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A PRACTICAL STRATEGIC RESOURCE FOR HEALTH SYSTEM EXECUTIVES AND PHYSICIAN LEADERS

Successful Computerized Physician Order Entry System Implementation

Tools to Support Physician-Driven Design and Adoption

By Robert B. Williams, M.D., M.I.S.

Editor's note: Attaining physician acceptance of technology has been a challenge in many organizations. As pressure builds for health systems to implement computerized physician order entry (CPOE) systems, healthcare leaders will be increasingly faced with this challenge. In this article, Robert B. Williams, M.D., M.I.S., a partner in Cap Gemini Ernst & Young's Clinical Transformation Practice, provides a blueprint for healthcare leaders seeking to make the transformation to CPOE and involve physicians in the process.

Since publication of the 1999 report by the Institute of Medicine, *To Err is Human: Building a Safer Health System*, health system organizations have spent significant time and effort reviewing the potential benefits to be attained through the integration of enhanced clinical processes and technology. Front and center in these deliberations has been computerized physician order entry (CPOE), in large part because of the focus given by national entities such as The Leapfrog Group, but also because of a growing recognition of the advantages of sustaining clinical process improvements through automation. This translates into significant enhancements in patient safety and ongoing operational savings for health systems.

The purpose of a CPOE system is to refine and automate the clinical ordering process, and to provide the clinician with relevant and valuable information at the point of decision making. In doing so, it reduces the current medical error rate by "fixing" the underlying problems of:

- Misinterpretation of handwritten orders
- Dosage errors due to mistakes in decimal placement
- Overlooked adverse drug interactions
- Medical practice variations

To date, however, fewer than 10 percent of health systems in the United States have actually implemented CPOE.[1] According to a recent Gartner Report, the most challenging issue facing health systems in the successful implementation of CPOE is that of gaining acceptance of the systems and changes from affiliated physicians.[2] Clearly, the greatest benefits from the implementation of CPOE systems will

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In This Issue

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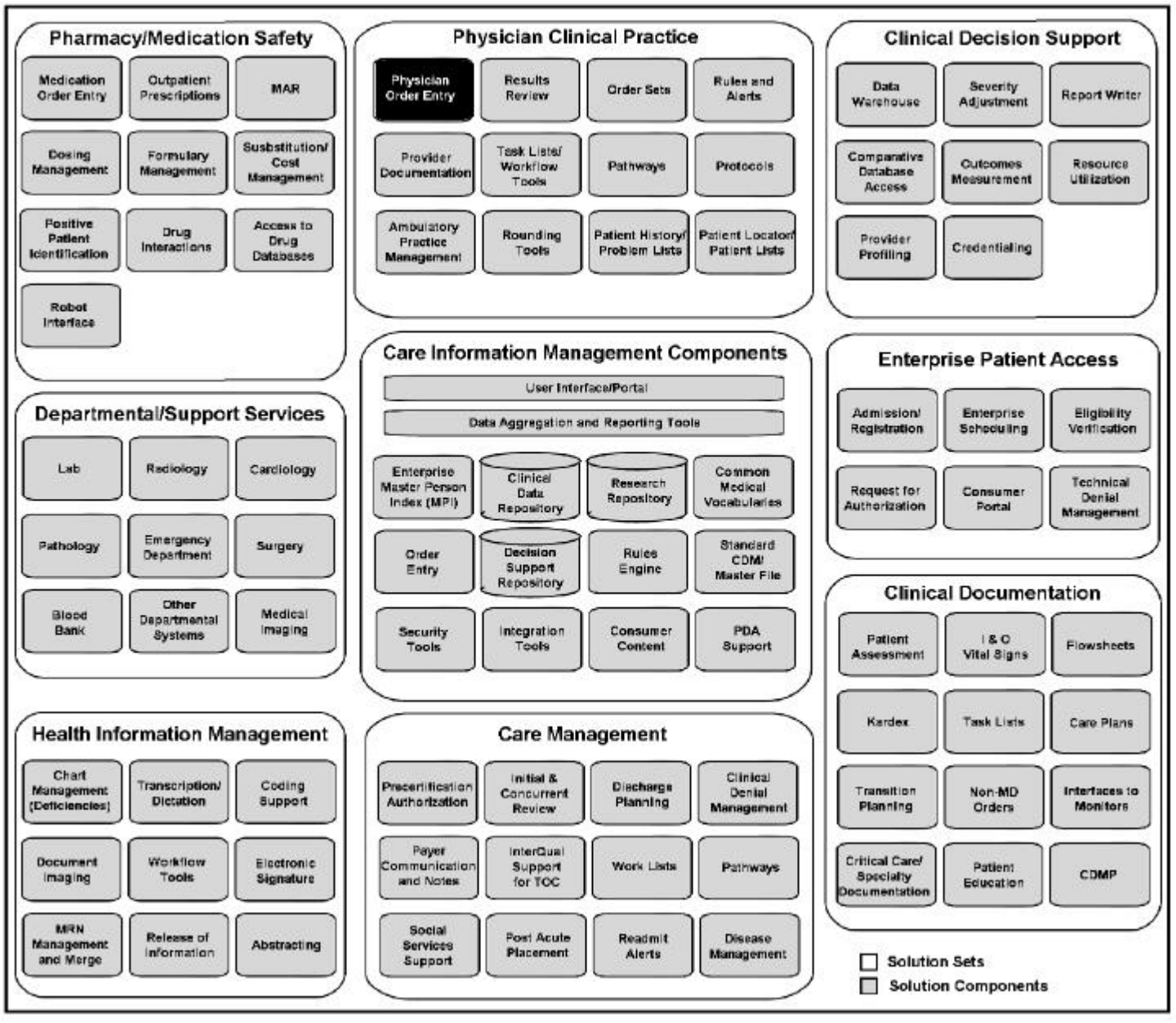
CPOE is a capability included in advanced clinical information systems (CIS) that allows physicians to directly enter orders and supports physicians' clinical practice both inside and outside the hospital setting. The goal is to provide clinicians with the information they need at the time they need it to make good clinical decisions.

