Chapter 2

EHR Critical Success Factors

INTRODUCTION

Successful use of electronic health records (EHRs) requires defining the organizational goals that will be fulfilled by their use, selecting a vendor with values and goals that are congruent with practice goals, and planning for the implementation, ongoing management and development of the EHR system. Long-term success with EHRs is dependent on establishing a continuous process of assimilating the features and functionality of this technology into the fabric of the practice.

Critical success factors are the elements necessary to accomplish a specified goal. Critical success factors for EHRs include:

- Change management
- Completion of a readiness assessment
- Buy-in and contribution from stakeholders, including physicians
- Ability to report on evaluation metrics established for each phase of the project
- Training before, during, and after EHR implementation
- How leadership deals with technology malfunctions

Operationally, the critical success factors medical practice leadership needs to consider are the following:

- A governance plan that ensures uniform adoption and assimilation of the system.
- Reliable information technology (IT) infrastructure.
- A well-designed system that supports practice workflow and workload.
- A deliberate implementation plan that capitalizes on the strengths of the clinic or health center and minimizes its weaknesses.
- Standardized workflow and processes, as established through a collaborative effort among administration, providers, and staff.
- Ongoing management and development that ensures optimal use of EHRs.

Physician groups, both private and hospital-owned groups, decide they are ready for EHR technology for many reasons. A significant driver is the government mandate and tax incentives to use EHRs. Although many groups will not meet the 2012 deadline for maximum stimulus participation, most groups do not want to be left behind when
there are penalties for not using EHRs. A decision based purely on tax incentives, however, frequently does not lead to positive, successful assimilation of this technology.

Other drivers can include:
- Improved quality of care, documentation, staff efficiency and patient safety.
- Decreased medical errors and healthcare delivery costs.
- Improved revenue and a compressed revenue cycle.
- Increased staff interest in improved access and management of clinical data.

EHRs improve the quality of care by providing decision support at the point of patient contact. In the case of chronic illness, built-in triggers prompt physicians to order tests that could prevent disease progression and improve patient health. In the case of preventive care, patient protocols can be built in (or downloaded) to encourage providers to order preventive screening or provide counseling that improves overall health within a specified patient population. In the case of acute illness, EHRs can suggest treatment options.

Many groups experience improved efficiency when they adopt and assimilate EHRs. They find that EHRs are capable of putting the right information in front of the right person at the right time. EHRs also allow patient requests to be handled by fewer people and satisfied more quickly. This process, in turn, leads to fewer phone calls and steps to follow up on simple requests, such as obtaining copies of medical records or prescription refills. It also leads to better utilization of highly trained (and paid) provider staff. For example, a patient calling in for an appointment can be told that getting laboratory work performed one week prior to an office visit will allow the provider to review test results in person with the patient. Furthermore, with EHRs there are no more lost medical records—and many fewer steps to get the results of laboratory and radiology studies back to the provider and entered in the patient’s medical record.

In most cases, a provider can “template” a visit and—using a point-and-click method—document findings, “tee up” follow-up studies for tracking, pass charges to the billing system, and, in most cases, ensure that he/she is providing the “gold standard” of care to every patient, every time. That said, EHRs will improve efficiency only if they are properly deployed and supported.

Through the use of decision-support applications and drug-to-drug and drug-to-allergy testing, EHRs help providers improve patient safety and decrease medication errors. Most EHR systems use an external database to support prescribing practices. These databases present the provider with dosing options and may even suggest a lower cost alternative. In addition, when medications are added as discreet data, they can be cross-checked within the patient’s medical history to ensure that (1) he/she will not have an adverse reaction, and (2) the drug is not already a part of his/her prescribed medication regimen.

Managing paper medical records is expensive. It requires a tremendous amount of staff to manage paper systems properly. Paper records are easily misplaced (or even lost), and basic data-entry tasks require many hands and many steps. Also, paper records are available to only one person at a time.

