Chapter 2
Vision: How You Start

Abstract This chapter explains the importance of vision for successful CPOE projects. The author provides a structure for developing and managing order set content for a CPOE project. In addition, he discusses how to one plans the initial scope of their CPOE project. The author stresses that patient safety is the best reason for a hospital or health system to pursue a CPOE project.

Where there is no vision, the people perish:
– Proverbs 29:18 (Bible, King James Version)

Why start with vision? Because if you do not get vision right, you are doomed to failure. Whether you are tackling CPOE or any other large-scale initiative, vision is what determines what you are actually trying to accomplish and why.

Over the years, I had multiple opportunities to assess projects that had failed, were failing, or seriously stalled. Each time, I have observed a lack of clear vision from the senior leadership. Typically, the IT department has an idea why the project is proceeding, but not the CEO and senior executives. The worst case occurred in the early 2000s, when the senior executives, 1 month prior to CPOE activation, did not even know that CPOE meant that physicians would be entering orders into the computer and no longer writing them. It was news to their medical staff as well. Yet the project team had built the platform and was ready to execute! I was unpopular when I recommended that they were months away from being able to activate CPOE. Fortunately, the CEO did get involved and many months later saw a very successful implementation.

At the Adventist Health System (AHS), "Deploying clinical information systems and having CPOE well under way" was the leading statement for the 2010 Vision Statement. The senior leadership made it clear from the beginning that our EHR and CPOE were corporate initiatives and not just IT initiatives. This visibility places it in the annual report, before the Board, and at the front and center of strategic discussions. Senior leadership determines whether CPOE is the highest priority, or just another project only affecting a small group within the system.

Why is this important in the case of CPOE? First, CPOE affects almost every workflow in the hospital. Therefore, it requires every department and unit of the hospital to understand how CPOE affects them and how to leverage it for improved efficiency. In addition, CPOE changes the physician's workflow from one

P.A. Smith, *Making Computerized Provider Order Entry Work*,
Health Information Technology Standards,
DOI 10.1007/978-1-4471-4243-0_2, © Springer-Verlag London 2013

of viewing information and handwriting orders to total interaction with the EHR. Handwritten orders have been the norm for years, so having the doctors perform computerized order entry is a major change for their workflow. Moreover, each CEO, in the community hospital, has physician satisfaction as a core responsibility. The hospital does not employ these physicians or award academic appointments. The CEO and medical staff form a relationship that depends on mutual trust and benefit. Therefore, getting physicians on board and participating with this change is critical. The CEO does not want, and cannot afford, to alienate the medical staff in the process.

Coupled with the Vision Statement, AHS clearly identified CPOE as an opportunity to improve patient safety while creating a consistent platform to deliver clinical best practices and evidence-based medicine recommendations to the end-users. This conclusion came after 10 years of medical staffs utilizing these pathways as paper-based order sets on only about 40 % of qualifying patients. The ultimate vision has always been to "hard-wire" evidence-based medicine into the physician's "path-of-least-resistance" workflow.

After the first two pilot hospitals went live with CPOE, Don Jernigan, the AHS chief executive officer (CEO), validated the vision through strong messages to the hospital CEOs at the annual meeting, saying, "Seeing CPOE go live at these two hospitals represented some of the proudest moments of my career." Dr. Jernigan's message, coupled with the 2010 Vision Statement, created a clear mandate to the CEOs and their hospitals that would follow the pilots. One cannot put a price tag on your CEOs public support.

Once you cast your vision, then all the fun work begins. What will the project encompass (i.e. What is the scope)? What is the roadmap? How do we begin? How will we make decisions? You will find detailed answers to these important questions in the subsequent chapters. I always like to start with Stephen R. Covey's[1] analogy of filling a bucket with rocks, gravel, sand and water – always start with the "big rocks" first.

2.1 Building Up from the Vision

The "big rocks" for AHS were how to achieve the vision of "hard-wiring" evidence-based medicine and promote patient safety. While the author had seen other health systems and hospitals use other approaches, it was obvious how to set up the program at AHS.

From the evidence-based medicine aspect, it became clear that while there are regional differences in how our hospitals operate and in the level of resources available (i.e., local variation), AHS wanted to fully leverage clinical guidelines and best practice for diseases and conditions for which evidence exists. For example, the American College of Cardiology regularly updates its guidelines on the treatment of

[1] Covey SR. The seven habits of highly effective people. New York: Fireside; 1989.

acute ST-elevated myocardial infarction[2] (acute STEMI, or heart attack). This then becomes the standard of care that we expect physicians to follow regardless of whether they practice at a large hospital in Florida or at a small critical access hospital in Wisconsin. This meant a move from "experience-based medicine" in which decisions on order set content for acute STEMI rests in the hands of the local medical staff, to a more universal approach, of deploying a common "evidence-based" order set at a corporate level, that would be shared by all. The common phrase by AHS Chief Medical Officer Dr. Loran Hauck became "we are not advocating a standardized approach to the practice of medicine by our physician, but rather that they practice to a standard." This was a change in approach to the paper order set days, when the Office of Medical Affairs sent an Acute STEMI template to each hospital for local revisions and printing, to a common electronic order set shared by all AHS hospitals.

