A Physician's Perspective: Deploying the EMR

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ABSTRACT

This case study presents a collection of thoughts regarding the process of selecting and deploying an electronic medical record (EMR) in a physician's practice. Practical advice and observations are detailed about what was learned and how the practice has benefited.

KEYWORDS

Electronic medical record
Return on investment
Workflow
Ambulatory practice

"W*ith some apprehension after 20 years in a small group, family practice, I reviewed my mid-life circumstances, bucked the trend toward larger and larger corporate medical practice and opened a solo office for the new millennium. My premise was that comprehensive use of an office-based electronic medical record (EMR) linked to an electronic practice management system could provide the cost-effectiveness, accurate documentation, and efficiency I need to offer a viable alternative to bigger group practice."*
    David Smith, MD
    Internal Medicine
    Lynchburg, Virginia

For the past 10 years, the ambulatory market has seen the advent of an elec-tronic medical record more specifically designed for this fast-paced, high-volume environment. There has been an increased number of electronic medical record products that have proliferated over the past five years, and the number of physicians making the decision to pursue this project continues to increase.

While the electronic medical record products continue to be enhanced over time, most notable is the growing wave of physician commitment and adoption that we see around us. Suffice to say, this product has never been about whether it had the best technology or best return on investment. It has really been about touching the core of medicine and needing to be integrated into the very workflow of each physician and the impact of their practice with patients. Until the last year, the amount of technology used by physicians may have been limited in their training period and even more limited in terms of actual component of their medical education. So while medical diagnostic equipment has been readily embraced with all of its collection of patient information, the corollary of this had been missing — the ambulatory electronic medical record.

Perhaps the best way to communicate to physicians across practices and geography is to present the personal and professional journey of one physician who left group practice after 20 years to pursue the goal of adopting and implement-

From the
Physician
Notepad.

Dr. Don Shuwarger, F.A.C.O.G.
Forest Women's Center
(3 physicians, 1 physician assistant, and 1 licensed professional counselor)
EMR in use: 1 year and 8 months
Users to date: All providers and staff

◗ *Question:* What have been the three (3) most significant benefits that you have realized as a practicing physician since the implementation of the electronic medical record? (Note: If you have identified more than three benefits, please do not hesitate to include these.)
◗ *Answer:* The three benefits we have realized include: (a) immediate and universal access to the patient record, (b) no lost charts, and (c) easier and quicker navigation through the patient record to find things such as lab data, pathology, etc.

◗ *Question:* Please comment on whether your patients have expressed any concern regarding your usage of an electronic medical record (positive or negative).
◗ *Answer:* Patients who have expressed an opinion regarding our EMR have been universally positive.

◗ *Question:* In hindsight, were there any issues, concerns, surprises, or challenges that arose during the implementation of the electronic medical record, which others can safeguard against?
◗ *Answer:* During the implementation/adoption phase, there was a greater impact on our "patient per hour" volume than expected for a longer period of time than expected. However, now there is the capacity to see greater numbers of patients per hour due to increased efficiency.

◗ *Question:* To date, have you been documenting information to support a return on investment for the electronic medical record? What are those results?
◗ *Answer:* No.

◗ *Question:* In terms of revenue, has the practice realized any improvement and can you indicate what percentage of revenue improvement has been realized?
◗ *Answer:* I have no data on these items.

ing the concept of automating medical practice through the tool known as the electronic medical record. We hope, by sharing this story, that physicians in both solo and group practices can better map their future toward integrating the electronic medical record into their practice of medicine.

Visualize Practice Workflow

The single area that requires the highest level of attention during the planning and deployment of an electronic medical record is practice workflow. The daily pattern of practice workflow of both physician and other staff members who will utilize the EMR should be thoroughly reviewed and even flowcharted or documented in some manner to facilitate the transition to an automated process.