Although the up-front costs of EHR technology are significant (i.e., approximately $55,000 per provider for installation, deployment, and implementation), its cost over time is significantly less than managing paper. For example, EHRs decrease wasteful
spending on diagnostic tests by eliminating duplicate testing and helping to ensure that the correct tests are ordered for any given illness. EHRs also help the bottom line by compressing the revenue cycle. In most cases, visit charges can be sent on the day of service.

Providers continuously struggle to provide documentation that is individualized, complete and comprehensive, and, most importantly, describes what happened at the office visit for the next person reading the documentation. EHRs help providers document and place orders. In paper medical records, information frequently must be written in several places, which guarantees that it will not appear in at least one of those places. However, many providers and certified coders struggle with the lack of individuality allowed in EHR office notes. For the best results, providers should use the point-and-click method provided by templates, augmenting standard EHR documentation to provide the level of individuality necessary for the patient.

Most importantly, EHRs provide access to a large volume of clinical data that is simply not possible with paper records. Although computers are not very good at critical thinking or applying clinical judgment, they are excellent at storing, remembering, retrieving and presenting data in a format that can be easily analyzed. Provider analysis will lead to improved quality of care for many diseases and illnesses.

**GOVERNANCE**

Decisive and clear governance is a critical success factor in EHR adoption and assimilation. It is essential to create the staff infrastructure that will allow for the successful completion of a project of this complexity. The governance team provides a steady infusion of motivation and leadership, as well as an awareness of practice culture that ensures the inclusion of stakeholders and wise information management (e.g., setting expectations).

In this setting, motivation consists of the persuasion, incentive and inducement necessary to assimilate EHR technology within the practice. During EHR implementation, motivation can come in many forms, such as educating clinical staff on the features and functionality of the system (persuasion). It can also involve establishing evaluation metrics and looking for opportunities to offer small rewards to staff for meeting or exceeding goals (incentive). For example, one might establish the number of medical records each staff member is expected to manually enter, or preload, in a given period and then reward individuals when they meet (or exceed) that goal with a modest department store gift card.

Motivation can also take the form of a stick. Although persuasion and incentive are certainly preferable to inducement, practice staff must understand that using EHRs is a requirement of employment. Similarly, physician staff must understand that using EHRs is not optional.

The first step in establishing good governance for an EHR project is to identify a physician champion within the practice. This physician advocate plays a critical role of transformational leadership and should be respected for his/her comfort with and knowledge of IT as well as his/her knowledge and understanding of practice culture. That said, choosing an early adopter of EHR technology may not be the best choice in a physician champion. It is often best to focus on enlisting a medical leader who is
well respected, has a good understanding of practice culture, works collaboratively with top-level leadership, can influence broad groups of peers and demonstrates good IT understanding and use. The physician champion should also be viewed as an advocate by his/her associates. This respected proponent should view the role of technology in healthcare not as a panacea that will solve all problems, but, rather, as a tool that can improve the efficiency, effectiveness and safety of patient care.

In addition, top management has an important role to play in EHR implementation projects. Chiefly, they must demonstrate an unwavering commitment to the success of the project as well as an awareness of the capabilities and limitations of EHRs. They must work in collaboration with the physician leader and practice administrators to create reasonable, attainable goals for the project, staff and physicians. Top management and the physician leader must also be able to communicate IT strategy to all employees and exhibit a strong commitment to incorporating IT. Leaders must exhibit resolve by holding project managers accountable to performance standards, such as meeting project milestones. In addition, the training provided should allow staff and physicians to have a sense of competence and confidence when using the system. EHR projects most often fail when they are handed off from top-level leadership to technical experts.

Practice culture is a crucial determinant of how EHRs need to be implemented in a practice. A young, progressive practice will likely move more quickly and be more tolerant of technology malfunctions than an older, more traditional practice. It is important to understand that many older physicians have been interacting with paper medical records in a particular way for 20 to 30 years. Transitioning to EHRs can be difficult in this setting. When there is resistance to change, the transition will be that much more difficult, time consuming and expensive.

