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Massachusetts Hospital CPOE Initiative

CPOE Readiness Roadmap Guide

October 2005



MASSACHUSETTS HOSPITAL CPOE INITIATIVE
CPOE READINESS ROADMAP GUIDE – OCTOBER 2005

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INTRODUCTION

The Massachusetts Technology Collaborative has launched a project to achieve statewide implementation of Computerized Physician Order Entry (CPOE) in Massachusetts hospitals. About seven hospitals in Massachusetts have implemented CPOE, according to the information recorded in the The Leapfrog Group survey and available from the Massachusetts Hospital Association. The remainder, a total of 63 hospitals, were surveyed in April-June 2005 to ascertain the status of planning for, and implementation of, CPOE via an online assessment tool. The purpose of the assessment was threefold:

1. To learn more about the project status in Massachusetts hospitals to guide further planning of the statewide initiative.
2. To obtain hospital-specific information for use in projecting costs of implementing CPOE.
3. To provide feedback to hospitals about opportunities to improve readiness based on accumulated industry experience with successful CPOE implementation.

A feedback report has been prepared for each of the 52 hospitals that completed the online assessment, displaying results for each component of readiness examined. This handbook has been prepared to accompany the hospital feedback report.

The document mirrors the organization of the readiness feedback report, which covers eight different components of preparation for CPOE:

- A. CPOE Project Status
- B. Leadership
- C. Organizational Structure and Process
- D. Organizational Culture
- E. Care Standardization
- F. Clinician IT Experience
- G. Information Technology Management
- H. Information Technology Infrastructure

Each component includes a number of characteristics of the organization or the information technology in place that lays the foundation for eventual success with CPOE. When they are not present, the challenges ahead are greater; if a significant number are not present, projects can be delayed, stalled, or fail.

Each of the readiness components is described in this information guide, along with a review of the importance to a successful CPOE project. Typical projects are also listed that hospitals can organize to address readiness gaps. It is hoped that the information in the feedback report, combined with the information in this handbook, will help CPOE project leadership in each hospital to increase readiness. Other information resources that can be useful are listed in References and Appendix A.

A. CPOE PROJECT STATUS

Implementing CPOE is a large-scale project for any hospital because it affects so many of the hospital's clinical staff – physicians, nurses, pharmacists – and the highly complex order management process. Within the Information Systems Department, many decisions are required, and possibly new applications. Like any other large project, CPOE requires detailed planning, dedicated resources, and effective project management.

The assessment examines readiness for this component, assuming the hospital was planning to go-live with CPOE in the next 6-9 months. In hospitals with implementation projected for further in the future, one would not expect all of the activities to organize the project to be completed.

Several aspects of getting organized often take so much time that they need to be completed well in advance:

- **Budget** – Resources must be budgeted over multiple years. Given the size of the expenditure, many hospitals require board approval.
- **Vendor strategy** – Some hospitals select the CPOE application of the current Hospital Information System (HIS) or Clinical Information System (CIS) vendor without a vendor search, others after performing due diligence in a review of the marketplace. When the hospital is considering swapping out some or all current applications to identify a satisfactory CPOE application, it typically takes 12-18 months to have a contract in place.
- **Hiring key members of the project team** – Many hospitals need to hire additional staff with the right skills and experience, especially physicians, nurses, and IS clinical analysts to work on the effort. Considerable lead time is needed to recruit, hire, and orient new staff.

Hospitals that have succeeded with CPOE have all used a dedicated project team to accomplish the necessary planning, workflow analysis, system set-up, pilot testing, and phased rollout. At a minimum, the project team for a small to medium-sized hospital includes:

- Physician Lead (0.5-1.0 FTE)
- Project Manager from IS or Nursing (1.0 FTE)
- Nursing Lead (1.0 FTE)
- Pharmacy Lead or Analyst (1.0 FTE)
- IS Clinical Analyst (1.0-2.0 FTE)

In the initial stages of implementation not all of the clinical analyst time is likely to be required. Otherwise though, these staff are fully dedicated to the project for 12-18 months (or however long it takes to implement hospital-wide) and then on a scaled-back basis for ongoing support. In large hospitals, the project team is likely to include more

representation from nursing and other departments, as well as possibly additional physicians.

CPOE implementation requires many decisions ranging from how far to push standardization in order management across departments and nursing units and how to train physicians to what values should be allowable entries for specific data fields in order screens, and what types of mobile devices to offer physicians. In addition to assembling the project team, getting the project structure in place requires assigning roles and responsibilities for decision-making during project planning, system setup, testing, piloting, and actual rollout.