The challenge then was to solve two issues. How does one provide the infrastructure to keep corporate content up to date, and how does one deal with the difference in resources available to hospitals of varying sizes, structure and markets? Fortunately, the Chief Medical Officer had recently expanded his department from an Office of Medical Affairs, into the AHS Office of Clinical Effectiveness (OCE). This proved a timely change that helped to drive the solution to our infrastructure issue.

2.2 Managing Order Set Content

AHS tackled content first, since they already had a Corporate Physician Committee (CPC) to review and develop evidence-based content and a relationship with Zynx Health,[3] a provider of evidence-based content. However, we knew the volunteer army of community physicians, nurses and clinical pharmacists could not manage the volume of content needed to implement CPOE. Previously, the CPC had developed and maintained content on about ten conditions, diseases, and operations through monthly meetings and a few workgroups. In assessing what they needed, they looked at all discharge diagnoses for the prior 2 years and determined what represented the top 85 % of conditions/diseases that they were managing in the hospitals. In addition, they identified 64 common presentations of signs and symptoms for the Emergency Department and several dozen protocols such as anticoagulation management. All told, this represented a need for about 550 order sets to have a robust catalogue. The principle for these order sets was that they were universal and the hospitals would not modify locally. As a comparison, the author has done CPOE projects with as few as 35 order sets and as many as 2,000.

[2] ACC/AHA. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction. J Am Coll Cardiol. 2004;44:671–719.

[3] www.ZynxHealth.com.

For admitting patients to the hospitals, AHS realized the hospitals varied in size, structure and resources, so committed to build a localized admission order set for each type of unit by hospital. The team called these order sets "Admit to Venue", and named them for the unit to which they applied. So in the case of Florida Hospital Zephyrhills (FHZ), the Admit to Venues included:

- Admit to Med/Surg/Telemetry FHZ
- Admit to ICU FHZ
- Admit to Labor FHZ
- Admit to Peds FHZ
- Admit to Behavioral Health FHZ

To promote local collaboration on the Admit to Venue design, the hospital's Medical Executive Committee, which governs the Medical Staff, became the approving group of the content for the local Admit to Venues. The OCE team would serve as content editors, to ensure that identified outmoded practices did not make it into these order sets.

Knowing that the content would have to be solid for over 9,000 community physicians to accept, they decided that the OCE would be the owner of all corporate order set content. This proved to be a wise decision.

In previous CPOE projects, a physician associated with the IT team, such as the CMIO or a medical director, would own content for all order sets. They would then have endless meetings with physicians by specialty and try to iron out the best order set to meet the needs of that group. While the author has observed some skilled physician consultants in my career facilitate these "rapid order set design sessions," the more likely result is that these sessions derail from local politics and opinions. Typically, one or two outspoken physicians will dominate the session with his/her "expert opinion" often overriding even the strongest evidence, and shut down all other collaboration. An example brings clarity to this concept.

> The setting was a 2-day, rapid order set design session for the Department of Orthopedics at a multi-hospital system (around 2002). The group included a couple of orthopedic surgeons, nurses, surgical technicians and unit clerks. By the second day, the group had designed three order sets, including total knee replacement, total hip replacement, and hip fracture. They were finishing up with post-operative recommendations for dosing two blood thinners, enoxaparin and warfarin, and had concluded that "mini-dose heparin" was no longer an evidence-based alternative to prevent the post-operative, life-threatening complication of blood clots (today VTE, or venous thromboembolism). As the group was ready to leave, after two hard nights of work, a lone unit clerk raised her hand and brought the process to a screeching halt, "Dr. Jones (name changed) does half the orthopedic surgery at my hospital, and he only uses mini-dose heparin on his patients."
>
> It took about 5 min for the group to capitulate on the evidence, and agree to add mini-dose heparin to the new "evidence-based" order sets. Moreover, Dr. Jones did not even show up to participate in the process.

The physician leading content design must be a person of influence and an excellent facilitator. The result is that the process completely consumes the physician responsible for content, who then has no time left to contribute to other aspects of the project, while disenfranchising all other physicians in that specialty who are now silent. There is one principle that one should honor if you decide to pursue order set design sessions: "Always begin a design session with a draft order set for discussion. Never start with a clean slate." Through the years, the author has sat through many order set design sessions to watch a consultant start the session with a blank sheet of paper. The sessions are very painful, drawn out, and the participants rarely come to quick consensus. It is much more productive to know the evidence surrounding the topic, look at what the physicians are already doing, point out where they already agree and use the collaboration time to tackle a few areas where experience-based medicine has kept them from following the evidence. In addition, feeding doctors at these events always seems to make them work out better.