EHR implementation projects are fraught with uncertainty. Although project managers and the implementation team try to account for every possible scenario, it is nearly impossible to account for everything.

The antidote to uncertainty is good communication. The governance team must control the content and flow of information related to the project. Adopting a communication plan that addresses project milestones, staff requirements and project vision is a key to success.

The communication plan should be organized by those who will develop message content (i.e., at least one member of the governance team) and those who will help determine what, when and how (e.g., posters, e-mail, company intranet messages) the information will be disseminated. The plan needs to address how the practice will communicate with patients and with associated healthcare providers in the community. Many practice groups communicate with patients using posters in waiting and examination areas as well as messages on practice statements.

Choosing a theme and name for the EHR project is another effective communication tool. The theme can be incorporated into staff incentive programs and help create a lighter atmosphere as the practice comes closer to launching the system. Humor and whimsy go a long way toward lowering staff anxiety and improving morale as the final transition to a live EHR environment becomes imminent.

Inclusion of the stakeholders is essential to the success of any EHR project, and the governance team is responsible for ensuring these individuals are included at key
phases of the project. In almost all decisions related to the EHR, it is important to include key physicians, technology staff, nursing or medical assistant staff, as well as staff from medical records, billing/coding and risk management. The opportunity for success is improved by asking stakeholders to work with the implementation team to (1) run workflows in the context of the new system, (2) test clinical content, and (3) regularly communicate their expectations regarding project functionality.

**IT INFRASTRUCTURE**

Most groups will need to upgrade their IT infrastructure when implementing EHR technology. IT infrastructure must be robust and reliable, with fast and reliable networking, enough of the correct end-user hardware, proper housing for server hardware and adequate help desk support.

When selecting a system, practice groups will need to choose between a client-server model software or a software as a service (SaaS) model. Typically, larger, more complex practice groups choose client-server systems and SaaS model software is preferred by smaller groups.

A client-server system requires a robust and reliable local area network that allows local computers, printers and scanners to connect to the application and the database where patient data are stored. In many cases, Internet access is required to allow multiple sites to connect to each other and to the application and database servers. Internet access must be high speed and dedicated to the EHR system. In addition, it is important to consider redundancy in the event that the primary Internet connection goes down or is not available.

SaaS models are completely reliant on a robust, reliable Internet connection because the practice will be accessing a system that is housed off site. In this case, the application and database are housed at the vendor’s data center and, although all data are owned by the practice, there is a subscription fee associated with the use of software licenses and database access. Redundant Internet connection is a requirement for practices using an SaaS model. In either model, creating a network that maximizes broadband speed to each workstation and works easily and reliably is a critical success factor.

**End-User Access Models and Peripherals**

How end-users (i.e., providers and staff) access EHRs is another part of the IT infrastructure that the governance team must consider. There are two choices: (1) workstations in every examination room and at each provider’s and staff member’s desk or (2) individual tablet PCs (personal computers) or laptop devices that connect wirelessly.

Although handhelds can be effective tools for viewing some data, such as laboratory and radiology results, such devices generally do not provide enough screen “real estate” to make them effective tools for inputting EHR data. Perhaps for this reason, they are not widely used for EHR systems. In addition, currently, they are not widely supported by the major EHR vendors. However, with the recent introduction of the Apple iPhone and iPad, it is only a matter of time before EHR applications will be supported by vendors for these popular devices.

Outfitting each examination room with a thin-client EHR workstation allows one to create a simple deployment that is relatively inexpensive and easy to maintain. The
main disadvantage of this set-up, however, is that it requires each user to log on and off during each patient encounter. Because EHRs house protected health information, a powerful, difficult-to-break password is required. Unfortunately, most providers object to the length and complexity of a strong password—preferably auto-generated and typically consisting of eight characters with at least one numeral, a character, and a capital letter—and will not be willing to enter it with every encounter. When using a thin-client EHR system, there is a significant risk that providers or staff will leave workstations running out of convenience or as a result of haste. Soon, patient information will be entered using someone else’s username and password, essentially falsifying patient medical records.