Typically, a project steering committee is created to meet regularly (weekly during some phases) to review and guide the work of the project team. In addition, the Pharmacy and Therapeutics Committee (or a subcommittee) and Patient Safety and/or Quality Improvement Committees are responsible for many decisions involving medication management, order sets, and clinical decision support, with major policy decisions involving the medical staff or nursing referred to the Medical Executive Committee and Nursing Practice Council, respectively. (Project structures in three different community hospitals are described in Reference 1.)

Hospitals in early stages of organizing the CPOE project may find the following list of projects helpful.

No.	Initiative	Description	Major Activities
1	CPOE Project Plan	Creates a project work plan including milestones, activities, staff/responsibilities, timeline, and dependencies to implement and manage the CPOE initiative	<ul style="list-style-type: none"> • Develop a CPOE work plan and schedule that is realistic and measurable – one that is agreed upon by all constituencies • Convene multi-disciplinary representation to set expectations • Document and monitor CPOE implementation plan
2	CPOE Application Strategy	Determines how CPOE capabilities and implementation fit within the broader clinical applications portfolio and goals and organizational IT strategy – a precursor to selecting the vendor application for CPOE	<ul style="list-style-type: none"> • Discuss and plan with a multidisciplinary team how CPOE is to be integrated with advanced clinicals, such as multi-disciplinary documentation and electronic medication administration record • Determine a process for iterative cycles of planning and implementation • If CPOE is not being added to an existing clinical portfolio, it may require discussion within a broader clinical system strategy and consideration of vendor replacement or use of a wrap-around CPOE solution to meet the organization's needs

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No.	Initiative	Description	Major Activities
3	CPOE Vendor Selection and Management	Includes CPOE vendor selection from determining selection criteria to evaluating candidates and negotiating contracts	<ul style="list-style-type: none"> • Determine multi-disciplinary selection team and selection approach to include key decision points • Identify key requirements to differentiate vendor solutions* • Perform selection activities – market review to identify options, creation of a short list, demonstrations, reference calls, and site visits • Negotiate contract with selected vendor • Determine implementation plan with selected vendor • Determine vendor communication plan and manage vendor partnership
4	Budget Development and Approval	Creates a dedicated budget over several years for CPOE	<ul style="list-style-type: none"> • Estimate project resources (people and technology – types and dollars) to initiate and maintain CPOE • Obtain approval and funding sources

*MTC convened a group of advisors in Massachusetts to develop functional standards for the program. These address what is needed for physician acceptance, ease of implementation, and achieving the value from clinical decision support. Program participants can obtain a copy from MTC.

ADDITIONAL POINTS TO CONSIDER: ORGANIZING THE CPOE PROJECT

- Beyond formal roles in project management, physicians must own, lead, and drive design and implementation of CPOE. It is important to involve physicians, including independent community physicians, as early as possible.
- A strong project management orientation is required to keep the CPOE implementation on track and to ensure success.
- Creating a realistic project schedule and then committing necessary resources is one important step in organizing the CPOE project. The generic timeline shown on the next page does not incorporate the steps necessary in some hospitals to implement other software applications in advance of CPOE or to upgrade the network or other technology infrastructure.

B. LEADERSHIP

Leadership is always cited as one of the critical success factors for CPOE. This is partly because any large-scale organizational project needs sustained commitment but also because this is usually the first time a hospital project affects how physicians do much of their work. Many of the challenges are organizational. Conventional wisdom from CPOE early adopters is that the work is only 20 percent technology and 80 percent change management and work flow.

Common leadership traits in hospitals that are successful with CPOE include:

- Senior executives have formal and visible roles in decision-making and ensuring the appropriate level of commitment throughout the hospital.
- The board is involved in endorsing the decision to implement CPOE.
- An executive other than the CIO is accountable, often the CMO and occasionally even the CEO.
- The Medical Executive Committee has endorsed the decision and is poised to play an active role in decision-making and policy development.
- Many physicians – including community physicians – have leadership, champion, or committee roles that connect them to decision-making.

All of these traits signal that CPOE is important and is going to happen. It also sets in place the right connections to decision-makers who can assign resources and remove barriers. For physicians, it shows that their issues and concerns will be given the proper attention.