In reviewing the work ahead at AHS, they planned for OCE to hire a full time medical director over content, to work with a team of a project manager, three nurses, a part-time clinical pharmacist, and a librarian. Dr. Paul Garrett, from Florida Hospital Orlando, the flagship hospital, accepted this position. In addition, the two other physicians in OCE, Dr. Hauck and Dr. Doug Bechard, chief quality officer, would round out the corporate infrastructure. Overall, ten content committees were formed in the process to include practicing community physicians with subject matter expertise. These included:

- Emergency Department
- Pediatrics
- Neonatology
- Anesthesiology
- Surgery and Orthopedics
- Neurology and Neurosurgery
- Gastroenterology
- Internal Medicine and Interventional Radiology
- Psychiatry
- Cardiology and Cardiovascular Surgery

Initially AHS contracted and paid for the community physicians' time on these committees as they developed initial content. Today, most have continued to serve as volunteers. Through the years, the author has seen similar structures with more committees at academic centers and pediatric hospitals. Community hospitals may only need Medicine, Surgery, Emergency Department and Obstetrics. The important point is to have a structure, not only for order set creation, but also for the physicians' ongoing review and maintenance of the content.

Each AHS committee reviews their content at a minimum of biannually, and whenever new clinical guidelines appear. The most active has been cardiology, with major revisions at least every year. Within the CPOE electronic order sets, physicians have an active email link in which to submit immediate feedback or questions on the content. These emails automatically log a change control request

assigned to the OCE for review and follow up with the physician. The end-user providers have seen hundreds of changes and enhancements that have originated through this feedback loop. The owner of any CPOE content should make sure that they have a long-term plan for ongoing order set maintenance.

2.3 Plug and Play

Knowing that patients frequently arrive at the hospital with more than one disease/condition, AHS devised an approach to order set design named "plug and play." In the paper world, admission order sets for heart failure, for example, would have all the orders to register the patient, as well as to define diet, activity, code status and vital signs. This worked fine until you admitted a patient with pneumonia and heart failure. If the physician used an admission order set for heart failure along with one for pneumonia, then the unit clerk ignores the duplicates on paper as she enters these orders into the EHR. In the CPOE world, however, the ordering provider must deal with the duplicates on the front end, prior to electronic signature.

Therefore, the team determined that a provider could electronically order the Admit to Venue order set and one or more "disease/condition" order sets to cover the needs of the patient. While a change in how physicians previously ordered on paper, this proved a rapid way to enter initial orders on a patient with multiple co-morbidities, such as diabetes and heart failure in addition to pneumonia. They designated the disease/condition-specific order sets as "core content."

In addition, AHS formulated a partnership with other similar "faith-based," community health systems that were pursuing CPOE on a similar timeline and EHR. This group has since worked with Zynx Health as the Care Collaborative,[4] which now provides order set content to a significant number of hospitals in the U.S. Through this collaboration, they developed a Style Guide for the order sets to facilitate ease of communication and tested various concepts for how best to deploy the content. The most powerful achievement, however, was gathering a large number of neonatologists, neonatal nurses and advanced practice nurses to formulate a complete library of order sets for the critical care of infants in the first month of life.

The final comment on order sets for this chapter is that one must have a formal process for change control. Changes arise through factors such as evolution of EHR system design, workflow changes, new clinical guidelines, new medications or discontinued medications, new service lines, and new technologies. At AHS, the OCE works very closely with the clinical IT team to ensure that each reviews any changes prior to implementation.

[4] Original members of the Care Collaborative were Ascension Health, Adventist Health System, Catholic Healthcare West, Cerner Corporation, Trinity Health and Zynx Health. Today, the Care Collaborative includes Ascension Health, Adventist Health System, Catholic Healthcare West (now Dignity Health) and Zynx Health. http://www.zynxhealth.com/News/Press-Releases/2010/05/Care-Collaborative.aspx.

2.4 Visual Anchor

The visual anchor is an image that provides a clear representation of the problem. In the case of CPOE, the author likes to use two images: one of an illegible set of handwritten orders, the other the same orders clearly displayed in the EMR via CPOE. Every patient, Board member, and caregiver can relate to this image and the dangers it represents:

- Medication delays
- Medication errors
- Patient harm or even death
- Liability
- Lack of immediate clinical decision support

The image must be very strong and stand independently to represent why one is doing CPOE. While physicians and other may resist CPOE publicly and privately, it is hard for them to deny the impact of illegible orders.

To further this image, the team should have stories that relate actual benefits of CPOE orders over handwriting. At one CPOE site a physician admitted his patient to the hospital from the office, 2 days into CPOE. The story relates how she arrived at the hospital and the nurse activated her planned admission orders, only to see everyone in her care working in concert rather than in a delayed, fragmented manner. The decisive moment, however, came when the CEO asked her what she thought of her experience as one of the first CPOE admissions, and she stated, "I felt like the whole hospital was on call for me!" That story left an impression on everyone, from the patient, the caregivers, the administration, and the entire CPOE project team. The anchor gives an emotional assurance to the leadership and to the all involved. The author has included the visual anchor (Fig. 6.2) for the AHS project in Chap. 6.

2.5 Project Plan and Scope

Once executive leadership determines the vision, the project sponsor must work to define the scope of the project, begin the formal project planning, and determine resources and the timeline. It is important that the leadership of the organization translate the vision of their project into a statement of scope that allows them to achieve the vision.

