GOING PAPERLESS: KEY DESIGN CONSIDERATIONS
AN EXCERPT FROM "THE ELECTRONIC PHYSICIAN: GUIDELINES FOR IMPLEMENTING A PAPERLESS PRACTICE"

ABSTRACT
Modern healthcare occasionally seems to be an odd blend of state-of-the-art technology and century's-old procedures. Just consider. A patient who undergoes an MRI—one of the world's most advanced diagnostic tests—often has the results noted by hand in a paper chart that must be photocopied to be shared. One explanation for this disjunction is that the transition to a paperless medical record is a complex undertaking that requires planning far in advance of implementation.

Much of that planning surrounds the assessment of current work processes, or workflows, to determine whether they are transferable to an EHR. The answer is not always cut and dried. For instance, some paper workflows can't be performed electronically and some electronic processes work better on paper. Divining the difference requires taking a situation-by-situation approach to analyzing your organization's workflows before designing them into an EHR. The same is true of virtually every other aspect of EHR design. Simplistic answers lead to simplistic functionality—and eventually many of reluctant users.

In this chapter we'll present some of the most important design factors to take into account before implementing an EHR.

SPECIAL CONSIDERATIONS FOR PAPERLESS WORKFLOWS
Just as workflows vary from one organization to the next, an EHR’s functionality can be quite different, too. One organization’s physician dictations may be included in the EHR; another’s may not. One may have lab results built into the system; another may still rely on paper scripts. While the EHR’s great strength is its flexibility, the truly complete electronic health record is completely paperless—all clinical data is populated in the EHR and the paper chart is archived. However, not every organization will be able to adopt a full EHR.

How do you determine whether your organization is ready to go paperless? Ask yourself whether your users would be able to adjust to viewing clinical data online vs. reading a piece of paper. If you’re confident the answer is yes, then your organization is already well on its way to a paperless workflow.

Still, making the decision to pursue a full EHR isn’t the same as preparing the ground for it to happen. For an organization to become truly paperless, several important design decisions must first be made. We’ll run through them one at a time.

Identify Locations Where the Electronic Chart Will Be Accessed
Determine the need for physical access to the electronic chart. If the paper chart is going to be removed, it’s vital that the electronic chart is easily accessed. One common way to accomplish this is to place networked desktop computers with access to the HER in every exam room and area pod. If wireless networking is available, then the clinical staff can access the electronic chart in virtually any area of the facility using Tablet PCs or PDAs.

Physicians often take a paper chart with them when they visit patients in the hospital. Once the paper chart is gone, your organization must enable physicians to access the electronic record offsite. Some organizations accomplish this by providing offline access through mobile devices such as a PDA, which store the record between regular updates, or by designating a secure workstation at the hospital that providers can use to access the EHR. We recommended that you work with your EHR vendor to identify features and configuration options to accommodate these workflows through stationary or mobile devices in the hospital. (For more on this topic, see Chapter Eleven).

Review All Paper Processes for Efficacy Before Conversion
In general, the workflows supported by paper processes are simplistic—a paper form is transmitted and an action is performed. To achieve a paperless workflow, each of these paper processes should be weighed for inclusion in the EHR. The sorting of mail is a good example. In a paper system, a nurse or office manager reviews incoming mail and discards unneeded information without the physicians’ review. When an EHR is deployed, the organization may choose to have the nurse or office manager continue to review the mail before scanning or simply scan all mail into the system. The decision impacts whether all data is memorialized to portions of the patient chart, and whether human interaction is still needed to pre-filter the documents. It’s a good opportunity to review existing processes and redesign future ones.

An example of an existing paper process on the clinical side is the medication renewal process. Today, a medical renewal request may include the following steps:

- The patient’s request is received via phone or fax.
• The message is transmitted to the appropriate clinician via paper or e-message.
• The chart is pulled to review existing medications.
• Approval of the refill is granted.
• The refill request is transmitted to the pharmacy (usually by fax).
• The refill approval is documented in the patient’s chart.
• The patient’s chart is sent back to the medical records department.