Patient safety is the impetus for CPOE and for investing the considerable effort needed to put it in place. Hospitals that have achieved widespread physician adoption used patient safety as the clinical case (or “burning platform”) for taking action. A portion of the organizational challenge is motivating the medical staff to take time out of their very busy work life to learn how to do their work differently. Improving patient safety is a strong message against which it is difficult for anyone to argue that they do not have time. Using actual data on gaps in care – either already collected by the hospital as part of quality improvement or designed for this purpose – reinforces the message and puts to rest the inevitable reaction, “those errors do not happen here.” It also provides a baseline for demonstrating progress.

Hospitals in the early stages of putting in place the leadership for the CPOE project may find the following list of projects helpful.

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No.	Initiative	Description	Major Activities
1	Establish CPOE Project Oversight and Leadership	Develops a structure to lead CPOE and establishes a decision-making structure to quickly resolve planning, design, implementation, and adoption issues	<ul style="list-style-type: none"> • Define executive and physician roles and accountabilities • Recruit physician leaders as necessary to ensure good representation on groups working on the project • Engage the Medical Executive Committee to develop policies about CPOE such as: <ul style="list-style-type: none"> – How soon CPOE will be required – Use of verbal and telephone orders – Use of hospital order sets <p>Note: This may be accomplished as part of developing the CPOE Project Plan</p>
2	Link CPOE with Quality Improvement	Integrate CPOE with Quality and Performance Improvement structures and processes	<ul style="list-style-type: none"> • Ensure that CPOE is on the quality/safety agenda and that the hospital community understands this connection • Integrate CPOE as one of the available interventions in quality/safety improvement projects • Involve the individuals and groups working on patient safety/quality in identifying initial performance improvement targets for CPOE and integrate into planning and rollout • Identify measures tied to the hospital's quality/safety goals that can be used to demonstrate the need for CPOE and the step-wise achievement of improvement • Collect baseline information and set up a process for monitoring as CPOE is rolled out
3	Define CPOE/ Clinical Vision and Objectives	Creates a shared, clinical vision for how care will be delivered once the new clinical processes and applications are in place. The purpose of developing and disseminating a CPOE vision is to gain consensus on the goal	<ul style="list-style-type: none"> • Outline impacts that CPOE will have on clinicians, focusing specifically on physicians, nurses, and pharmacists • Incorporate expectations about physician use and the value to patient safety and order management • Validate vision with clinical and executive staffs • Use vision to ensure common understanding of rationale and value of the project in the hospital community • Consider giving the project a name and/or slogan, if the hospital does not already have one for advanced clinical systems

ADDITIONAL POINTS TO CONSIDER: LEADERSHIP

- Passion (what some early adopters have called “a fire in the belly”) and personal commitment are key characteristics of leaders of successful CPOE projects. This is probably more important than title.
- CPOE is not a technology initiative – it is a change in the way an organization delivers care and should be treated as a key building block on the road to safer, more reliable care.
- Having the CIO as the accountable executive is viewed by vendors and early adopters as a high-risk strategy.

C. ORGANIZATIONAL STRUCTURE AND PROCESS

CPOE is a big change project. This component of the assessment looks at the organization’s capacity for change, as indicated by structures, process, and past success with clinical change.

Change related to CPOE is easier to make in an organization with a track record of succeeding with big change projects. In some hospitals, multi-disciplinary committees have already tackled patient safety issues and other gaps in care in a big way. They may have worked on medication reconciliation at patient transfer to a new level of care, improvements in areas addressed by the JCAHO core measures, or large industry initiatives such as the IHI 100,000 Lives Campaign. When this is the case, there is both a sense of accomplishment and know-how in the hospital about how to work across departments and disciplines to achieve improvement. In this state, the organization has an easier time sorting out the many decisions involved in CPOE. If, on the other hand, past attempts at change have not included physicians or multi-disciplinary efforts have stalled or failed, the hospital needs to build credibility and know-how with some successes. (Reference 2 describes how one community hospital set about to do that in advance of CPOE.)

Communication, especially to physicians, is important to build the case that CPOE is the right thing to do and to keep everyone informed about what is happening and what to expect next. Community physicians are particularly challenging because they spend little time in the hospital and travel time makes it harder to attend medical staff meetings. A hospital that already has multiple mechanisms for both getting word out to physicians *and* hearing back from them about changes that affect them is way ahead of the game.

Hospitals in the early stages of tackling quality improvement on a large scale may find the following list of projects helpful.