The author has seen many organizations through the years fail to take the time to define a full statement of scope that will fulfill the vision. As a result, the project team may determine that CPOE, i.e. having physicians place orders electronically, defines the scope of the project. They then turn it over to a project manager, who appropriately attempts to manage the scope around merely the electronic ordering processes. Later the project predictably stalls while physician resistance increases.

The project team creatively attempts to overcome the resistance as the project manager sounds the alarm of scope creep. Moreover, if the scope of the project is too narrow at the start, then any adjustments will require the team to either extend the timeline or commit more resources.

The author recommends that you really understand the vision of the project, and that CPOE is really a process that will help you achieve your vision and goals. However, CPOE may only address the first principle in Chap. 1. Without thoughtful planning, the organization may miss the opportunity to serve the second principle as well, i.e. the "What's in it for me?" principle. The result might be that you activate CPOE, but lose sustainability as the physicians see a drop in personal productivity.

One may avoid this pitfall by considering the first two principles simultaneously. Would it not be preferable to increase patient safety and help the physicians achieve higher personal productivity? Instead of seeing CPOE as the lone goal, one should likewise seek to improve physician efficiency. While CPOE activation is a project objective, we see automating the physician workflow to achieve improved efficiency, effectiveness and patient safety as the overarching goal.[5]

Once the organization commits to the goal of automating the physicians' workflow during their CPOE process, they can begin to focus on more than just orders and the medication process. For each workflow, teams need to document the current state processes. It is important that current state documentation reflect actual workflows, and not a manager's opinion of what the processes should be. These are also great opportunities for an organization to perform pre and post-CPOE metrics. We recommend that the scope include the following processes:

- Admission processes
  - This includes admission from office to hospital, Emergency Department to hospital, post surgery to hospital, and transfer from another facility. For CPOE, we recommend that nurses own the key components of obtaining and documenting allergies, height, weight, medication history including patient compliance and last dose, and an admission assessment dataset (e.g. vital signs, history of current presentation, family and social history). The physicians should own: determination of intensity of services (e.g. critical care vs. non-critical care), admission diagnosis, admission orders, admission medication reconciliation of home (or prior venue of care) medications, and an admission History and Physical. In addition, the initial registration process becomes critical path since nurses and physicians must have an electronic encounter on which to document and order.
  - At AHS, the team noted extreme variation in the pre-CPOE metric of time between a decision to admit until nurses and doctors complete all admitting processes. They measured cycle times at each hospital and worked prior to CPOE activation to improve both quality and expediency of the nurse admission

[5] Amusan AA, Tongen S, Speedie SM, Mellin A. Time-saver: a time-motion study to evaluate the impact of EMR and CPOE implementation on physician efficiency. J Healthc Inf Manag. 2009;22:4.

process with tremendous improvements. One should remember Principle #3 from Sect. 1.1, and improve the process prior to CPOE. We would like to see the provider complete the orders and medication reconciliation for the CPOE admission process in 3–5 min.

- Transfer processes
  - There are several transfer processes to consider, and the components of registration, nursing and provider workflows. Transfers typically include: critical care unit to non-critical care units and vice-versa, post anesthesia care to nursing unit, change in attending or medical service, and transfers (i.e. discharges) to other facilities (e.g. other acute care hospitals, tertiary care hospitals, long-term acute care or rehabilitation hospitals.). Both nurses and providers should document hand-off procedures, orders reconciliation, and registration events. One would ideally like the physician to complete a transfer within the facility in 1–3 min.
- Discharge processes
  - The discharge process represents a huge opportunity for improving patient safety/satisfaction as well as nurse and physician efficiency at the time of discharge. The discharge process begins with the physician's decision to discharge the patient from the hospital, and includes all processes through the patient actually leaving the hospital. The author discusses this in a later chapter in detail. However, he has seen many CPOE projects stumble as they fail to give appropriate attention to the discharge process. The physician owns all medical decision-making steps in the process: decision to discharge, order to discharge, discharge reconciliation of medications to determine a list of home medications, diet, activity, follow-up plan for medical care and instructions regarding the primary procedure or diagnosis. All of the physician's decisions should flow seamlessly to the patient's discharge instructions in lay terminology. The physician should also review the completion of any ordered interventions and comment on any exclusions for regulatory requirements (Such as why discharge plan excludes any evidence-based interventions such as daily aspirin following a heart attack). The nurse should return valuables, review the discharge plan for patient/family comprehension, educate according to the interdisciplinary plan of care, and ensure that there are no red flags such as lack of safe transport to the next venue of care or inability to understand the discharge instructions.
  - The discharge metrics should include current state for discharge to home, transfer to another acute care facility, transfer to other location (nursing home or assisted living facility), and in-hospital mortality (need for autopsy, release of body, and preliminary cause of death).
  - The reason for paying attention to the discharge process is that it is the last experience the patient has with the hospital and often is inefficient and inappropriate. Many a patient has had a doctor tell him that "you can go home today," only to have their loved ones arrive at the hospital and wait 4–6 h until

the actual discharge occurs. This is mainly due to nurses trying to track down the physician to obtain all the information necessary for a safe discharge. We recommend that you take the time to design a CPOE discharge process that permits a measureable improvement in time from discharge order until the patient leaves the facility. We believe that 30 min is an average goal that one can achieve. The physician part of the discharge process, exclusive of dictating or completing a discharge summary document, should take 3–5 min on average.