When this process is converted to an EHR, the organization must determine the procedures to be used for capturing and routing the message, accessing the chart reviewing existing medications, calling in the refill and documenting the approval. The decision impacts whether all data is captured to portions of the paper chart and whether human interaction is still needed to maintain this information.

Before converting an existing paper process, it’s advisable to examine the efficacy of the workflow, to fix bad processes and redesign others. In other words, ask yourself what steps should be taken to ensure that a particular paper workflow is appropriately translated into an electronic workflow. Some paper workflows can’t be performed electronically and some electronic processes just work better on paper.

For example, a physician might be accustomed to initialing lab results and placing them in an outbox for routing by a clerk. When this workflow is converted into the EHR, the physician is still responsible for viewing and initialing the lab result, and determining routing. However the process now requires the use of a keyboard and mouse; so it’s likely to be even more time consuming than the old paper process.

Many methodologies offer guidance on the workflow analysis process. Guidelines specified in “The Power of Six Sigma,” by Subir Chowdhury, have been used successfully by many organizations to analyze the efficacy of their existing workflows. The title comes from the mathematical symbol for standard deviation, “sigma,” which is a measure of variation. According to the Six Sigma guidelines, a process is efficient when the number of defective results it produces is small enough to fit within six standard deviations of the mean performance and an acceptable specification limit.

The Six Sigma process suggests that before you can ensure that a paper workflow is appropriate for conversion into an electronic workflow, you must first understand, document, and measure your current processes.

**Approach That You May Use More Paper After Implementation**

Before going “paperless” with an EHR, consider some policy decisions that could prevent paper use from actually increasing—at least temporarily—with the new system. Dr. Richard M. Podhajny noted this strange phenomenon in an article in Paper, Film & Foil Converter, a monthly Internet printing magazine. “It wasn’t too long ago that the coming of the electronic age was predicted to have dire effects on the use of paper,” Podhajny wrote. “In fact, the opposite has occurred. The predictions for the demise of paper demand failed to appreciate the fact that the average person wants a ‘hard copy.’”

We all know the truth of this observation. The low cost of electronic information retrieval—and a general failure to consider the costs of printing—makes it easier for employees to use more paper than in the past. The EHR should reduce paper filing in the long term, but expect to see an increase in paper use immediately following implementation as employees print out paper reference manuals and other reference information. Paper consumption can be expected to drop over time as users become more comfortable retrieving and storing information electronically.

Some organizations have implemented policies and procedures that discourage employees from printing unnecessarily, including:

- Implement faxing alternatives: In a paper system, incoming faxes are scanned and indexed into the patient chart. In implementing its EHR’s scan functionality, Orthopedic Associates USA designed the system to save incoming faxes to a server in digital form. This step eliminated the need for printing all incoming faxes before scanning, saving the organization $6,000 on paper and ink in the first six months alone.

- Use a workflow engine (tasking): If your organization’s EHR enables the electronic communication of tasks, consider mapping out existing workflows so they can be incorporated into the system. Incorporating everyday workflows in an electronic setting generally reduces the need to print certain tasks or documents because they are captured electronically.

**Establish Organization-Wide Printing Guidelines**

Organizations may choose to strongly encourage their employees to use terminals vs. printing by assigning printing responsibility to different people. This approach has proven most successful when printing is shifted from the clerical staff to the doctor’s nurse. For example, it’s common for a
physician who refuses to use the EHR to require the medical records department to continue printing the last office note. If the responsibility for printing the note were shifted to the physician’s nurse, however, the nurse would be forced to stop clinical care to pull and print the chart. In the interest of protecting patient care, the printing requests would soon cease.

Stop Distributing the Paper Chart Once All Information Has Been Captured by the EHR

Some organizations may choose to reinforce the switch to an EHR by creating policies that prohibit printing of the chart. To increase their effectiveness, such policies should be reviewed with employees, allowing time for questions or voicing of concern.

Before you implement strict paper-control policies, be sure to consider your organization’s culture and size. At least one organization that implemented a nurse-only printing policy had to abandon it after employees voiced frustration with their lack of control over this simple task. Other organizations were able to successfully implement a similar policy, despite initial employee frustration, by convincing staff that the new policy supported important organizational goals.