No.	Initiative	Description	Major Activities
1	Develop Communication Plan and Process	Develops a communication plan to provide staff with accurate information regarding CPOE projects, and subsequent process/policy and procedure changes. <i>The goal of effective communication is to prevent issues from arising</i>	<ul style="list-style-type: none"> • Charter a Communications Team to manage communications for CPOE or advanced clinical systems, as appropriate • Determine target audiences, messages, and communication timing (consider coordinating communications with key milestones in the CPOE implementation plan) • Create new and strengthen existing communication channels, with a focus on the IS/physician dialog • Assign resources to prepare, distribute, and deliver information updates (presentations for staff meetings, newsletters, posters for the physician lounge, etc.) • Develop formal and informal feedback mechanisms especially two-way communication channels (e.g., intranet, suggestion boxes)

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No.	Initiative	Description	Major Activities
2	Initiate Structure and Process for Hospital-Wide Quality/Safety Improvement	Sets up structure and process for accomplishing multi-disciplinary, multi-departmental improvement	<ul style="list-style-type: none"> • Engage medical, nursing, and quality leadership to set up structures and assign accountability and roles • Develop an agenda of patient safety/quality projects that are viewed as important • Incorporate measurement and reporting
3	Design and Implement Measurement Concerning CPOE	Sets up metrics and process for measurement that will document progress with adoption and value to patient safety and quality	<ul style="list-style-type: none"> • Starting with the vision and objectives, develop metrics of use and impacts on timeliness and quality of care • Consider measures already routinely collected and those available from the CPOE software • Assign resources and develop process for data collection and reporting • Collect baseline information • Incorporate measurement plan and results in communications to the hospital community

ADDITIONAL POINTS TO CONSIDER: ORGANIZATIONAL STRUCTURE AND PROCESS

- Leaders of successful CPOE projects advise that there is no such thing as too much communication, especially with physicians. Some have instituted a new position – physician liaison – to ensure that planned communication, both in person and via vehicles such as a newsletter, actually happens. If CPOE and other patient safety initiatives are to be discussed at staff meetings, someone needs to be responsible for preparing the materials.
- Two-way communication channels are critical to obtaining feedback about physician concerns so they can be addressed. Accessibility of executives and project staff is critical. Among the other vehicles some organizations use are focus groups, e-mail project mailbox, and voicemail box for the project. Quickly responding to each question or request is, of course, as important as soliciting feedback.
- In hospitals where the staff have little experience tackling gaps in care outside of their own department, JCAHO core measures and safety issues identified by the Pharmacy and Therapeutics or Patient Safety Committee are natural targets for building organizational structures for, and experience with, clinical change.
- Most hospital leaders report that not all physicians read electronic mail. As a result, this is usually employed as only one of the communication vehicles about big initiatives such as CPOE.

D. ORGANIZATIONAL CULTURE

The hard work of implementing CPOE is easier when the medical staff has a good working relationship with both the administration and the IS department, and the entire hospital community has come to expect a continuing focus on patient safety. This component looks at these signs that the organizational culture invites, rather than discourages, everyone to pitch in and play their role in an important change. It can be very difficult in some organizations to make change “stick.”

A hospital where many physicians participate in and lead patient safety initiatives and patient safety is part of the organizational fabric (discussed at staff meetings, constantly referenced in communications) is the ideal backdrop for CPOE, which is logically tied to patient safety and quality. The nature of the historical relationship between physicians and the hospital determines how hard it is to convince the medical staff that all parties are working toward a common goal and that the hospital and IS Department can deploy computer systems that improve care and the work environment.

Every hospital needs to go through the steps of developing a physician engagement strategy. In those with a higher readiness score on this component, less is required upfront to build the necessary trust and consensus that CPOE is the right thing to do.

No.	Initiative	Description	Major Activities
1	Physician Engagement Strategy	Define expectations for physician participation, cultivate champions, and make a commitment to invest in making the transition for physicians as easy as possible	<ul style="list-style-type: none"> • Engage the Medical Executive Committee to define expectations for physician use of CPOE consistent with the Vision and Objectives (including timeline and related policies) • Reach consensus on the hospital commitment to physicians to invest in training and support • Identify incentives (if appropriate) for committee work and training • Cultivate physician champions across clinical departments and among community physicians and involve them in CPOE-related decision making • Formulate messaging around CPOE and communicate broadly to the medical staff • Develop process and accountability for monitoring adoption