- Medication reconciliation processes
  - Medication reconciliation (med rec) actually represents several sub-processes, all centered around the goal of the physician giving consideration to the patient's home medications each time a change in venue occurs. In the author's opinion, med rec is an essential process for patient safety and should be a physician responsibility for all CPOE projects.
  - Online medication reconciliation tools must be able to provide the providers with the ability to perform and reconciliation during admission, during transfers and at the time of patient discharge. The tools must permit the physician from distinguishing home medications from any inpatient medications. Admission medication reconciliation must allow the provider to continue a patient's home medications as inpatient medication orders. In addition, admission med rec should already be a physician-led process prior to CPOE. However, some facilities, in preparation for CPOE, discover that they have not established clear accountability and metrics for getting the attending physician to complete it in a timely fashion. The author recommends that you establish your meds rec process and ensure physician accountability well in advance of CPOE activation. In addition, one must provide ongoing monitoring and optimization ever after.
  - Another variation that one must understand is the concept of multi-physician meds rec. The author will discuss that further in Chap. 3. However, a facility should be clear on the scope of meds reconciliation for their project.

- CPOE in the Emergency Department
  - The Emergency Department is the front door for most acute care hospitals in the United States, and CPOE creates many opportunities. Many facilities utilize the ED as a pilot unit for CPOE, since it has a defined set of providers and typically starts from a paper MAR (medication administration record). In regards to scope, "Will the ED be the pilot unit for CPOE?" is an important consideration for the executive team. In addition, if you do pilot in the ED, what about admitting doctors who come to the ED?
  - Moreover, the ED physicians should have few verbal orders and no telephone orders. The hospital typically contracts with them, and can incorporate CPOE into their performance metrics. However, the team must provide appropriate order set content for the management of ED patients and an efficient ordering

process. Important metrics for the ED include the time from patient arrival to physician engagement, patient arrival to discharge home, and patient arrival to admission if inpatient care is the result.

- Patient summary views
  - When doing CPOE, physicians like to be able to see a quick snapshot of their patients. The current EMR may already have one or more summary views that bring various elements together onto one view. One should assess whether the current views available will be sufficient for physicians doing CPOE. Typically, the EMR vendor can provide suggestions based on other clients who have already implemented CPOE.
- Ordering processes
  - **Scope of CPOE orders**: The author once consulted on a project in which the client wanted to have the physicians do inpatient CPOE only for laboratory and radiology and not for medications and other orders. This would have created a process in which physicians would be constantly moving between the paper and online chart as they place orders. While this actually might improve throughput in the short term in the ED setting, we would not support fragmenting workflow in this way for inpatients. We believe that one should be giving physicians context during the ordering process and fragmenting the orders does not seem consistent with that effort, or useful to achieving long-term CPOE success. The author passed on this project, as he believes that CPOE should be an all-out effort to create seamless ordering processes with very few exceptions that he will discuss.
  - **Non-formulary meds**: While patients may be taking any of the numerous medications on the market, the hospital pharmacy may have a limited formulary available for its inpatients. Therefore, the team will need to understand how to display only formulary items for inpatient orders, as well as a strategy to allow physicians to convert non-formulary home medications into active hospital orders. Most EMR also provide reference tools online for many medications.
  - **Telephone and verbal orders**: Since telephone and verbal orders are a reality of hospital care, the project must include processes to allow telephone and verbal orders. We will discuss these further in the next Chap. 3.
  - **Co-signature of orders**: The EMR should have some mechanism to ensure that doctors can subsequently sign orders that they give verbally or over the phone. Ideally, this should be an electronic signature with the system "pushing" orders to sign to the physician. Therefore, the CPOE project needs to include a mechanism for electronic signature in its scope. A CPOE metric would be the percentage of telephone/verbal orders with physicians sign within 24 and 48 h, depending on local medical staff bylaws requirements.
  - **TPN** (**total parenteral nutrition**): TPN orders are complex and the physician often customizes them for each patient on a daily basis. Modern day CPOE systems should be able to provide solutions for ordering TPN online. Some

medical staffs delegate TPN orders to the pharmacy department, while others keep TPN on preprinted forms.
- **Prescription writing/e-Prescribing**: As physicians discharge patients from the Emergency Department or following an inpatient stay, they will need to provide prescriptions to the patient. Project scope should indicate whether physicians will handwrite patient prescriptions, or the project team will provide an electronic solution. The project team should spell out if prescription printing and/or e-Prescribing will be in scope for the CPOE initiative. The Emergency Department is often an ideal place to start prescription printing and e-Prescribing due to the volume of new prescriptions.
- **Special Orders and Chemotherapy**: The project team should understand how the CPOE system manages orders such as dialysis and chemotherapy. While most EMR vendors will accommodate hemodialysis and chemotherapy protocols, they may require add-on modules or additional design and build time. Therefore, it is advisable that the team make this decision early as to whether physicians will place such orders from pre-printed order sheets or in electronic format. The author would not recommend allowing physicians to handwrite them without some pre-printed template.