Implementing agreed-to clinical standards or guidelines can be done effectively only by employing an advanced clinical information system. Advanced CIS includes many other integrated functions within the following areas: pharmacy and medication safety, physician clinical practice, clinical decision support, enterprise patient access, care management, health information management, department and support services, and core information management components. These functions and their core information management components are shown in Figure 1. It should be noted that CPOE is only one of many functional CIS components that supports physician clinical practice. Others include results reviewing, order sets, rules and alerts, and rounding tools.

Physician adoption of innovations in both medical technology and clinical

Figure 1: Overview of CIS Functionalities

CPOE is part of an advanced clinical information system (CIS)



practice has been the subject of numerous research studies[3]. Findings from these studies suggest that adoption of innovations by individual physicians is dependent upon the *perceived value* the innovation represents to the individual physician in terms of:

- Relative Advantage: The degree to which an innovation *is perceived* as better than that which it supersedes;
- Compatibility: The degree to which an innovation *is perceived* as being consistent with the existing values, past experiences, and needs;
- Complexity: The extent to which an innovation *is perceived* as difficult to understand or use;
- Trialability: The extent to which an innovation can be experimented with on a limited basis; and
- Observability: The degree to which the results of the innovation are visible to others.

Also critical to the speed of innovation adoption are the structural elements of the social system in which such decisions take place. For example, innovation adoption decisions left to the individual are usually solid when made, but notoriously slow to diffuse through a large group. Studies have shown that less than 20 percent of a given physician population is actively open to the adoption of new technologies, but another 60 percent can be persuaded to adopt over time[4]. Authoritative decisions (those made by a small group for the larger group)—while successfully ushering in the adoption of innovation within formal organization and corporations—have proven to be singularly unsuccessful in sustaining the adoption of innovations within the clinical practice arena.

The critical elements in physician adoption of systems such as CPOE are devising an approach and set of tools that permit the individual physician to recognize *and perceive* the benefits to his practice in a shorter time frame, and engaging physicians in the customized design of the system for local use. This article addresses how health systems can use this approach to shorten the design and adoption time frame and assure high levels of acceptance by the medical community.

What Physicians Want

Through experience in successful design and implementation of clinical processes and information systems, we have learned that an in-depth understanding of the drivers of physician adoption of innovation is critical to success. Health system leaders often lack a complete and concrete understanding of the issues faced by physicians in their daily professional practice. To successfully engage physicians in the adoption of clinical systems, physicians must be able *to perceive* how a new system will influence the three major activities that compete for their time throughout their professional day. These activities are:

- Providing patient care: Clinical decision making, procedural interventions, accessing patient information, and communicating with patients, families and other providers;
- Running their practices: Achieving efficiency, enhancing productivity, coding, billing, addressing regulatory compliance, and completing administrative responsibilities; and
- Managing time: Professional and personal, balancing patient care and administrative responsibilities, including teaching and research within the academic setting.

What physicians want from CIS and CPOE is definable and knowable. In the course of conducting numerous interviews and focus groups with health systems across the country, Cap Gemini Ernst & Young U.S. LLC (CGE&Y) has gained an understanding of the key operating characteristics for clinical systems that meet physician expectations:

- Requires the same or less clinical time per patient and does not encroach on personal time
- Allows easy entry of orders with brief training session
- Provides useful access to current clinical information to support decision making for patients (lab, pathology, diagnostic studies, vital signs, current orders, history)
- Is accessible from hospital office, home, and remote sites
- Integrates other services used such as Internet, e-mail, etc
- Provides access to reference information such as medical references, national guidelines, in-house guidelines
- Enhances the safety of the patient environment through integration with reporting, documentation, and medication related systems
- Supports successful medical business practices (documentation, coding, patient scheduling, HIPAA, etc.)

To attain these performance characteristics, CPOE must undergo local clinical and administrative customization. Physician participation and direction in this customization process is critical if the results are to support extensive adoption and acceptance. Tools and techniques exist to facilitate and shorten the customization process, but not short-circuit key issues. It is instructive to view CPOE in a framework for action that incorporates these tools within a context that keeps the benefits physicians value front and center in the process, while structuring the detailed customization process in a way that optimizes the use of physician time.

CPOE and CIS can be implemented independent of significant redesign of clinical and other processes. However, the real quality and financial opportunities that can be created and sustained by CIS rely on rethinking how the core work is done and by using the CIS/CPOE implementation as a lever to redesign these processes. The axiom becomes, "Don't automate broken processes!" This overall approach to CIS implementation is known as *clinical transformation*, which can be defined as, "optimizing your clinical operations using information technology to drive significant quality and financial improvements."

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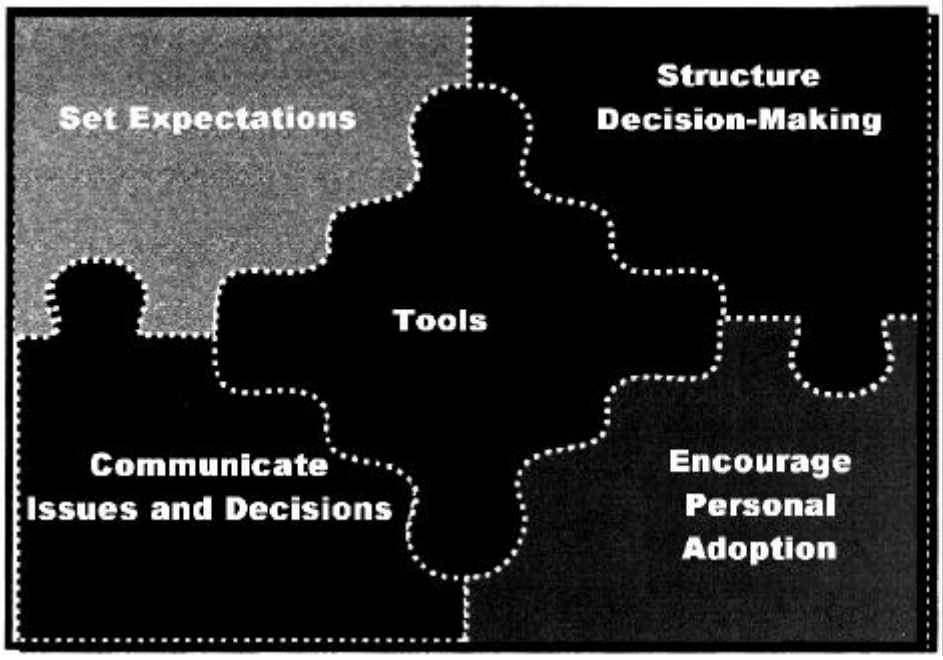
The Physician-Driven Design Framework