ADDITIONAL POINTS TO CONSIDER: ORGANIZATIONAL CULTURE

- Project leads in hospitals that have adopted CPOE recommend being honest with physicians about CPOE; it does require some effort to learn and it will never be quite as fast as scribbling an individual order. However, when the hospital invests in setting the system up to be user friendly and in extensive training and coaching, electronic order writing can approach being time neutral. In situations where order sets can be employed, CPOE is much faster.
- Hospitals that succeed with physician adoption start out with the expectation that all orders (except for a few, defined circumstances such as a code) will be written

in CPOE *once* everyone is convinced that order management is working properly, and physicians have had sufficient time to become proficient users. Realistically, at some point universal CPOE must become the standard of practice and its use enforced. (For more about how hospitals employ both "carrots" and "sticks" and an example of a hospital policy, refer to Reference 1.)

E. CARE STANDARDIZATION

This component measures the ability of the organization to adopt or develop standard care processes and standards for care across the organization. This is important for CPOE because the computer expects a fairly regularized process. As CPOE project teams tackle order management work flow across the hospital, they are always surprised by the large variation in process and practice across clinical areas, which has crept in over the years. Some variation is warranted because the work is different, but much that is not is inconsistent with standard operating procedures of the hospital and/or complicates setup in CPOE. The extent to which hospital teams have already tackled standardization is both a measure of how much work lies ahead *and* whether the structures and processes are likely to be in place to accomplish this work.

Signs that standardization in medication management is already in place include whether medication administration times and documentation are the same across acute care units. Certain patient information such as weight and allergy are critical input to both physician decision-making and medication checking in CPOE. If they are not already captured reliably, special attention must be paid to this gap. Many hospitals have been hard at work on medication management processes because of the focus on patient safety and medication reconciliation. All of this is good preparation for CPOE.

Current practices in formulary management can also make CPOE easier or more difficult to implement. If the Pharmacy and Therapeutics Committee actively manages formulary, always maintaining the up-to-date list and achieving good compliance from physicians, many of the tasks in system setup will be easier. Otherwise, considerable work and discussion to achieve agreement lies ahead.

Much of the value of CPOE comes from using electronic ordering as a tool to guide and critique care. A second reason for looking at efforts to reduce variation in care is to ascertain the current state of institutional experience in coming together to determine desirable practice and encourage its adoption. One of the most powerful tools in CPOE for bringing recommended practice to physicians – pre-defined sets of orders for a diagnosis or condition – is also critical for physician acceptance because it cuts down on order writing time. The hospital will have a much easier time with CPOE if there are already processes in place to develop and encourage use of order sets and if order sets and protocols for high-risk medications have become part of how care is delivered. Therefore, these tools for reducing variation in care are also addressed in this part of the readiness assessment.

Hospitals in the early stages of working on care standardization may find the following list of projects helpful.

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No.	Initiative	Description	Major Activities
1	Develop Process and Initiate Work on Institutional Order Sets	Jump-starts policies and process to develop and adopt order sets as a vehicle for improving patient quality and safety	<ul style="list-style-type: none"> • Engage Medical Executive Committee to set policy regarding use of institutional order sets and define process • Collect existing standing orders from all units of the hospital • Identify high-priority conditions and situations to be addressed and assign ownership • Convene assigned groups to research and reach consensus on recommended practices • Obtain review and sign-off by designated groups such as clinical departments, nursing, Pharmacy and Therapeutics committee, etc. • Educate clinical staff about rationale, policies, and rollout of order sets • Test and deploy order sets and protocols • Set up accountabilities and process for regular review and update of order sets and protocols
2	Review and Redesign Order Management	Provides an opportunity to increase standardization in order management, where it is desirable, in advance of CPOE	<ul style="list-style-type: none"> • Engage the MEC, Patient Safety, or other appropriate committee that governs safety to identify process targets and specific gaps to address • Utilize multi-disciplinary teams (physicians, nurses, pharmacists) to redesign the requisite processes to reduce undesirable variation • Pilot test new processes and revise as necessary • Engage the governing committee to approve hospital-wide adoption and make necessary policy changes • Communicate rationale and changes to clinicians in the hospital and conduct training as necessary • Rollout redesigned process components • Monitor use and effectiveness of redesigned order management processes