Thirteen components of daily physician activity were documented for this practice. The relevance of sharing this information for all physicians, regardless of specialty, is to provide a framework for organizing your review into logical, component views. Once this exercise is completed within your own organization, it will help organize your analysis of each internal segment of the daily patient care so that a potential EMR being considered by the practice can be reviewed in the proper context. It is important to remember that the EMR product is only the tool to facilitate the process of patient care; without understanding this process in detail, the transition to automation will be fraught with obstacles and challenges.

For each identified component of clinical workflow, personal observations are included regarding the necessary, corresponding functionality that should be assessed with any EMR products under consideration. While this is a comprehensive listing of functional EMR elements, it in no way represents every potential element of functionality. These were deemed as those of highest priority for consideration in our particular selection process. In addition, it is important to note that an EMR contains other interrelated components that should not be overlooked as components of the broader interaction of patient care. These include electronic messaging, prescription management, other vehicles for data entry (i.e., scanners, voice, PDAs, etc.), and template construction.

The components of clinical workflow in an ambulatory setting follow:

1. Front Sheet/Summary View
2. Printable Chart Summary
3. Chief Complaint (CC)/History of Present Illness (HPI) View
4. Review of Systems (ROS) View
5. Past Medical History (PMH) View
6. Physiologic Data Screen
7. Physical Examination View
8. Assessment/Plan of Care (A&P) View
9. Laboratory View
10. Flowsheet View
11. Demographics View
12. Evaluation and Management (E&M) Coder View
13. Preventive Health Services View

For each of these 13 components, the following lists the specific functional items that a viable EMR must address.

1. Front Sheet/Summary View

The software should have a summary view much like that of a paper chart. The summary view should include a problem list, a medication list, an allergy list and an index of interactions with the patient (office visits, hospital records, outside records received, phone calls, etc.). This view will be used when the physician or care provider needs to refresh their memory prior to a patient encounter and when it is important to find chronologically stored medical information. This is a high-usage area that you and your staff will access constantly, so pay close attention to its design and navigability.

- The lists (i.e., problems, allergy, medication, etc.) should allow for editing so items can be removed with minimal keystrokes.
- Each list should be in an expandable window to promote easy viewing.
- The user should be able to sort each list alphabetically and/or by dragging and dropping items (for instance, you'll want to group related medications together so that one diabetic medication follows another).
- The lists should be linked to other areas of the EMR, including the past medical history area and Assessment and Plan area (A&P). The user should have an option to add an information element to the past medical history or as an assessment and automatically populate the

active problem list in the summary view.

- The problem list should segregate active, ongoing medical problems from short-term, limited problems. (There's nothing worse than having to wade through every ache and pain to find chronic problems.)

2. Printable Chart Summary

Primary care physicians regularly make referrals to physicians and other healthcare providers. Good medical practice includes forwarding a succinct summary of the patient's medical history as well as description of the problem that led to the referral.

- The EMR should easily generate a form letter addressed to a selected healthcare provider selected from a list identified in the system. The letter should include: (1) practice-specific, standard, introductory language, (2) a brief, free-text summary of the referral problem generated by dictation, a voice recognition system, or your own typing, as well as (3) a summarized, active problem list, medication list, allergy list, and past medical history and laboratory data.
- Sometimes a copy of the most recent EMR progress note can be used to provide introductory information to other practitioners, but often it's not ideal.

3. Chief Complaint (CC)/History of Present Illness (HPI) View

There needs to be a format in which the patient's history of present illness is documented. If your office works like mine, before you interact with the patient, an office nurse gathers several pieces of data including vital signs, a brief history, and identification of a chief complaint. The physician can then review the nurse's intake information and expand upon it as you interview the patient.

- There is often some overlap between documentation in the HPI and the Review of Systems (ROS) view. For HCFA documentation purposes, it is important that the EMR lists and counts different elements of the HPI for a condition (onset, duration course, pattern, severity) and allows the user to easily select one or more conditions for which the patient is being followed (hyperten-

sion, congestive heart failure, diabetes, etc.).