Engaging physicians in the design, leadership and adoption of hospital and system change initiatives is a challenge for most organizations. It is valuable to draw upon approaches that have been successful in achieving physician adoption of innovation. Using experience and literature-based evidence, CGE&Y has developed a framework for achieving physician participation and co-design of advanced CIS with specific focus on electronic order entry. CGE&Y's Physician Driven Design Framework is shown in Figure 2. Four activities form the core of this framework and provide a set of proven tools to support each area. The activities are structured to engage and support multiple groups of physicians in a purposeful process of understanding the capabilities of clinical technology, establishing expectations for the impact on their practices, addressing fears concerning transition, autonomy and performance, and establishing local customization of the clinical software to assure acceptance and support for quality care.

Figure 2: Physician-Driven Design Framework



Set Expectations: The work within this activity brings clarity to the reasons behind the recommendation for CPOE adoption and the consequences of that adoption for the individual physician. Research has shown that lack of clarity about why such a change is necessary or what its consequences might be lengthens the adoption decision process and is a major component in project failure.

Structure Decision Making: This activity addresses the development of an overall project structure driven by collaboration between physicians and health system leadership. In addition, one of the major tasks is the customization of CPOE software to reflect local clinical and administrative practices. Through the use of specific decision support tools, the expectations of the local medical community are integrated with the key operating characteristics for the system to create the instructions the software programmers will use to customize the system.

Communicate Issues and Decisions: To achieve clarity concerning the consequences of CPOE adoption for the individual physician, it is necessary for there to be a strong communication program that allows physicians to access issues, discussions, and decisions in the manner that is most convenient for them. Additionally, acceptance of the system is highly dependent upon making system information available at teachable moments and from respected sources. Defining the details of such communication is the work within this activity.

Encourage Personal Adoption: Personal adoption decisions are based on the physician's personal assessment of how such adoption can benefit his practice. The work within this activity focuses on making sure the clinical

systems do just this. Through shared decision making, improvement in "ease of use" features, and incentives designed locally to encourage faster adoption of CPOE, health organizations will realize the return on investment in shorter time frames.

Set Expectations

CGE&Y's experience with physician interviews and focus groups shows how necessary it is to establish realistic and common expectations for CPOE performance and the implementation process. In doing so, serious concerns can be addressed and refinement of clinical and administrative operations can be affected.

The decision to undertake CPOE design and implementation commits the organization to transformational change. One physician likened the process of transformation to the metamorphosis from a tadpole to a "leapfrog," in pun referring to the national group focused on patient safety issues. In such a large undertaking, creating institutional readiness is one of the keys to success.

An example of the issues arising around institutional readiness comes from the recent experience of a major teaching health system designing and implementing CPOE. In the process of setting expectations, CGE&Y uncovered dissatisfaction and unhappiness among clinicians toward a results-reporting system that had been installed within the past year. This dissatisfaction was creating a climate of controversy and resistance to the CPOE project. While this dissatisfaction had not gained attention from the health system leadership, it was sufficiently broad-based to threaten any further clinical system initiative.

Through a series of focus groups, CGE&Y learned that use of the system was characterized by significant glitches and learning curve issues which had not been addressed in a timely manner. For example, the new system had some early downtime issues that were never explained to the clinical staff. As a result, they "learned" through their own experiences that the system was not reliable, rather than understanding that the downtime issues were temporary and were being addressed. Many physicians did not know how to access the "help" hot button on the screen, and were therefore frustrated in their attempts to use the system. Physicians were also frustrated by an inability to graph the results they were receiving and were unclear how to get this information.

To address these issues while not derailing the CPOE process, CGE&Y integrated a problem-reporting period, which opened each physician advisory committee meeting for the CPOE project with a specific focus on discussing problems with the results-reporting system, and reports by the systems staff on actions taken to address these issues. Additionally, the health system took several steps to improve the learning curve issues. First, they enhanced their "power user group" of physicians who tended to be excited in pioneering the system and teaching their colleagues. Second, system staff members were sent out to the floors to find physicians as they sat in front of the computers and help them accomplish their work more effectively. This was an example of taking advantage of teachable moments.

While none of the issues surrounding the implementation of this system were major, the overall effect was to leave the primary users feeling as if no one was listening and responding to their concerns. Once addressed, the climate quickly captured the inherent trust and motivation to move forward with CPOE. Had the health system simply moved ahead with CPOE without changing the underlying "readiness" of the organization, there is little doubt that design and adoption of the system would have suffered greatly.

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Several tools are useful in setting expectations and assessing institutional readiness. Firsthand experience tools such as surveys, interviews, and structured focus groups form the core of the information capture. The information is used to create a quantitative and qualitative understanding of the organization's readiness to undertake CPOE implementation. The areas of inquiry include:

- Medical staff experience with existing clinical systems — positive and negative
- Opinions regarding a desirable "future state" for clinical system usage
- The characteristics of optimal work flows to support efficient, safe, and cost effective patient care
- Perceptions and experiences with barriers to achieving change and physician buy-in in the organization
- Opinions and insight on the most desirable ways to successfully implement CPOE within the specific organization
- Identification of workflow issues affecting care management and assessment of the interest in clinical redesign efforts to reduce practice variation within focused clinical populations

Data capture occurs either online or through paper surveys depending on the physicians' preferred method of reply. The data are then arrayed to highlight areas of opportunity and/or concern. Figure 3 illustrates the type of information capture and display.