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No.	Initiative	Description	Major Activities
3	Develop Process and Plan for Managing CPOE Clinical Decision Support	Establishes in advance the priorities for clinical decision support in CPOE and sets up the process for managing it	<ul style="list-style-type: none"> • Engage quality and safety leadership in the hospital to develop policies about focus and plan • Assign a small number of physicians and clinical analysts to become experts in the CDS tools of the advanced clinical system to be used • Assign accountabilities, group and individual roles, and process for <ul style="list-style-type: none"> – Setting agenda and priorities – Setting up and testing CDS – Review and approval – Physician education – Piloting and rollout – Ongoing maintenance of rules and other tools • Identify required patient information (e.g., allergies, weight, BSA, current problems) needed by CDS and ensure documentation processes will provide it • Incorporate CDS setup in system implementation plan • Reference 3 includes approaches and tools for managing clinical decision support
4	Update Pharmacy Formulary	Provides an opportunity to clean the formulary and collect the information needed for medication order master files in CPOE	<ul style="list-style-type: none"> • Engage the Pharmacy and Therapeutics Committee or other appropriate group to update the formulary • Use this as a good time to reassess hospital policies for formulary management • Ensure that all of the information needed for CPOE system setup is collected at the same time • Communicate to physicians any changes in formulary management

ADDITIONAL POINTS TO CONSIDER: CARE STANDARDIZATION

- JCAHO core measures and other regulatory requirements are a logical starting point for institutional order sets.
- Pre-CPOE, many hospitals have made hospital order sets available online via the hospital Intranet. Assuming that sufficient terminals and printers are available, online order sets can be printed from any location in the hospital. Any changes also go into effect immediately. Making order sets part of the standard care process in this way is great preparation for CPOE.
- Organizations build and improve their clinical decision support capability over several years. Many initially implement guided choices – templates, order sets, calculations, basic mandatory fields, and access to reference databases initially and then move to more advanced alerting and prompting later.

F. CLINICIAN IT EXPERIENCE

The learning curve for CPOE – and both the investment needed to coach physicians and the time lag before they become competent users – is reduced when clinicians in the hospital already routinely use computers. This part of the assessment looks for the typical pre-CPOE computer uses:

- Electronic mail for routine communication
- Retrieval of electronic laboratory test results and other patient information
- Online clinical documentation
- Online review and signing of transcribed reports both within the hospital and from outside locations

Many hospitals plan to introduce physicians to electronic results management and document signing ahead of time to ease the transition to CPOE.

Sometimes current use is uneven, with some physicians still relying on others to look up laboratory results, for example. In other cases, the views and screen flow can be improved to encourage more enthusiastic physician use or a new physician portal introduced that does a better job of organizing communications and information for physicians. Efforts such as these not only build computer skills for users but also increase the value of computer use.

The following projects may be of interest for hospitals with a low score on this readiness component.

No.	Initiative	Description	Major Activities
1	Optimize Current Applications for Physicians	Attempts to increase the utility and ease of use of current applications	<ul style="list-style-type: none"> • Engage IS and physician representatives to gain a better understanding of reasons for non-use and opportunities to optimize • Consider introducing new portal application, if relevant, and additional terminals, if this is a factor • Consider customizing displays and patient data flow sheets to meet the needs of different clinical services • Consider expanding online reference material that is a high priority with physicians
2	Increase Physician Use With Additional Support		<ul style="list-style-type: none"> • Evaluate data on system use to identify users to target for additional support • Design and implement coaching program • Monitor physician use on an ongoing basis

ADDITIONAL POINTS TO CONSIDER: CLINICIAN IT EXPERIENCE

- Prior success with delivering computer applications that physicians find useful builds trust in the hospital’s ability to do so. This is another reason to focus on optimizing current applications for physician users.

- Most physicians welcome remote access to clinical systems because they can check on their patients from the office or home. Because this is also a pre-requisite for CPOE, many hospitals make it as easy as possible to establish remote access, including providing assistance with technical setup and other services.
- Although physicians are the focus of the above discussion, nurses also need to make the transition to computers. Depending upon the stage of clinical system rollout, many hospitals have opportunities to optimize use of nursing applications as well. Not only do nurses provide critical information such as weights needed for CPOE, but electronic documentation adds information about patient status and medication administration to what physicians can retrieve online. Often, hospitals find additional training and education can increase the adoption of point of care, real-time documentation by nurses.

G. INFORMATION TECHNOLOGY MANAGEMENT

The more experience the hospital IS Department has with advanced clinical applications, especially for physicians, the more likely that the existing staff and processes can support CPOE and that physicians trust the hospital to deploy systems that improve patient care. This component of the assessment looks at these processes. It also looks at the extent to which physicians are connected to decision-making about systems intended for them.