- The CC/HPI area should allow point-and-click, table-driven documentation as well as free text input for elements and conditions.
- The EMR should provide an easy-to-edit base list of chief complaints appropriate for primary care (or the specialty of your choice) as well as choices from the active and non-active medical problems already established for this patient. Not all chief complaints match up to ICD-9 coding. As a result, a patient may start an office visit by saying, "I came because I read an article about stroke prevention in the newspaper," and this needs to be documented appropriately.
- Certain responses about symptoms in the HPI screen should populate the ROS area. For instance, the keyword "fever" in HPI documentation should register in the appropriate section of the ROS documentation.

4. Review of Systems (ROS) View

Using this view, doctors and nurses ask standard questions related to the medical problem encountered. If the pick lists are constructed well, almost all of the ROS documentation can be done using point-and-click selection, thus avoiding the need for free text.

- The EMR should allow each practitioner to create and easily select preferred ROS templates for common circumstances such as routine gynecologic care, upper respiratory illness, etc. Templates should be easy to construct. Base templates should be included in the system and may be available by medical specialty (this varies by vendor product).
- ROS lists should be editable spontaneously to include new questions that were not identified during the EMR building phase of implementation for the list. The reverse is also true, that questions can be excluded when it is determined they are not being used in practice.
- ROS data should be recorded in tables from which queries and reports can be generated in the EMR's reporting tool. For instance, you should be able to quickly generate a report listing all patients with hearing loss or headache.

5. Past Medical History (PMH) View

This is a workhorse area for both you and your staff. A good EMR allows extensive point-and-click documentation of the patient's past medical and surgical problems, family history, social history, ongoing medications, immunization history, past procedures history (for instance, cardiac catheterization in 1998), and a list of doctors consulted in the past.

- Customizable pick lists for the PMH medical and surgical history should be creatable from ICD-9 and CPT tables. These lists will be similar to the pick lists used to document in the A&P area.
- Items on the lists should be able to be renamed to avoid cumbersome ICD-9 and CPT descriptions without losing the ability to sort by the underlying ICD-9 or CPT code.
- A good EMR should provide a stock set of pick lists for medical and surgical conditions and procedures consistent with the needs of primary care physicians. It's not fun to start from scratch building custom lists of ICD-9 and CPT codes.
- The pick lists should provide easy access to a larger table of ICD-9 codes. (For instance, when Porphyria is not in your pick list, it should be relatively quick and easy to find it in a complete ICD-9 table and add it to your patient's PMH.)
- Some diagnoses in the PMH should be added to the patient's active problem list in the front sheet summary view, while others should be excluded (hypertension is an ongoing medical problem that should appear in the active problem list; you may not wish to list a resolved pneumothorax in the active problem list).
- Family history should be organizable by family member or by disease.
- Recorded immunization history should be copied into a flowsheet in the flowsheet area, allowing documentation of previous immunizations and prompting new immunizations and updates.

6. Physiologic Data Screen

This view allows entry of vital signs, weights, and other physiologic data.

- Users should be able to customize templates for data entry, depending on patient type. For instance, infants

From the Physician Notepad

In addition to the insight provided by Dr. David S. Smith, we have gathered the thoughts of some physicians in his community that have also chosen to integrate the electronic medical record into their group practices.

Dr. H. C. Eschenroeder, Jr.
Central Virginia Orthopaedics
(5 physicians and 1 physician assistant)
EMR in use: 4 months
Users to date: All physicians

◗ *Question:* What have been the three (3) most significant benefits that you have realized as a practicing physician since the implementation of the electronic medical record? (Note: If you have identified more than three benefits, please do not hesitate to include these.)

◗ *Answer:* I would say that the first most significant benefit has been to achieve standardization of care amongst the physicians in our practice. The second benefit we realized is accessing more readily available information about patients' medications, and a past history that is formatted to make it easy to read. The third benefit that we have realized is the ability to retrieve information about our patients, although we have not used this feature that much yet.

◗ *Question:* Please comment on whether your patients have expressed any concern regarding your usage of an electronic medical record (positive or negative).

◗ *Answer:* All our patients seem interested and view it as an exciting new development.

◗ *Question:* In hindsight, were there any issues, concerns, surprises, or challenges that arose during the implementation of the electronic medical record, which others can safeguard against?