The synthesis of this information creates a "readiness for change" assessment. This assessment addresses certain core issues that have been historically at the core of CPOE project failures such as:

- Physicians' readiness for engaging in computerized order entry
- The state of relationships between the medical staff and hospital or system and its leadership
- Knowledge, attitudes, and behaviors regarding medical management and resource utilization

If the assessment shows areas of serious concern, steps can be taken to address the issues prior to commencing the CPOE design. For example, if, as shown in Figure 4 on page 7, the level of trust between the medical staff and system leadership is shown to be "competitive" (on a scale that ranges from collaboration to cooperation to competition), then specific steps are recommended which might focus on sharing detail behind the clinical and business case for change, conducting focus groups to explore the issue in more detail, and examining the possibility of entering into personal services agreements with key physicians. Health systems vary in their cultures regarding payment to physicians for their contributions to system-driven initiatives. In most organizations, experience has shown that the significant time investment required of physicians in the local design warrants reimbursing physicians at a fair market value for their consultation to the project.

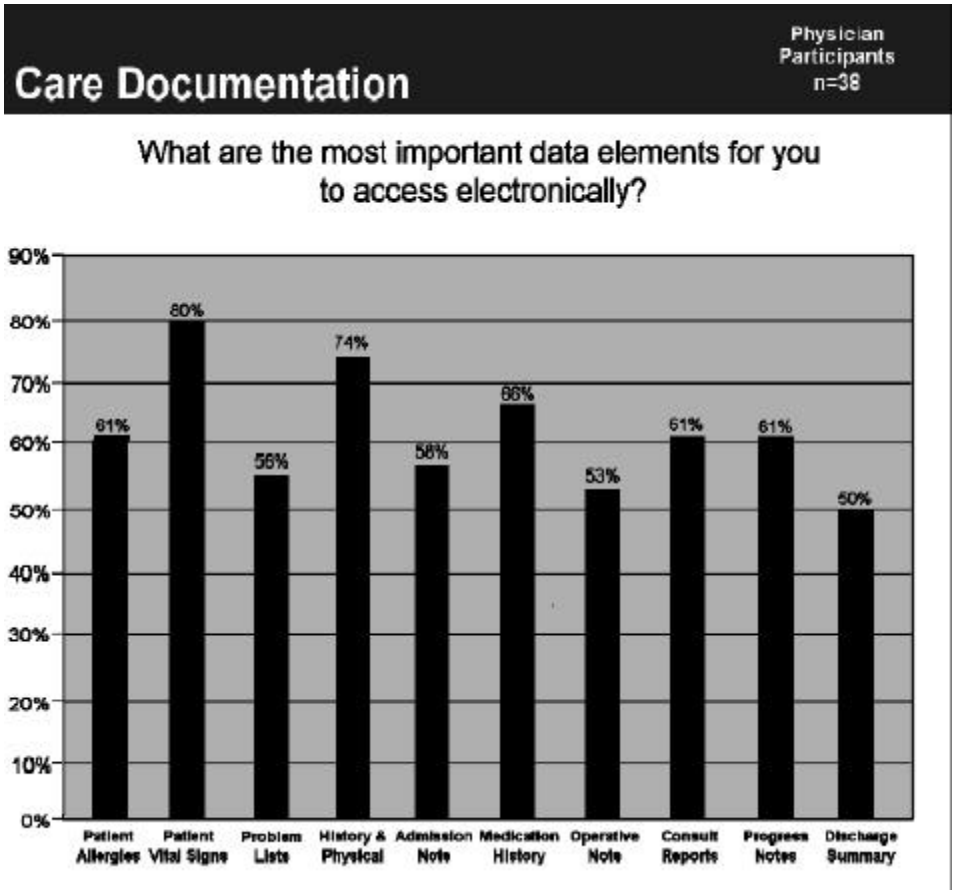
Once the readiness assessment and a current state analysis have been created, physicians and operational leaders develop a vision of the desired future state. This is used to guide the group through a series of complex decisions needed to support the initiative, focusing on:

- Developing understanding of each group's priorities and needs
- Creation of a common vision for the future state
- Development of an agreed-upon action plan and assigned accountabilities to attain clinical and financial objectives

Rapid Design℠, which was developed by CGE&Y, is a proprietary approach for accelerating business change that has been customized for use with healthcare organizations and includes three stages: *scan, focus,* and *act*. An example of the power inherent in Rapid Design can be seen in the results of clinical redesign. Processes that have been mired in inertia, complexity, and lack of ownership yield to the forces of logic and improved efficiency in very short time periods. At a Midwest health system, groups of clinicians and administrators were convened to redesign clinical processes around orthopedics, neurosciences, and cardiac services. Each content area was addressed in back-to-back evening sessions. Existing content-specific tools (standing order sets for joint fracture and joint replacement, protocols, drug selection, rehab plan) were updated and readied for final approval. Physician work flows, including pre-procedure processes for elective surgery, were reviewed.

Stakeholders designed the future processes needed to effectively

Figure 3: Survey Result Capture and Display



integrate CPOE with clinical workflow. Patient safety issues and disease-specific rules and alerts were identified. Nursing plans of care were modified.

Participants were highly satisfied with this accelerated process and the avoidance of multiple meetings over several months that their traditional approach would have required. A significant finding of these sessions was that physician office staffs were spending tremendous amounts of time on the phone waiting to connect with registration and scheduling staff; and running down patients who fell between the cracks or whose preparations for procedures were incorrectly addressed. On the health system side, the difficulty of getting all the pertinent patient information from the physicians' offices had resulted in lost revenue and incorrect billing. When the system implemented a policy that required that all information be available prior to the performance of procedures, physicians found they were looking at cancellations and changes in their schedules. Such cancellations were difficult for patients as well who had gone through the process of getting time off from work only to need to repeat the effort. In summary, very little worked well with this duplicative and complex process.