To manage large, complex IT projects, successful hospitals typically have an IS Steering Committee or other group overseeing IS projects, ensuring coordination between projects and other hospital initiatives, and monitoring progress to identify and address problems that arise. Important members of this group are executives and managers who have the clout to provide resources and remove barriers. In addition, the likelihood that clinician needs and expectations for computer systems are met is greatly increased when credible representatives of the medical and nursing staff directly participate in IS management. For CPOE it is also important that Pharmacy be at the table.

Mastering CPOE and becoming efficient at writing electronic orders requires some form of training for physicians. Unless the hospital has already implemented advanced clinical systems such as clinical documentation and electronic medication administration, clinician training is likely to require a new structure and approach that emphasizes coaching and provides multiple ways to learn. (Methods for, and lessons learned about physician training are discussed in Reference 1.)

No.	Initiative	Description	Major Activities
1	CPOE Training Plan	Creates a structure and process for training with defined roles and accountabilities to help position for successful implementation of CPOE	<ul style="list-style-type: none"> • Establish workgroup to define CPOE training structure and determine roles and responsibilities (especially for physician training) • Identify (recruit, as required) individuals to perform CPOE training • Develop course content and tools for classroom training, individual coaching, self-guided training, and assistance resources (e.g., online HELP, reference guides) • Determine adequacy of training space and enhance as necessary • Build training schedule coordinated with phased CPOE rollout • Develop methods for tracking training status and trainee satisfaction
2	Constitute or Revitalize IS Steering Committee	Creates or reactivates a group with decision-making authority to oversee large projects such as CPOE	<ul style="list-style-type: none"> • Define purpose and procedures • Recruit hospital executives, physician and nursing leadership, physician representatives (including community physicians), and managers from departments such as Pharmacy and Quality Management • Involve immediately in reviewing plans for CPOE, making decisions, and removing barriers

ADDITIONAL POINTS TO CONSIDER: INFORMATION TECHNOLOGY MANAGEMENT

- Early adopters of CPOE learned that for physicians coaching works better than classroom training so they emphasized coaching. Other lessons include that “just-in-time” is critical, including during the first few weeks of rollout and that physicians must be trained using the actual screens they will use.
- For CPOE and other advanced clinical systems, hospitals typically develop a training team that includes nurses and others who understand both the application and order management work flow, as well as rely heavily upon Super Users to provide assistance as needed.
- Some hospitals require participation in CPOE training/coaching before physicians are given electronic access to CPOE. This ensures that users have at least a basic understanding of how CPOE works before they start writing orders.

H. INFORMATION TECHNOLOGY INFRASTRUCTURE

Two aspects of IT performance are absolute prerequisites for CPOE:

- Availability (uptime) around the clock
- Instant responsiveness to each user keystroke and screen flip

When these are not in place, the hospital cannot count on accessing and managing patient orders at all times, and physicians must spend more time writing orders. Most hospitals need to invest in network upgrades, added processing power, and tools for monitoring and managing network and system resources to ensure the necessary level of performance for CPOE and other advanced clinical systems. In addition, provisions are made for system continuity in the event of a disaster, so that critical patient information is not lost and CPOE can be brought back online as soon as possible. This component examines the stage of preparation for these and other infrastructure requirements for CPOE.

Another absolute requirement is easy access to the system. If physicians are to write electronic orders for their patients, they need immediate access wherever they write orders – on the nursing units, in the physician lounge, in their office, from home. Requiring busy physicians to stand in line for a terminal is not acceptable, and hospitals usually deploy a mix of fixed and mobile devices to ensure quick access even during busy times of the day. Hospitals also promote and actively support remote access so that physicians can write admission orders from their office and check on patients, as well as write orders, from home.

Mobile access via a wireless network is not only expected by many physicians, but it is a good fit with physician workflow as they round on their patients and they need only to sign-on once. Wireless also reduces the need for fixed-user devices on space-constrained nursing units. Conventional wisdom is that mobile access is a pre-requisite for CPOE. (Wireless access is also required for nurses to document vital signs, medication administration, etc. in real time.)

Many hospitals offer physicians more than one type of mobile device, usually including laptops on carts, though they find that fixed devices in work spaces set aside for physicians are also required. It is important to involve physicians in the review and selection of wireless devices. Today mobile laptops and tablets are used most often because other devices with smaller screen real estate are functionally limited for viewing patient information and writing orders.