Another disadvantage to this deployment model is that it requires supporting more workstations (i.e., one per provider plus one for every examination room). Finally, providers and staff cannot make full use of the features and functionality of most EHR systems in this deployment model. Most wireless-based EHR systems notify providers of patient arrival and readiness to be seen, but this feature is not available in a thin-client environment. Furthermore, other communication methods supported by wireless-based EHR systems (e.g., electronic delivery of laboratory and diagnostic test results, notification of prescription refill requests and notification of patient and other referring/referral provider communication) are not available. When EHRs are available only from examination rooms and at provider and staff members’ desks, the just-in-time communication features supported by many EHR systems are limited.

When laptops or tablet PCs are used, a wireless network must be deployed to allow for connection of the devices to the network. Although wireless networks require specialized skills for proper installation and configuration, wireless access points are becoming easier to deploy and manage as they become ubiquitous in medical settings. The advantages of wireless EHR deployments are improved system features and functionality, fewer log-ins, and improved security, including secure user credentials for data entry. This type of deployment requires that each provider and clinic staff member is issued one device, either a laptop or tablet PC. Providers should be permitted to take their devices home or to other clinical locations. This deployment model limits the number of machines/devices that the organization must support.

The main disadvantages of this type of system are mostly related to the level of IT skill required to support and maintain the system and the expense of the devices and wireless connections. Although laptop and tablet PCs are more expensive initially, outfitting providers and staff (rather than rooms) requires fewer machines and, in most cases, the costs are offset.

The remaining infrastructure issues are fax servers, printers, scanners and remote access. A fax server is the most efficient way to manage incoming and outgoing fax messages. Most EHR systems allow faxes to come directly to the desktop of the recipient and allow providers and staff to fax directly from their desktops. Although it is relatively simple to configure outgoing PC-based fax capabilities, enabling incoming faxes generally requires more thought and work, depending on the fax server used. Typically, incoming faxes require workflow considerations and the proper fax equipment to receive the fax. Most new (i.e., less than three years old) computers incorporate fax servers and can handle in-bound faxes.
While the practice is transitioning to an EHR system, there will be an ongoing need to print and handle paper coming into the practice. Mapping printers and using a naming convention for them that is easily understood by staff will minimize printing frustration and support issues. It is also important to consider printer location. Meaningful use guidelines require that the patient receive printed instructions at the end of each visit. These instructions should be printed in the clinical area and delivered by a medical assistant or nurse, allowing the patient one last opportunity to ask questions before leaving the office. Making a printer easily accessible for this purpose improves patient flow.

Scanning is an essential component of any good EHR system. Using dedicated scanners and workstations ensures the highest level of efficiency for the medical records department. Networked scanners are not as efficient because they are typically multifunction machines; a fax or printout can arrive in the middle of the scanning process.

Remote access is essential for the efficient use of EHRs. Providers and others supporting EHRs must be able to access data from locations outside the clinic network. This level of accessibility requires publishing EHR data to a secure website or deploying a virtual provider network, which requires installing a software client on each workstation that will access EHR data remotely. In either case, creating remote access requires specialized IT skills.

**SYSTEM DESIGN**

System design is a critical success factor for good system adoption and assimilation. A well-designed system supports the workflow and workload of the practice. Ensuring that your practice has a well-designed EHR system begins at the system-selection stage of the process and continues through the implementation phase when the system is customized. Design includes addressing clinical content and other set-up issues, such as messaging features, physician orders, prescription refill management, results management, documentation of communication with patients, and managing clinical documents management.