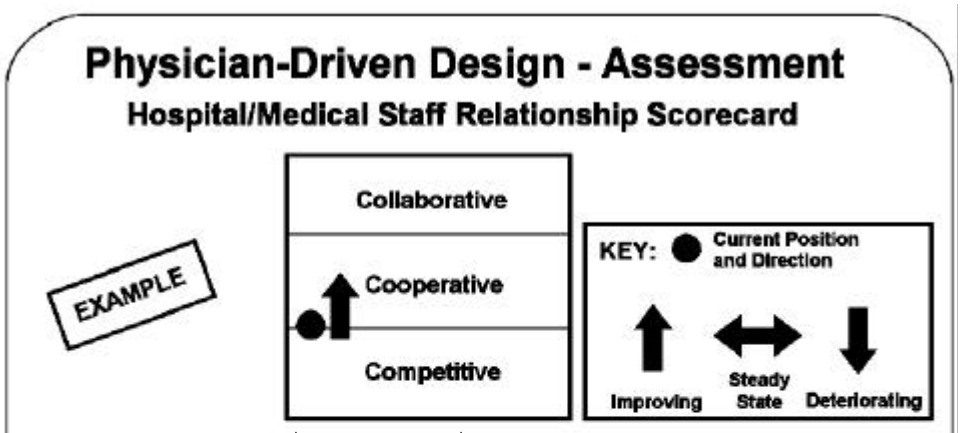
As a result of the collaborative efforts of physicians and operational managers, a rapid clinical design session clarified the work processes, identified a preferred future state and supported them with automation. A single electronic form was created by which all scheduling and information sharing for an individual patient could occur. In busy physician offices, routine scheduling requests were batched and sent electronically to registrars and schedulers who worked into the evening hours when patients were available at home for information verification. The electronic format of these requests permitted the schedulers to create reports on the requests that improved productivity and responsiveness to patients.

"While the energies invested in engaging physicians in the adoption of CPOE are rightly focused on recruiting the majority of physicians who are in the "middle" of the adoption curve, there is an increasingly enthusiastic group of early adopters whose expectations are likely to exceed the initial offerings of the CIS implementation."

The results of the rapid clinical design session resulted in improved efficiency and job satisfaction for physician office staff and health system staff. Physicians saw a significant drop in the cancellation or postponement of procedures due to inadequate information, and patients were no longer inconvenienced by a faulty information verification process. The willingness of the health system to address these physician practice issues increased trust and led to improved support for the overall implementation.

While the energies invested in engaging physicians in the adoption of CPOE are rightly focused on recruiting the majority of physicians who are in the "middle" of the adoption curve, there is an increasingly enthusiastic group of early adopters whose expectations are likely to exceed the initial offerings of the CIS implementation. It is important to note that many of these physicians will be ready to move faster than the rest of the organization and will require a strategy to manage them and sustain their engagement.

Figure 4: Readiness Assessment



Assessment Area	Organization Rating	Recommended Tools/Approaches
Perception of relationship	Cooperative	Identify opinion leaders--engage this group and build consistent message; develop communication strategy; conduct clinical rapid design; support physician leadership training
Motivation for change	Cooperative	Identify what's in it for me for physicians
Level of trust	Competitive	Share clinical and business case for change; conduct focus groups; offer personal services contracts; distribute patient safety white paper
Application of power	Competitive	Develop strong physician steering committee; utilize key physician decision matrix

Structure Decision Making

Successful implementation of CPOE is nothing short of simultaneous system design and implementation, clinical workflow redesign, and cultural change. Though highly complex, the effort can be structured to be purposeful, productive, and intellectually exciting for physician and health system leaders.

The process is based on the understanding that physician behaviors are more effectively influenced by "professional currencies" (e.g. clinical quality, time, peer pressure, personal income, liability avoidance) than prescriptive authority. Structures and tools are needed however, to leverage this knowledge. Once the desired future state has been developed and an action plan established, it is most important to commence work. This work consists of several high level efforts overseen by a steering committee supported by more detail-focused work groups. The high level efforts are:

- Customizing rules and alerts: updating/redesigning local policies and use of clinical system tools for avoiding errors, supporting consistent delivery of knowledge based care, and facilitating ease of practice for individual clinicians.
- Establishing physician order entry work flows: addressing specific physician needs for easy access to electronic information and order entry that is integrated into the way that they organize their work day and call coverage.
- Customizing medication management: using patient specific data and locally derived pharmacy and therapeutics committee preferences to deliver safe and cost-effective medication administration to patients.
- Integrating patient care clinical documentation: defining and automating a standard approach to clinician documentation (physician, nursing and other) to enhance accuracy and reduce duplication of patient specific information.

"It is difficult to overstate the importance of creating the right leadership and participant group for a CPOE project. It is the intellectual backbone and driving force behind success."

It is difficult to overstate the importance of creating the right leadership and participant group for a CPOE project. It is the intellectual backbone and driving force behind success. To that end, it is valuable to identify the leadership characteristics needed by those on the physician advisory group and the project steering committee. When this selection process has not been well attended to, delays and less clear decision-making characterize the process. A case in point is a large health system that began CPOE design and implementation work. The system had not, however, realized the time required to populate the appropriate committees, and therefore additional time was needed to work with the senior vice president of medical affairs to undertake this selection prior to commencing the work. Once this was fully addressed, a physician was chosen to lead the physician advisory committee who had helped in the integration of two medical staffs when two hospitals had merged to form the health system. This physician was approaching the end of this career, still practicing, and well respected for his leadership in doing the right thing for the organization. The job required a half-time commitment, for which the leader was compensated. This individual was supported by another physician with a more technical focus, a person with an informatics background and skilled in process improvement efforts.

With the selection of physician leadership, the task then turned to the participants of the advisory committee. To cover the appropriate clinical areas, selections were made from primary and specialty internal medicine, primary and specialty pediatrics, surgery, critical care, and emergency medicine. The leadership was careful to include physicians who represented each of the two campuses of the system, as well as physicians with little enthusiasm for the adoption of technologies. In this manner, the committee believed that most of the adoption issues would be brought into the design forum where they might most constructively be addressed.