Identify Changing Roles Used to Capture Clinical Data

Another design factor that should be decided before going paperless concerns how data is entered into the EHR. With the onset of more direct data entry into a patient’s chart, organizations may find that the employees who historically captured information in the patient’s paper chart no longer are required to do so in the EHR. On the other hand, resources may be assigned responsibility for entering data electronically that they were not responsible for in the paper chart.

For example, physicians may be accustomed to dictating a patient’s visit, receiving a hard copy of the transcribed text, reviewing the transcription for accuracy and sending it back to the transcriptionist for corrections. With an EHR, physicians may receive the transcribed text electronically and be responsible for making the corrections themselves within the EHR. The increase in efficiency of the workflow translates into more direct involvement in editing by the physician, and is a factor organizations must consider when identifying workflows.

Acknowledge That Required Skill Levels May Increase as the Number of Resources Decrease

In preparing to go paperless with an EHR, you should understand how the change will impact your most important resource—the people who’ll use it. Because an EHR is so much more efficient than paper records, it can sharply reduce the number of people needed for filing and pulling paper charts. Central Utah Clinic experienced this phenomenon in 2003, when several members of the medical records department were laid off or moved to other jobs following an EHR implementation.

In switching to an EHR, the skill level required of medical records’ personnel might actually increase. That’s because the new process of entering paper-based information into the EHR generally requires two steps: physically scanning the document and then indexing it to the appropriate patient or folder. While a college intern or other temporary resource can scan the documents, it takes someone with clinical experience to do the indexing properly and to review questionable documents to see whether they were misfiled. (On a related note, if you purchase an EHR for its scanning capability, be sure that it allows you to change or move documents that are mistakenly scanned into the wrong patient’s chart or the wrong folder).

Organize Document Categories for Efficient, Easy Viewing

The final design factor to consider before you go paperless is how to increase the efficiency of viewing documents in the EHR. A typical EHR offers a variety of ways that data may be filtered and viewed by users. These include sorting documents chronologically, sorting documents according to user defaults based on who is logged into the system, and allowing physicians from different specialties to view only those documents generated within their department (e.g., cardiology vs. internal medicine). (For more information on the viewing functionality of an EHR, see Chapter Two, “The EHR Mental Model”).

There are steps you can take to design the most efficient views possible. Consider taking the following steps ahead of implementation:

- Minimize the number of documents a user needs to access before finding the desired information. If the descriptions of the documents are too vague or include too many different types of data, the user will end up scrolling through many different documents before finding the correct one. Ensure that the document names are descriptive enough to tell the user what’s inside.

- Identify the appropriate number of document types to use in storing and retrieving documents within the viewer. Deciding whether your document names should be more complex or less complex depends on the type of EHR you purchase. Many top-of-the-line EHR’s can filter and search documents by specialty, document type or other criteria. If your EHR has this capability, you don’t need to worry about using complex naming conventions to make it easy for users to identify the proper document—the EHR will search the entire contents of the document for the proper information, not just the document name. In this case, you should consider simplifying the document naming conventions to make searches more efficient. If your EHR does not have the ability to filter and search by specific criteria, then you should ensure that the document type names are sufficiently descriptive to help the end-user find the right document. For example, within the paper chart, a multi-specialty organization may use “office notes” as a document type. When building document types for viewing, consider adding specificity to the document type name by including the provider’s medical specialty so that a
cardiologist knows to look for the “cardiology office note” vs. the “orthopedic office note.” Otherwise, he or she would need to search for all such documents in order to find the notes specific to cardiology.

- Devote time and resources to proper document labeling during the indexing process. As discussed above, scanning documents into an EHR is usually a two-step process: scanning the document and then indexing it to the appropriate patient or folder. During the indexing process it’s wise to encourage the administrative staff to devote as much time as necessary to creating highly specific document type names. In the short-term, it may seem like a waste of time, but in the long-term the more descriptive document type names will save end-users—and the organization—far more time than it cost to create them.