- Physician documentation in ED and inpatient
  - Many CPOE projects have not included electronic physician documentation within their scope. The author has found, to the contrary, that physicians adopt online documentation very rapidly when coupled with the CPOE activation. However, there is a strategy that will increase success, and accounted for physicians voluntarily doing over 1.5 million electronic notes at AHS in 2011.
  - The author has found that structured electronic documentation empowers physicians as long as they have the ability to personalize their experiences. He recommends two major elements that will increase your success for physicians voluntarily adopting online notes: grow it virally and combine it with near-time scanning of the paper chart. Since we mentioned AHS above, we will use it as a case study.

Long before Meaningful Use, the team believed that physicians could gain adoption of electronic notes by using a viral marketing approach: find some early adopters to build the business case around personal efficiency then let organic growth occur. Therefore, the they introduced structured electronic notes in October 2008, prior to the initial CPOE pilots in May and June 2009. They utilized our vendor's templates, and added some custom-coded smart templates to add auto-population of data elements that the physicians were already using in their daily Progress Notes. This included T_{max} (the highest temperature in the past 24 h), latest vital signs (while maintaining one-click access to all vital signs from within the note), lists of problems and diagnoses, and laboratory results including bedside blood sugars. Over the past few years, the team has added imaging "Impressions," microbiology summaries, pathology reports, and I & Os (intake and output calculations). Physicians can save pre-completed templates and utilize personal macros as well.

In areas like the ED, the team created "required fields" for the visit diagnosis, which ensures that the visit note meets profession and billing requirements. In the ED, they started with templates based on presenting complaints, and have done little modification to these. They did allow the optional use of speech recognition software, though few use it today. However, one may make the case that it provides a more narrative result than templates for items such as History of Present Illness, Impression and Plan. A handful of ED's do utilize scribes, but this does often delay the completion of the notes rather than enhance them (and creates the need for clear policy as discussed in Chap. 3). We find it quite humorous today now that all of the AHS emergency department documentation is electronic. Previously, the ED physicians were very committed to their paper templates, which allowed them rapid documentation and billing efficiencies, while creating a visit record that other physicians could barely interpret. Today, many of our ED physicians report that it is quicker and easier for them to see a patient that returns to the ED, since they, themselves, can better understand the story of the prior visit from the electronic note than the older paper templates.
AHS added near-time scanning of the paper record as part of the scope of CPOE and it proved a critical success factor for the project as well as for moving physicians to electronic documentation. In addition, it helps the physicians to increase their personal efficiency. The author will discuss the mechanics of this below. However, the goal is to have the entire chart digitalized so that the physician has a complete picture of the patient, whether at the bedside, or viewing the EHR remotely. The efficiency comes as physicians no longer spend time looking for charts, competing with others for the chart, and can review scanned paper notes more quickly than even flipping through pages. Moreover, when the physician no longer goes to a paper chart for any information, it becomes easier to complete an online Progress Note than to look for a paper form to complete. This effectively makes the electronic note the "path-of-least-resistance."

Today, AHS brings new hospitals live from completely paper-based physician workflow to CPOE and electronic documentation with much less physician resistance. They do not prohibit handwritten notes, but the physicians quickly see the benefits of electronic documentation not only for efficiency, but also for more effective physician-to-physician communication and handoffs.

In addition, we teach both ED and inpatient physicians to place orders from within their documentation. This creates valuable timestamps within the notes, and allows all users to get a clear picture of the physician's medical decision-making process.
There can be a downside, however, to electronic templates, as they reveal the heart of some providers. Once live, the HIM (Health Information Management) team and the medical staff should police the process of physicians copying each other notes, using excessive documentation of needless words, or creating inaccurate documentation through mindless use of macros and canned phrases. A real example from several years ago was the description of a patient pharmacologically paralyzed, on a ventilator, and in a drug-induced coma. The physician's canned phrase read, "The patient is alert and oriented." Always remember, the problem is the heart of the documenter and not solely problem with the technology.

- Speech recognition software
  - If the project team determines to include online documentation in scope, then they should consider the option of speech recognition software as well. In the case of physician documentation, the "history of present illness" within the History and Physical Examination report as well as the "hospital course" within the Discharge Summary both lend themselves to narrative structure. While the providers should use structured elements for the Diagnosis and Problem lists as well as orders, there are also opportunities for providers to add narrative commentaries to the Assessment and Plan of documents. The combination of structure and speech recognition can allow providers to add more contexts to their documentation.

- Transcription
  - Since most hospitals already offer transcription with dictation for documents such as History and Physical, Consultation Reports, Operative Reports and Discharge Summary, the consideration for CPOE is around whether physicians will move these reports to structured documentation, and whether providers may dictate daily progress notes. In addition, hospitals now have the option to add "back-end" speech recognition (i.e. provider dictates, voice recognition software transcribes draft document, and transcriptionist performs final edit) to their transcription system. This will only cut costs if that organization negotiates better transcription fees with their transcription vendor, or can perform more transcription per employee if in house.