While cultural expectations for payment vary from organization to organization, in this case the health system agreed to compensate the physicians of the advisory committee for their yearlong commitment to meetings every two to four weeks.

Figure 5 shows a sample project organizational structure. The structure places physician and health system leadership in sponsorship roles, and engages physicians and operations managers in the process of local customization. The goal is to transform patient care processes while implementing an advanced clinical information system.

The steering committee oversees the overall project and resolves conflicts that might arise among different working groups as they focus on their specific areas. To resolves such conflicts, the steering committee defines a set of guiding principles that set forth the health system's philosophy on issues such as:

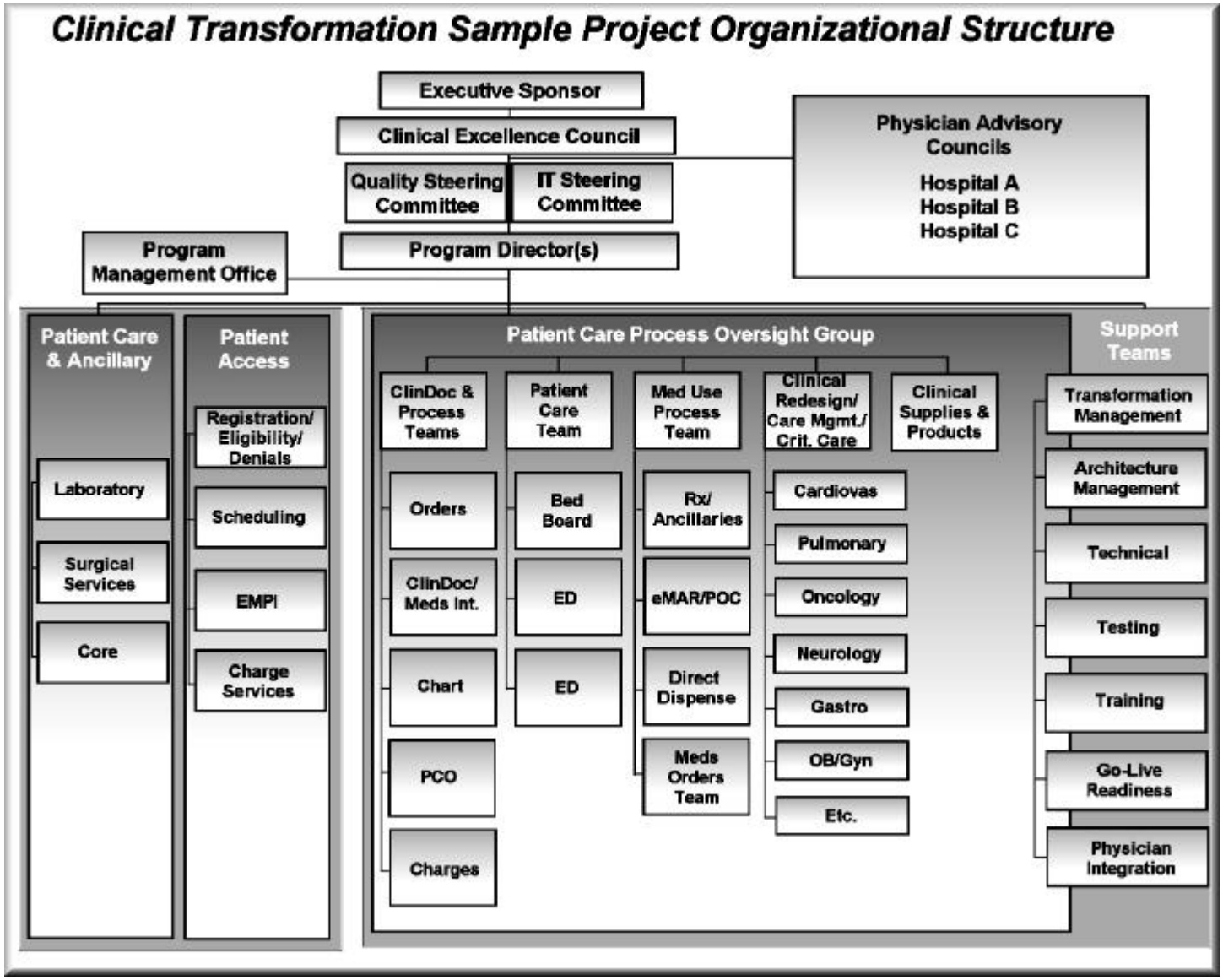
- Approach to patient safety issues
- Use of evidence-based order sets
- Expectations for operational performance
- Accessibility of information to physicians

For many organizations, the time spent developing such principles creates an important linkage and reference point among participants. The guiding principles serve to support streamlined authority and decision-making.

To keep the process on track, the physician steering committee uses a tool called a Key Decision Matrix that organizes the work of the committee, keeps the group focused on decision-making, and tracks decisions from meeting to meeting. Figure 6 on page 10 presents an example of the Key Decision Matrix. Use of such a tool minimizes the time requirements for busy physicians outside of committee meetings, yet keeps the participants up to date on issues and decisions that are pending. The work of all subgroups automatically feeds into the Key Decision Matrix to keep all participants current on the status of the project and key issues.

Much of the "real work" of clinical and administrative customization occurs within Rapid Clinical Redesign sessions that engage groups of physicians and other clinicians in an examination of their expectations for the CPOE from a performance perspective in a specific disease process or service line, and their fears related to the impact of the system on their autonomy and practice. The structure of these sessions results in the development of new care processes, policies and procedures that become the specifications in the design and programming of the customized software for the organization.

Figure 5: Project Organizational Structure



Rapid clinical redesign can be a two-evening process in which care processes for a specific cluster of DRGs can undergo scrutiny for appropriateness. Ways in which the redesigned process could be supported by automation then become the "programming specifications" that are used to customize the CPOE implementation. For example, one organization wished to improve quality process scores for coronary artery disease, and post surgical processes. The physicians wanted to meet standards that had been set by Joint Commission and other quality oversight groups for specific measures. The physicians chose the following indicators for focus:

- Percent of patients receiving smoking cessation advice
- Percent of patients receiving beta blockers, ACE inhibitors, or aspirin

The solution was to build prompts into the systems that appeared one or two days prior to discharge which cued the physician and clinical staff to attend to these issues so that they did not fall through the cracks.