During the planning process, the practice must examine the workflow and workload of several processes. At a minimum, they need to consider:

- Preloading patient medical records to accommodate the transition to EHRs
- Prescription refills
- Referral requests
- Patient phone calls for issues other than refill and referral requests
- Patient visit flow, including check-in and checkout
- Dictation and transcription
- Laboratory and radiology orders and results
- Patient follow up on diagnostic tests and referral results
- Paper workflow for paper documents still coming into the practice
- Release-of-information requests

Mapping current workflows using a *swim lane diagram* is the first step in re-engineering workflow for the EHR. Swim lane diagrams identify all of the actors in a given process, indicating all of the processes the actor performs and the sequence in which they are performed, along with any hand-offs from one actor to another.
EHR workflow re-engineering is then documented on a separate swim lane diagram. This diagram is used as the foundation for all EHR training materials. After workflows are re-engineered, the EHR team reviews them in the context of the EHR, making sure that all processes are accounted for, that the processes are in the correct sequence and that the hand-offs are accurate. A combination of workflow documentation and training materials ultimately become the policy manual for the organization. Therefore, each document should be developed and organized with this deliverable in mind.

During EHR implementation, it is important to track and monitor workload. Many processes will become more efficient, requiring fewer steps—and, in many cases, fewer people. However, during the implementation phase, the practice must continue the processes necessary to maintain paper medical records, changing existing processes and evaluating the new processes put in place. At times, implementation can be overwhelming to staff. Although it may be tempting to bring on additional staff, it is generally best to hire temporary staff and/or look for opportunities to shift existing staff into critical positions. Re-engineering workflow to standardize and improve efficiency for EHRs can assist in keeping workloads manageable. Furthermore, try to resist maintaining parallel paper and electronic processes whenever possible.

**IMPLEMENTATION PLANNING**

Implementation planning is a critical success factor. Implementation planning includes considering an overall plan and timeline for the project. This plan should include a delineation and assignment of responsibility for all tasks related to each phase of the project. Typically, an EHR project has a “build phase” that includes set-up of server and end-user hardware, loading of software, network design and deployment and security assignments. This phase of the project can take 90 to 120 days, depending on the need for network infrastructure re-design and deployment. Adding bandwidth and converting to fiber optic or multiprotocol label switching networks requires telecom providers to make adjustments and can take 45 to 60 days. These requirements will not be vendor-dependent and should be initiated during the vendor-contracting phase because most EHRs require robust and reliable wide area and local area networking regardless of the vendor selected.

Once the EHR system is installed, critical tables will need to be built. These include:

- Adding users
- Building custom lists
- Establishing a connection from the practice management system for exchanging patient demographic information
- Setting up electronic prescribing (E-prescribing) functionality
- Setting up document management systems
- Loading content and making the necessary customizations

All functionality must be tested before user training and before launching the EHR system for use in the live environment.

Making the transition from paper to an electronic environment requires preloading patient data from paper medical records to EHRs. This phase of implementation
gives physicians and staff an opportunity to gain experience navigating in EHRs and helps them begin to understand the logic of the system.

Additional implementation planning involves the components of training. A training methodology must be adopted: direct training from the vendor for all end-users, or a train-the-trainer approach when “super users” or “power users” can be identified. Super users are trained by the vendor before they, in turn, proceed to train an assigned number of end-users within the practice.

A training curriculum for each phase of the project must be developed to ensure that critical functionality is taught to end-users in the proper sequence. After workflow changes are delineated, training materials that reflect adjusted workflows for various processes must be developed.

Each phase should also have documented evaluation metrics, such as the number of preloads each physician and staff member is expected to perform during the course of a week, the number of refills and new prescriptions processed through the E-prescribing feature, accurate placement of physician orders and disposition of laboratory and diagnostic result reports. Unit managers must be trained in how to track and report progress.

**CONCLUSION**

Creating an awareness of crucial success factors guides the planning and evaluation of a project of this magnitude. Keeping administrators focused on success and using the elements discussed in this chapter improves the opportunity to routinize high-functionality use of EHRs.