**STRATEGIES FOR REDUCING PAPER CHART PULLS**

When implementing an EHR, the ideal situation would be to have every page of every patient’s chart scanned into the new system. That way, there would no longer be any need for storing, filing and pulling the old paper chart—everything would be electronic. However practical considerations, such as cost, make this situation highly unlikely. In the absence of a totally digital chart, several questions must be answered before the EHR comes online:

- Should you scan all historical information into the EHR? The charts of long-term patients may consist of multiple folders. How much of that history should be considered important enough to scan into the EHR? The answer is important because an incomplete EHR chart leads to more requests to pull the paper chart for review, which contributes to higher operational costs.
- Should existing electronic data processes be converted into the EHR? If your organization captures data electronically from a transcription or lab company, you should consider converting the process into the EHR.
- How much of the chart should you scan and index? The decision to scan a patient’s chart requires an organization to decide whether the entire chart should be scanned, or only designated portions. Once it’s scanned, you must then determine how much of the scanned chart should be indexed and how much filed directly into a folder.

The majority of organizations scan only those portions of the active chart that they fell are most important. Determining how much to scan often becomes a question of balancing the financial benefits of going paperless with the clinical benefits of maintaining the entire paper chart for physician review. This quandary can spark a tug-of-war between the physicians and the administration, which may argue that physicians rarely use the historical chart, so why keep it? The clear answer—and best practice—is that organizations should simply do what’s right and scan the entire chart, but only index a portion of the chart.

**STRATEGIES FOR REDUCING, STREAMLINING AND ELIMINATING PHYSICIAN DICTATION/TRANSCRIPTION**

As health care costs continue to rise, medical transcription is an easy target for cost cutting. Increasing demands on physicians’ time coupled with increased documentation requirements have led healthcare facilities to spend an estimated 20 billion dollars annually on medical transcription services, according to the American Association for Medical Transcription. In an attempt to reduce this expense, healthcare administrators have focused on solutions that attempt to boost transcriptionist efficiency, but these efforts have met with limited success.

An alternative to focusing on transcription-based efficiencies is to leverage technology to seamlessly document clinical encounters. Leading practices have found that a properly planned, modular implementation of an EHR is a highly effective change-management strategy that enables healthcare organizations to significantly reduce or eliminate transcription. Short of an EHR, several products and strategies exist that will either improve the responsiveness and efficiency of dictation/transcription; combine dictation with other methods to reduce transcription or eliminate dictation/transcription all together. These include:

**Mobile Digital Dictation**

Wireless digital dictation devices, such as handheld PDAs and Tablet PCs, give physicians access to a patient list, and can add efficiencies and quality to traditional dictation and transcription processes. Physicians can dictate clinical notes into the convenient devices, saving 20 to 30 seconds per patient encounter. Most mobile solutions also automatically attach demographics and other patient data to the recording, reducing the number of lines that need to be transcribed and accelerating turnaround time. Mobile devices can further reduce dictation by advising the physician on the degree of documentation required for each visit. And when they are integrated into an EHR, these advanced mobile solutions provide a complete solution—immediate access to real-time patient information, the status of the current encounter, and access to the completed note.

**Structured Note Templates**

Combining dictation with structured note templates can significantly reduce the volume of dictation. Physicians increasingly use electronic templates loaded with boilerplate information for standard sections of the clinical note—information they would otherwise have to cite or obtain from the patient record. Templates allow physicians to dictate only the most important sections of the note. Leading EHRs come pre-loaded with templates utilizing medical terminology from coding sources like MEDCIN(r). This allows the EHR to also provide clinical decision support during the patient encounter. Taken together, templates and dictation can reduce transcription to just a few sentences per encounter, saving
time for the physician and transcription charges for the practice. Additionally bringing templates into a mobile environment achieves the dual benefits of wireless digital dictation with structured documentation.

Speech Recognition

In recent years, as the quality of speech recognition software has improved, front-end speech recognition has thrived in specific clinical specialties such as radiology. Front-end speech recognition, which shows up on a computer screen at the time of dictation and can be corrected by the physician, is increasingly being used to augment structured notes in an EHR. Because real-time documentation eliminates transcription expense, more practices are finding ways to encourage physicians to incorporate speech recognition technology.