◗ *Answer:* I would just comment that it is a large task and really requires rethinking how we get information as well as how we assess and make plans for patient care. I am, however, excited about its potential to improve our function. We are midway through the implementation process, so I think that there are great benefits that we have not yet realized.

◗ *Question:* To date, have you been documenting information to support a return on investment for the electronic medical record? What are those results?

◗ *Answer:* We have not been documenting financials that would allow us to calculate a return on investment.

◗ *Question:* In terms of revenue, has the practice realized any improvement and can you indicate what percentage of revenue improvement has been realized?

◗ *Answer:* I do not think that we can attribute increased revenue at this point to the use of an electronic medical record.

need head circumference measured, but no blood pressure readings.

- Users should be able to enter certain data more than once without changing screens. For instance, it should be easy to enter multiple blood pressure readings.
- Pick lists should allow scrolling to a number or should default to a number rather than always having to type in the number (for instance 98.6).

- It should be easy to display physiologic data graphically.
- A single click should print out the graphic display (patients really like this).

7. Physical Examination (PE) View
This area is "template heaven." Use this view to efficiently and accurately describe physical findings.

- The EMR should allow point-and-click documentation for most physical findings, but should allow additional free text when needed.
- It should be easy to create and modify templates for different kinds of exams with a selectable subset of templates for organ systems. For instance, a respiratory disease template is used together with a knee exam template when a patient presents with more than one problem.
- There should be an option to use documentation from a previous exam when the exam is unchanged.
- Users should be able to add to an organ system template spontaneously. The system should allow a template to include a combination of terms selected from tables as well as free text expressions. Users should be able to query and report for standard terms contained in the systems base table, but should also be able to query and report for custom terms they have added to these tables.

8. Assessment/Plan of Care (A&P) View
This view includes information that should be visible as the clinician assigns diagnoses and procedures for an office encounter.

- A list of drug allergies, the active problem list, and a list of all active and inactive medications used should be displayed. Diagnoses and medications from these lists should be selectable individually or as a group and dragged and dropped to the A&P area of the office encounter note.
- The EMR should include customizable pick lists of diagnoses, on-site procedures, and off-site procedures like diagnostic x-rays done elsewhere. In addition, there should be a customizable pick list of standard instructions (when to return, when to call, when to come back for lab work). All such lists should be generated from tables that can be queried and reported.
- Clinicians should be able to customize lists so that, for a given diagnosis, there is an associated group of routine procedures (for tonsillitis, a single click should display a list of standard procedures like rapid strep, monospot, etc). For a given laboratory procedure code, lists of diagnosis codes acceptable to HCFA should be accessible

9. Laboratory View

This area displays laboratory data received through an interface from a lab system as well as laboratory data generated in the office.

- There should be three display formats: (1) a last-in, first-out chronological display of test names, with values viewable by clicking on the name, (2) a customizable table view of lab values organized by last-in first-out, and (3) a graphic display of one or more lab results.
- The EMR should inform users when lab results are pending.
- Users should be able to combine lab results done in the office and lab results received from other sources with lab data entered electronically from a reference lab interface.
- The EMR should allow capture of summary information about certain procedures like mammography, PAP smears, etc. either in the lab area or in the PMH area.

10. Flowsheet View

An EMR allows much better application of flowsheets than a paper chart system. Flowsheets allow chronological display of different data sets like immunizations, lab data, preventive health parameters, and disease-specific parameters, and should allow the user to amend the flowsheets as requirements change.

- Flowsheets should be simple to construct and modify. An EMR should accommodate flowsheets designed for use throughout the office and flowsheets designed for individual use.
- Flowsheets should be designed to capture data in tables, from which users can query and report, and from which automatic reminders can be generated. For example, a user should be able to create a flowsheet for diabetic care including regularly scheduled services such as Hemoglobin A1C testing and foot examinations. The user should be able to periodically run a report identifying patients in need of diabetic services and direct communications to them. In addition, when services are needed, a reminder should be provided to EMR users when a patient's chart is opened.