In another case, the physicians identified the task of optimizing the time sensitive window during which cerebral vascular accident patients could be evaluated for the use of thrombolytic agents. This required design input from emergency, lab, radiology, neurology. At issue was the challenge of getting lab and CT scan work results back within short time periods. If the patient was not experiencing bleeding as a result of the CVA, then the thrombolytic agents could be administered to reverse the results of the stroke.

The solution design called for an alert to come up in the emergency department upon arrival of the patient showing the standard order set and protocol for evaluation. Simultaneously an alert was to go out to both lab and radiology informing them of the time sensitive case coming in. An electronic page went out to the neurologist and radiologist covering as well. Through use of technology to support the redesigned clinical processes, patient care was enhanced.

Figure 6: Key Decision Matrix

Physician-Driven Design--Sponsorship/Participation/Alignment Implementation Tools

Key Decision Matrix--Decision Support and Tracking Tool Format

This tool organizes the work of the physician steering committee, keeps the group focused on decision making, and tracks decisions from meeting to meeting.

Category	Question	Decision Options	Decision	Needed Information	Dependencies	Outcome Measure	Priority	Next Step
Order Sets	1. Should standing order sets (care sets) be all unchecked, all checked, or both?	All checked None checked Both	X			# Used	H	
	2. Can physicians develop their own individual order sets?	Yes No	X			Phys. Set	H	Med Exec
	3. How will physicians create their favorite orders?			Vendor Educ. Session			M	
Rules	1. How will we modify vendor-specific rules?	Oversight Group Ad Hoc Group		Rules Educ. Session			H	
	2. How will we create local rules?	Oversight Group Ad Hoc Group					H	
Alerts	1. How will we balance safety and the burden of multiple alerts?			Educ. on Rx Rules	Pharmacy Capabilities	# of Overrides		
Implementation	1. How should we educate physicians about rules and alerts?	General Session Dept. Session	X X			Attendance		
	2. How should physicians be supported at the time of implementation?	Direct Support On call Support				Use Rates		

Communicate Issues and Decisions

Effective communication during a complex change process is critical. In the end, the individual physician will make a timely and positive adoption decision based on his perception of the value held of the CPOE for their practice.

One model of communications is particularly useful in the creation of a communications plan. It is the Source-Channel-Audience-Message model.[5]

Source: Who the message comes from

It has been found that the more distant the source of a communication from the world of the decision-maker, the less influential is the communication.[6] This is one reason why health system leaders and managers carry limited influence with physicians. It is important, therefore, to use opinion leaders and other influential members of the medical community to carry key messages throughout the process.

Channel: The manner in which the message was received

Research consistently concludes that face-to-face interaction is the most persuasive channel of communication. But in general, other communication channels must be used to reach a large group. To have the greatest impact, therefore, a portfolio of channels must be developed and maintained that:

- Alerts physicians to the availability of information on issues, discussions, and decisions surrounding the initiative
- Provides multiple venues for the discussions of the consequences of decisions
- Ensures availability of information when a window of opportunity opens for the internalization of decisions or the use of information in decision-making.

Audience: The group(s) to which the message is directed

It is not unusual for a steering committee to develop a single communication strategy to cover management, physicians, employees, and the public. This is, however, a complex set of audiences with significantly different concerns and issues. Each will respond to tailored approaches that should be developed with the assistance of representative members of each so that preferred formats, media, timings, and venues can be addressed.

Message: The issues, discussion, and decisions for dissemination

At its heart, the message is an attempt to influence a decision-maker in a particular direction. This is where the use of research on adoption of medical innovation and technology becomes critical. To influence a clinical decision maker, the message must reflect the determinants of adoption:

- Relative Advantage: The greater the perceived improvement in performance, the greater the likelihood of adoption.
- Compatibility: The more the message is couched in language that is compatible with the culture of the practitioner's environment, the more likely the adoption.
- Complexity: The less complex the message, the adaptations, and changes in practice implied by it, the higher the likelihood of adoption.
- Trialability: The extent to which an innovation can be experimented with on a limited basis, the greater the likelihood of adoption.
- Observability: The degree to which the results of the innovation are visible, the more likely it is to be adopted.

A communication strategy focuses on ways to improve the ongoing exchanges between the steering project management group and the impacted practitioners. It is also an effort to persuade the targeted audience to adopt innovation. Figure 7 illustrates the major elements of such a plan.

Figure 7: Communications Plan

Source	Channel	Audience	Message
Project Management Team	Kickoff Meeting	Management	Project Overview
Physician Advisory Committee	Monthly Updates	Clinical Redesign Groups	Updates & Sharing of Issues & Decisions
Business Innovation	Web Page	All Employees	Vision
Systems	Presentation	Leadership	Demo of Capabilities