In contrast to front-end speech recognition, the back-end version of the technology lets physicians dictate and run, just like the old phone-based systems. Transcriptionists correct the recognition, achieving an average 25 to 30 percent gain in efficiency over standard transcription. Because back-end speech recognition requires no change in physician behavior, it tends to be more popular than the front-end technology. While both solutions require a significant investment along with a substantial workflow change for transcriptionists, many large transcription services have proven willing to absorb the costs in exchange for added efficiencies.

Workflow Integration

The ultimate solution for documenting clinical encounters relies on workflow integration and documentation capture as part of a more complete EHR. Workflow integration automatically collects patient data entered into either a practice management system or an EHR and then uses the data to populate the clinical note during the patient care process. By leveraging existing data and allowing the documentation to be built during the patient encounter across physicians, clinicians, and nursing staff, the documentation process is streamlined and constructed in a manner that mirrors the delivery of healthcare.

Many leading practices are finding ways to seamlessly document clinical encounters while encouraging physician adoption of these electronic solutions by initially requiring few behavioral changes of them. Managing documents through mobile, wireless dictation and anytime-anywhere access to the completed note moves organizations closer to implementing a full EHR. Once physicians begin to appreciate the efficiencies from this initial step, they tend to migrate towards a structured note approach, further reducing transcription expense. A number of physician practices have already implemented this model of clinical notation with impressive results.

A Case in Point

Central Utah Clinic purchased the TouchWorks modular EHR from Allscripts to help control their transcription costs and to bring additional efficiencies to their organization. Central Utah initially enabled their physicians to use a PDA to dictate anywhere and anytime. This gave the practice’s physicians an easy way to dictate and better access to patient information.

Central Utah Clinic then introduced the note functionality of TouchWorks, enabling physicians to document in the exam room at the point of care and eliminating transcription costs for many. Central Utah’s physicians also commonly augment the template process with front-end speech recognition that inserts text directly into subjective sections of the note. Thanks to templates and speech recognition, physicians were able to leave work earlier with more detailed documentation, and to document higher coding levels—all while eliminating dictation costs.

As reported in the Winter 2004 issue of the Journal of Healthcare Information Management, the change has produced significant savings for Central Utah. The practice estimates it will save $660,000 on transcription costs in 2004, and nearly $5 million over five years. The EHR has also allowed Central Utah Clinic to reduce chart pulls by 40 percent and to improve coding levels thanks to improved documentation practices. The practice is currently building a completely paperless new facility that lacks a chart room. Following these preliminary results, Central Utah Clinic has added additional modules for orders, accessing lab results, prescribing and even capturing charges.

As you can see, the transcription-documentation challenge today goes well beyond the application of transcription management tools that merely automate an inefficient dictation and transcription process. Such solutions only partially address the costs of clinical documentation. But by focusing on physician workflows and how clinical documentation can be aligned with an EHR, healthcare organizations can significantly improve the documentation of clinical encounters, enhancing accuracy and patient safety, and achieving real reductions in the cost of transcription.

STRATEGIES FOR LOADING CONTENT INTO THE EHR

In Chapter Three, we discussed the design and input of EHR clinical content from the physician’s perspective (specifically, pick lists and patient data). Here we will discuss some of the technical aspects of converting existing digital information into the EHR. To begin, consider the following questions: Do you currently capture elements of a patient record electronically? If you do, then do you first review the integrity of the source data to determine if it makes sense to convert it into electronic form? Is your organization interested in reducing chart pulls when the EHR goes live?

If you answered yes to any of these questions, then the electronic components of your source system may be eligible for conversion into the EHR. Conversion automates the
transfer of data from the old system into the EHR, as opposed to physically typing the data into the new system. Converting data from an existing information system to the EHR is usually far more efficient than manually entering it, but be aware that it may impact the usability of the new system.

To determine if pursuing a data-conversion strategy is worthwhile, consider doing the following:

- **Perform a cost/benefit analysis.** If source data exists in electronic format, your organization must determine the cost effectiveness of conversion versus manually entering it into the EHR. A simple analysis would estimate the time it takes to manually enter the data and then prices the time accordingly, taking into consideration possible overtime pay and reductions in revenue due to employees neglecting their current jobs to complete the data entry.