- Scanning of paper records into EMR
  - As mentioned above under physician documentation, hospitals should strongly consider adding near-time scanning to the scope of their CPOE project. If the paper chart no longer contains orders, physician documentation or nursing/ancillary documentation, then scanning the remaining paper will allow the providers to manage their orders remotely with no gaps in critical results or documentation. The author recommends that one support this by also removing all chart binders and using a clipboard with a front cover, once you start scanning. This serves as another visual anchor to remind the users to go to the EMR and not the paper chart. He also recommends that one use the clipboard only as a location for patient labels, consents that have not yet been fully completed, and forms that remain on paper (e.g. Living Wills, chemotherapy orders, ambulance sheets) until the facility scans them. Moreover, the hospital unit clerk (HUC) should no longer place blank order forms and Progress Note forms on the clipboard. The hospital should avoid printing anything (e.g. lab or imaging reports) that is already in the EHR. This is the time to get all end-users going to the EMR and not the clipboard.
  - At AHS, the team brought near-time scanning live 2 weeks prior to the CPOE go live. Because orders and progress notes were still on paper, the HIM (Health Information Management) department typically had 26 pages of

paper to scan daily for each patient. Depending on the unit, they would scan two to four times a day. While the HIM department owns scanning, most sites put scanners on each nursing unit and direct the HUC to scan, with HIM staff overseeing the quality of scanning through audits. Once CPOE went live, the typical scanning volume fell to zero to two (0–2) pages per patient per day as order sheets and Progress Notes went electronic except for orders still on paper (e.g. hemodialysis, chemotherapy) and the occasional handwritten Progress Note.

  - Handwriting a Progress Note requires the physician to get the form, write the note, and then place it on the clipboard. The physician still needs to access the electronic record to review orders, results and others' notes. Therefore, many physicians quickly move to online documentation.
  - The other benefits of starting scanning 2 weeks before CPOE activation are less obvious, but valuable. First, it makes a clear statement to all end-users that CPOE is moving forward. Second, it gets all the users on the EMR and assures that they can log on and navigate through the EHR. Thirdly, it determines if you have deployed enough devices on the clinical units to accommodate all the users during the peak rounding times. The facility should be able to see an ROI (return on investment) of moving users to the electronic chart and minimizing pages of the patient's record that HIM (Health Information Management department) must collect, scan, index and perform quality assurance. The facility must include the cost of scanners and should acquire some temporary workers to help with scanning during the transition from initial scanning through the first few days of CPOE activation. A metric for scanning is the number of pages of paper per patient per day.

- Clinical decision support
  - The author will discuss clinical decision support (CDS) in later chapters. However, he recommends that the team determine the number of CDS alerts that they will include in the initial scope. He recommends that they understand major patient safety opportunities and select six to ten CDS alerts that will get providers engaged in understanding alerts, without over-taxing them early in the process. Some common alerts that physicians understand are around the avoidance of digoxin in the face of electrolyte imbalances, potentially lethal drug combinations, use of anticoagulants in the face of excessive anticoagulation, and warning on certain renally excreted drugs in the face of acute or chronic renal failure. Metrics include number of CDS medication alerts per 100 medication orders and the percentage of alerts in which providers cancel, modify or supplement an order rather than override the alert.
- Code Blue and Rapid Response Teams
  - Code Blue is a common term US hospitals use for sudden cardiopulmonary arrest while rapid response teams typically respond to patients who are deteriorating and are at risk for arrest. The author recommends that the project team examine workflows for each, including early warning techniques (such

as rules and alerts), and include these in the scope of CPOE. On typically see Code Blue orders as documentation and allow these to remain on paper or as electronic forms. An organization may want to measure the incidence of Code Blues or inhospital mortality as CPOE metrics.

- Anesthesia Information Management System
  - Anesthesiologists have managed their intra-operative documentation for over a century on paper. Their intra-operative records include:
    - Common operating room events:

      Anesthesia start time,
      Anesthesia induction time,
      Incision time,
      Surgery stop time,
      Time out of the operating room, and
      Arrival to the post anesthesia care unit/PACU;

    - Physiological monitoring (e.g. vital signs, oxygen saturation),
    - Intravascular fluid and blood administration,
    - Induction medications, and
    - Anesthesia administrations:

      Oxygen and nitrous oxide flows, and
      Delivery of IV/inhaled anesthesia/analgesia agents

  - The paper record is often a silo for important information and data such as normally found on the eMAR (electronic medication administration record) and the ongoing calculation of the I & O's (intake and output volumes).
  - Most U.S. hospitals do not have an electronic Anesthesia Information Management System, and therefore remain on the paper Anesthesia Record. When they do, medication and I & O's should flow seamlessly into the appropriate portions of the EMR.
  - If the Anesthesia Record remains on paper for the CPOE project, the author recommends that you still keep pre-operative and PACU processes in scope for CPOE. That means that anesthesiologists will need to utilize CPOE for their pre-operative orders as well as for all the orders in the PACU following surgery. He also recommends that if the anesthesiologist is administering the pre-operative antibiotics, that he documents it on the inpatient eMAR. This will allow better timing for the nurse administering any post-operative antibiotics 8–12 h later.