Encourage Personal Adoption

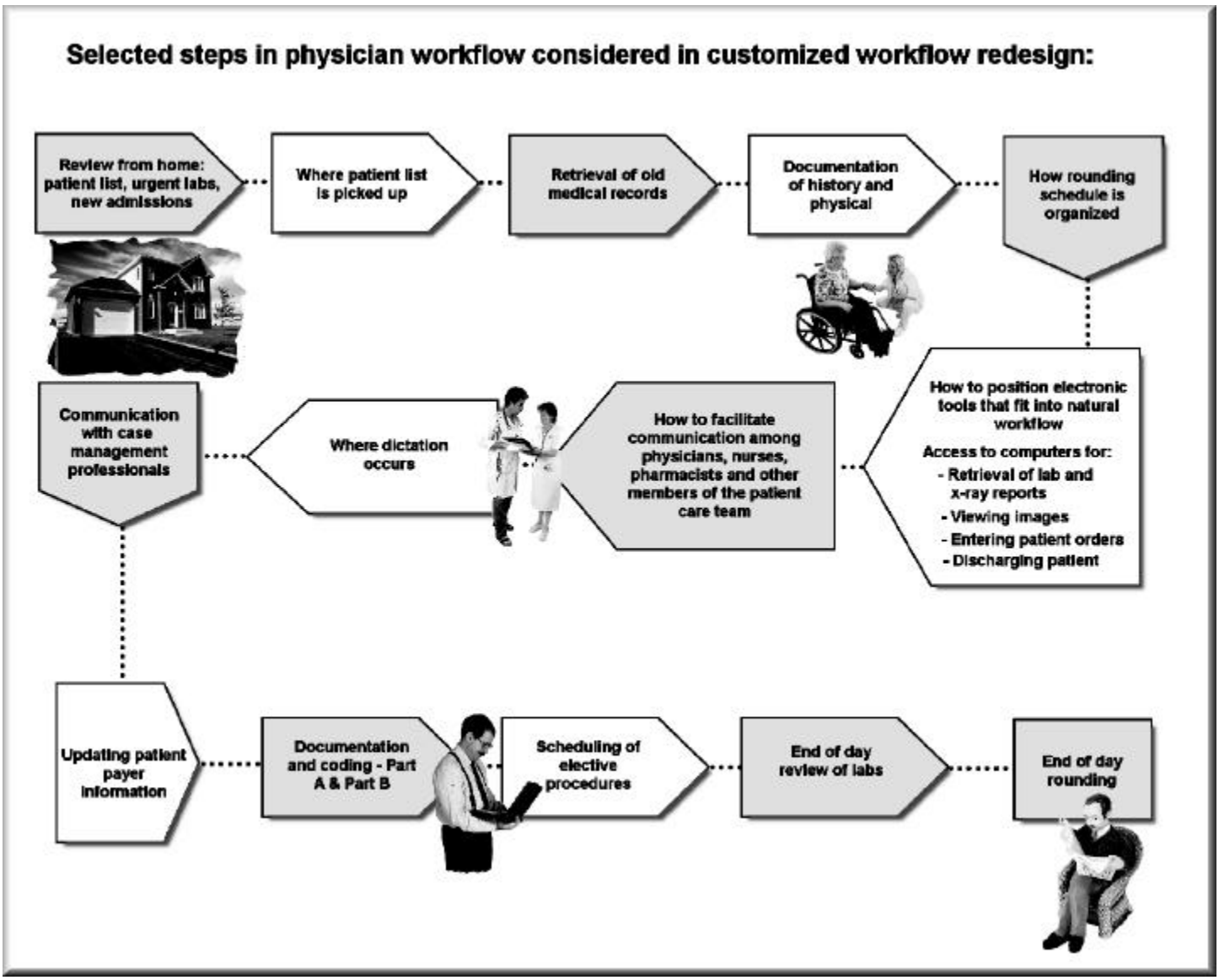
As we have seen, individual adoption decisions can be influenced by a number of factors which influence the physician's practice from the perspectives of operational efficiency, patient care/safety, ease of use, and financial impact.

In Figure 8, the steps in physician daily workflow are arrayed to determine where a workflow redesign can have a positive impact on the physician's practice, specifically from an ease of use perspective.

Creating ease of use for physicians means allowing them to access information they need from multiple locations. Creation of individual 'home pages' centralize much of the information a physician needs on a daily basis by providing a single point with access to lab and radiological results, the ability to write orders from home, and access to other frequently used tools such as practice protocols, research journals, and the Internet. A day in the life of the physician with access to such automated support starts in the morning with access and review of patient lists for the day, urgent results, and new admissions. Influencing where this information is accessed is an ease of use opportunity. If physicians can access this information from home, then they have time while commuting to organize their day and handle immediate issues.

Once rounds begin, access to history and physical data via terminals on the floor can expedite the time involved in this process. It is clear that physicians won't wait for access to terminals and other entry devices. To create an enhanced ease of use moment, easy access to computers and use of

Figure 8: Physician Daily Workflow and Ease of Use Opportunities



proximity devices, swipe technology, thumb prints or other technology to log a physician into the computer is important.

Accurate coding and documentation is desired by the hospital and by the physician practice. Solutions that facilitate these goals serve to enhance adoption of the technology.

Conclusions

Perhaps the most important tasks facing health systems today are to improve patient safety and reduce ongoing operating costs. While computerized physician order entry systems hold great promise on both fronts, success is highly dependent upon physician adoption of the system once implemented. Review of research shows that adoption of new technologies by physicians can be positively influenced if it is easy for the individual physician to perceive the advantages of system adoption for his practice. While implementation of advanced clinical information systems has proven to be challenging to accomplish historically, a structured design and implementation approach will significantly raise the success rate for such projects. Established and proven tools support this process.

Experience shows that there are core principles that must guide a successful CPOE design and adoption:

Set Expectations: It is important to clarify the need for CPOE as well as the consequences of implementation to individual physicians and their practices. It is only when the individual physician clearly understands the individual advantage to his practice that acceptance of a new way of operating will be embraced.

"While implementation of advanced clinical information systems has proven to be challenging to accomplish historically, a structured design and implementation approach will significantly raise the success rate for such projects. Established and proven tools support this process."

Structure Decision-making: It is important that the new system undergo local administrative and clinical customization. Physician input into this design process is critical, as the rules and alerts resulting from this customization are the instruction set for the software programmers. A structured decision process that permits rapid design and development supports the success of the project

Communicate Issues and Decisions: When change with consequences for their clinical practice looms, physicians must have easy access to communication channels that help them understand the issues, discussions, and decisions that will impact them.

Encourage Adoption: Finally, only 20 percent of physicians within a given population are active adopters of innovation and new technology. The remainder needs support that encourages their individual decisions to adopt the new technology.

CPOE projects are complex, as they must address cultural, financial, clinical, and efficiency issues simultaneously. While there are no "shortcuts" around these issues, a systematic and well-constructed approach can accelerate the process of addressing them. Given the value that resides on the other side of system adoption for patients, physicians, and health systems, there is no choice other than to move forward and embrace this innovation.

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