at Denver Health:

- They invest aggressively yet purposefully in IT. They deploy IT where they can anticipate a variety of clinical, business, and community service results including revenue realization, services expansion, and operational efficiency. Then they rigorously measure the results.
- Information is tightly integrated, flowing into a common financial and clinical data warehouse. It is also readily exchanged as doctors and nurses seamlessly, yet securely, access all of a patient's information from PCs at the point of care—from clinic exam rooms to the ER, operating rooms, and the patient floor. Only about five percent of healthcare institutions have reached this level of capability.
- They measure rigorously and turn what they learn into process improvements. Performance scorecards are posted prominently. The organization has dozens of Six Sigma "black belts." They look outside the industry for innovative best practices. In addition, the application of lean process improvement methods has yielded over \$20M in savings.
- They take a platform approach to IT, with a cost-effective and scalable infrastructure that delivers high performance and near 100 percent uptime through advanced monitoring, planning, redundancy, and virtualization.
- They follow through. Over 90 percent of IT initiatives are clear successes (compared to an industry average of about 50 percent). They collaborate effectively with technology partners and rely on their own center of expertise in project management.

What is your IT strategy?

With so much going on in healthcare today, it may be difficult to focus a lot of attention on IT, but it is critical. Information management is perhaps today's most important clinical technology. Connection and collaboration are at the heart of fast-emerging healthcare delivery and business models. An agile platform is the key to enabling growth and change.

What's your strategy, from both clinical and business perspectives, for leveraging information technology? Do you have the funding model to find the resources to execute your strategy? Do you have the measurements to gauge your progress, adjust as you go, and maximize the results?

Your overarching responsibility is to ensure that information technology is on the right path for the institution and its objectives. Without that guidance, the path will be incoherent, and time, effort, and money will be wasted circling back. You may install the right applications like EHR, but you'll feel the cost more than the benefit. In the worst case, your technology becomes an ever more complex patchwork that inhibits coordination and change—a scenario no healthcare provider can afford.

Give your technologists direction by articulating objectives and guiding principles. Understand the technology roadmap, provide the resources to follow it, and monitor progress.

Key capabilities for the IT organization

In this period of transformational change new skills and work methods are crucial. To facilitate success, the IT organization must already excel or quickly build skills in three areas:

- Standards-based integration of information and technologies of all kinds— Connection, collaboration, and efficiency all depend on it. An early test of this capability is how the institution incorporates (or provisions) physician practice management systems. A big test down the road is how well it participates in HIE.
- Systems security, information privacy, and business compliance—You can't keep everything locked-down and still collaborate effectively. Institutions need new risk-balanced approaches for meeting the twin objectives of transparency and control.
- Measurement and analytics—People throughout the institution will need assistance in developing metrics, applying analytical methods, exploring the potential of integrated information, and making more informed decisions with confidence.



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