Most hospitals need to change the Help Desk function to support physicians when they need assistance. Staff who know and can fix or explain all of the functions of CPOE must be available 24 x 7.

MASSACHUSETTS HOSPITAL CPOE INITIATIVE

CPOE READINESS ROADMAP GUIDE – OCTOBER 2005

No.	Initiative	Description	Major Activities
1	Network Assessment and Upgrade	Upgrades the capacity of the network infrastructure to support CPOE	<ul style="list-style-type: none"> • Assess network capacity including need for wireless access • Develop, test, and deploy the upgraded infrastructure • Acquire and implement network performance monitoring and management tools, as necessary • Monitor and maintain performance
2	Point of Care Device Plan/ Clinician Mobility	Analyzes the point-of-care access requirements for CPOE in clinical and support areas, as well as remote access	<ul style="list-style-type: none"> • Review implications of new processes and work flow for CPOE • Determine the appropriate devices (e.g., hand held, rolling carts, workstations, etc.) • Consider conducting a device fair for the presentation, review, and consideration of the various device types/models available • Determine the number and location of new devices throughout the hospital campus • Identify and address operational and facility issues (e.g., renovations to nurses stations to accommodate physician work space, locations for the charging of rolling carts, charging and check-in/out of wireless devices, etc.) • Develop documentation of the desired devices, types, and locations • Complete a deployment plan and schedule that will support rollout • Involve physicians in choices of end-user devices (among those that meet technical and cost criteria)
3	IT Service and Support Management/ Operations Service	Upgrade the Help Desk to add skilled resources to answer calls from physicians on a 24 x 7 basis	<ul style="list-style-type: none"> • Redesign Help Desk roles and responsibilities • Define policies and procedures for new areas of responsibility for Help Desk • Develop the call routing for physicians • Incorporate new processes into current Help Desk software management package • Identify staff with requisite knowledge and communication skills to provide user support to physicians
3	Continuous Computing Architecture Plan	Analyzes the systems architecture and implementation alternatives to meeting the reliability requirements of CPOE	<ul style="list-style-type: none"> • Identify system availability requirements • Review key operations and maintenance processes and technologies • Review current system architecture, including storage, backup, and recovery solutions • Identify system processor, peripheral, application, and network architecture and configuration alternatives aimed at meeting or exceeding the identified availability requirements • Evaluate most promising solution alternatives • Provide recommended systems architecture and configuration solution

MASSACHUSETTS HOSPITAL CPOE INITIATIVE

CPOE READINESS ROADMAP GUIDE – OCTOBER 2005

No.	Initiative	Description	Major Activities
4	Disaster Preparedness Plan	Assesses the existing recoverability and coping strategies for information systems outages, including CPOE and addresses the gaps	<ul style="list-style-type: none"> • Define the impact of short-term and long-term outages on applications, data backup/restoration requirements, and application recovery priorities. • Evaluate the current documentation, policies, procedures, and the technologies for providing disaster recovery • Prioritize recovery requirements and develop a plan for developing new policies and procedures along with acquiring and implementing new technologies
5	Upgrade Clinician Sign-on	Designs and implements single sign-on to synchronize the logon process and support pass-through of authentication credentials to multiple information systems	<ul style="list-style-type: none"> • Define customer and security requirements • Research SSO frameworks offered by vendors • Develop a short-list of vendor products and select best fit using pre-established criteria • Conduct proof of concept in a lab environment • Build plan to migrate to standardized Identity Management across the entire organization • Conduct pilot implementation and full rollout

ADDITIONAL POINTS TO CONSIDER: INFORMATION TECHNOLOGY INFRASTRUCTURE

- Many components of the infrastructure take time to put in place. Vendors report that major contributors to long lead times to CPOE implementation are projects to upgrade networks and renovate facilities, either in the data center or on the nursing units.
- Whether actually working at the Help Desk or available by pager, in many hospitals the same clinical analysts who worked on system setup and training man the Physician Help Desk. E-mail and voicemail hot lines are other venues offered in some hospitals for non-urgent questions and suggestions from physicians. Timeliness and reliability of response to every inquiry are very important.
- Many hospitals now offer physicians access to images via PACS and the ability to review and sign dictated documents online. Multiple applications increase the value of single sign-on for both physician acceptance and security management.

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APPENDIX A. OTHER RESOURCES ABOUT IMPLEMENTING CPOE

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