- Problem List maintenance
  - The Problem List is an excellent communication tool within the EHR, enhancing physician documentation, communication and for helping to optimize clinical decision alerts. The author recommends that physician own the Problem List and its maintenance, and not nursing. Physicians should be able

to view and update problems during the ordering and documentation processes. While CDS may suggest to the physician, the inclusion of new problems (such as adding diabetes if the patient is on insulin or has persistent hyperglycemia), the author does not recommend that one automatically add problems as a byproduct of the use of order sets, or other schemes that do not require a physician's confirmation. Otherwise, one will be building long problem lists with no motivation for physicians to review and maintain them. The author does recommend that you utilize CDS to remind physicians when they have not addressed that Problem List during the hospital stay. A metric for Problem List would be percentage of charts in which physicians have documented active problems, or the absence of problems.

- Incentives and CME
  - A final consideration for scope is to include incentives for physicians to adopt CPOE. This could include CME for review of evidence-based content, for attending CME presentations and for training that leads to adoption of evidence-based order sets. The hospital must provide any incentives to all members of the medical staff equally. Planning must occur to offer CME or to budget for other incentives.

As the hospital leadership determines scope of the project, the project manager will work to determine an appropriate timeline and resources. Whether you implement CPOE at one hospital or many hospitals, you will need to have a defined project plan to implement successfully. Fortunately, at AHS, the team had a dedicated project manager, and used a repeatable process to implement multiple times. Chapter 4 will address this topic with more detail.

2.6 Key Points

- Provide a clear vision statement/concept for the project
- Articulate the vision at every event/opportunity
- Use a visual anchor to communicate the vision
- Use the vision for all course corrections
- Wear the vision on your sleeve
- Build an effective plan to fulfill the vision
- Have a content team separate from the IT team
- Define a change control process for managing content
- Allow physician review of order set content at every juncture
- Consider scope that automates physicians' workflow rather than only the ordering process.
- Consider opportunities to move behavior in multiple areas, not just orders.
- Use pre and post-CPOE metrics to demonstrate value and define success.

2.7 Fingernails on the Chalkboard

- **Lack of a central, unifying vision**
  You need to have a vision you can articulate at every level of the organization and with enough authority to overcome the noise of competing priorities. An executive, preferably the CEO or Board, must own and communicate it.
- **Vision statement that only provides value to the organization and not the end-users**
  The vision must provide a strong business case at every level. End-users, including physicians, will act on what provides them value, and are not as strong in their support of projects that value the organization without providing some personal value. Patient safety alone cannot drive the adoption. The end-users also need to see new efficiencies (or similar reward) for their efforts.
- "**The Joint Commission (or CMS, Corporate, etc.) is making us do this**!"
  Organizations that do not provide a clear vision with defined value statements will move into the victim role as its end-user repeat any of these mindless mantra that fail as effective motivators.
- **Absence of a visual anchor**
  A visual anchor, tied to the vision, provides a simple reminder to all of the importance of seeing the project completed. CPOE is a complex project, so a visual anchor helps to keep everyone focused on the reason we are going through this massive change.
- **Absence of a statement of work (scope)**
  Without a clear statement of work on the front end, the organization will not complete the project on time, on budget, or with significant benefit. By clearly defining scope at the start, the team can better project the timeline and resources for success and avoid costly scope creep later.
- **Senior executives not leading the project**
  Organizations always have competing projects. All projects have risks and challenges. The project with the highest level of senior support will always receive priority when competing interests arise, as they always do. CPOE is a major change initiative for an organization, affecting almost every person in a hospital. Having the CEO lead at every occasion sends a clear message of the importance of the project and the commitment for project success.
- **Senior executives multi-tasking or absent during project meetings and major events**
  As in any other leadership, the team watches what the senior leadership does. If the senior leaders lack full engagement, the rest of the team loses its confidence of their support. The executive, who is distracted, such as reading e-mail during a CPOE meeting, sends a conflicting message that this project does not have high priority at the facility.
- **Having the IT team own content**
  CPOE teams chronically underestimate the amount of effort to complete the content. Leaders tend to draft CPOE implementation timelines in stone and not recognize the

importance that content be complete and up to date. It is always best to have a dedicated content team that works independently of the implementation team and are not distracted by last minute IT issues as the activation date approaches.

- **Not having identified physician resources with the time to participate**
  Most CPOE teams have an identified physician, but few have a physician with the time to commit to project success. I have seen many failing CPOE projects that have a roster of physicians on the project who are essentially unengaged. The other risk is the partially engaged physician, who is making recommendations with only peripheral knowledge of the project.

http://www.springer.com/978-1-4471-4242-3

Making Computerized Provider Order Entry Work
Smith, P.
2013, XX, 196 p., Hardcover
ISBN: 978-1-4471-4242-3