- **Determine how much and what type of data to convert.** Your clinical team can determine the type of data to be converted and decide how far back in time to go in retrieving it. Information on patient medications, for instance, may be needed for the previous year, while six months’ worth of lab results may be enough. The guideline is to choose data that helps your organization make clinical decisions that are medically necessary for continuity of care.

- **Assess the integrity of the source data.** Prior to pursuing a data conversion strategy, consider reviewing the source data to ensure that it’s accurate and up-to-date. Many organizations pursue a clean-up effort to reduce duplicate records and remove inactive entries prior to data conversion.

**Integrating With External Systems**

Connecting your EHR to external information systems such as a practice management system or laboratory often makes it easier to maintain a complete and current patient chart. Once integrated, the external systems can automatically populate the chart with current data that would otherwise have to be manually entered. Typical system integrations include:

- **ADT (Admissions, Discharges and Transfers) information.** Provided by hospitals via a live feed, ADT information can be used to auto-populate the patient list and provide up-to-date information on patient status.

- **Practice Management Systems (PMS).** The PMS provides registration, scheduling and billing information critical for adding or updating demographic, insurance, and appointment information for the patient.

- **Laboratory and radiology data.** Two-way integration allows you to either send outbound radiology and lab orders via the EHR, or receive inbound results that are automatically entered in the patient chart.

- **Transcription suppliers.** Integration can route digital voice files from the EHR’s dictation module directly to the transcription service.

- **PACS systems.** Organizations may choose to integrate with a Picture Archiving and Communication System (PACS) to populate imaging results into the EHR. Integration lets providers view the image side by side with the clinical note.

- **Medical devices.** Many devices can integrate with an EHR. For example, a Welch Allyn device that is used to test blood pressure, temperature, oxygen-saturation and heart rate can electronically share the information with the EHR (or any computer) through a standard interface. This information instantly appears in the appropriate patient’s record for reference by end-users.

- **Patient eHealth systems.** Patient eHealth systems let patients request appointments or prescription renewals, and update registration information over the Internet via secure messaging. Integration captures patient requests (e.g., for medication renewals) and documents the action in the EHR without additional data entry.

The benefits of integrating the EHR with external information systems are clear, but the strategy can also be expensive. Before deciding whether integration with a particular external system makes sense for your organization, run through the following list of questions:

- Is the external source compatible with the EHR?

- Does the external system help provide ease of access to patient data?

- Does the external system provide data that is indispensable to performing patient care?

- What are the costs and financial benefits of building an interface with the external system?

- Are there alternative ways to capture the information, such as manual entry of lab results?

The answers to these questions should make it easy for you to decide on a case-by-case basis whether integration makes sense.

**THE RECAP**

- Going paperless requires careful planning. Begin by determining where the new electronic chart will be physically accessed in your facility.

- Assess individual paper-based workflows carefully to see whether they merit inclusion in the EHR as electronic workflows. Six Sigma principles will
help to understand, document and measure your current processes. This is a good opportunity to examine the efficacy of each workflow, to fix bad processes and design new, improved processes.

- Design the EHR to view documents more efficiently by: minimizing the number of documents a user must access before finding the desired information; identifying the appropriate number of document types to use in storing and retrieving documents within the viewer; label the documents appropriately during the indexing process.

- Reduce the need for paper chart pulls by scanning the entire medical chart into the EHR rather than only certain portions of it.

- Make use of technologies and strategies that will either improve the responsiveness and efficiency of dictation/transcription, combine dictation with other methods to reduce transcription, or eliminate dictation/transcription. These include mobile digital dictation, structured note templates, speech recognition and workflow integration.

- Before deciding whether existing digital data should be converted into the EHR you should determine the cost effectiveness of conversion versus manually entering the data into the new system. Be sure to examine the source data for accuracy.

- Integrating the EHR with external systems (laboratory systems, PACS, etc.) offers advanced functionality but may be expensive. Conduct a separate cost-benefit analysis of each integration before proceeding; you may find that alternative data-capture methods such as data entry are more cost-effective.

### IF YOU HAVE TIME