11. Demographics View

Certain information should be visible from any portion of the patient's electronic medical record (name, date of birth, primary insurer, home telephone, etc.). In addition, the EMR should contain a dedicated demographics view where all demographic information is housed.

- Demographic information display should be customizable; each user should have a preferred display format default.
- Demographic information from the office practice management system should populate the EMR. Certain information should be editable in either system, with updated information displayed in the other system (for instance, telephone numbers).

12. Evaluation and Management (E&M) Coder View

In this view, clinicians review completed documentation to establish the appropriate evaluation and management code.

- The coding assistant should automatically indicate whether or not the patient is new.
- The coding assistant should determine the level of the HPI, ROS, and PE based on chart documentation and HCFA criteria
- The coding assistant should provide ready access to reference tables to help determine the severity of illness.
- The coding assistant should show how to code based on time spent counseling the patient.

13. Preventive Health Services View

If there is not a display of preventive health information for each patient at the level of the front sheet view, the EMR should offer a dedicated view of this information. In this view, users should be able to review and add information about necessary preventive health services, based on one or more flowsheets from the flowsheet area.

Other Considerations

Electronic Messaging

- How easily can electronic messages be generated and sent to one or more staff members?
- Can external e-mail be generated from within the EMR?
- Can messages be attached to patient records (so the recipient automatically opens the patient chart) and saved in patient records?
- Can background information messages be attached to key elements of a patient's record like lab results, prescription refills, or scanned documents, without adding this information to the permanent record?
- Can reminders be generated prompting those who open a patient record in the future?

Prescription Management

- When patients call or request on-site for one or more prescriptions to be refilled, the EMR should allow immediate review of the patient's prescription history (drug, dose, schedule, quantity, previous refills).
- The individual recording the patient's request should be able to call up on a template the last refill of a drug and make any requested modifications. The modified template(s) can be sent as an electronic message to the physician, who can review the patient's history, make point-and-click changes to the request, and authorize or reject the refill. The template should show physicians' options in dosage available.
- When prescriptions are generated, a drug interaction warning system should send an automatic message to physicians. The interaction warnings should be customizable.
- The EMR should allow batches of prescription refills to be processed and transmitted within the system. The EMR should allow completed prescription refills to be faxed as a group to pharmacies.

Reporting Capability

- Reporting should be comprehensive, customizable, easy to structure, and fast.
- The capability to recall patients and improve compliance is a very valuable aspect of a good EMR, both for financial reasons and quality improvement.
- Establish what data the EMR records in tables from which queries, and reports can be generated. The most important data are diagnoses and procedure codes, lab values, and categorized patient instructions. The

From the **Physician** Notepad...

Dr. Ron Fisher
Seven Hills Urology Center, Inc.
(6 physicians, 1 clinical nurse specialist)
EMR in use: 10 months
Users to date: 4 physicians and clinical nurse specialist

◗ *Question:* What have been the three (3) most significant benefits that you have realized as a practicing physician since the implementation of the electronic medical record? (Note: If you have identified more than three benefits, please do not hesitate to include these.)
◗ *Answer:* The three most significant benefits that I have realized since implementing the electronic medical record have been: (1) continuous availability of the patient's chart and reduction of paperwork; (2) immediate retrieval of patient's medical history, medications, and allergies; and (3) ability to electronically transmit information in the form of prescriptions to pharmacies, correspondence to other physician offices, etc.

◗ *Question:* Please comment on whether your patients have expressed any concern regarding your usage of an electronic medical record (positive or negative).
◗ *Answer:* Patients have made very few comments regarding electronic medical record. Comments that have been received have been very favorable. Most patients seem to be impressed that we are embracing the new technology and they view this as doctors "keeping with the times."

◗ *Question:* In hindsight, were there any issues, concerns, surprises, or challenges that arose during the implementation of the electronic medical record, which others can safeguard against?
◗ *Answer:* I would say the biggest issue and concern about implementing electronic medical record is the difficulty in the startup process. Any practice needs to be prepared to increase their costs in implementing the system. It is also a very gradual process in which the chart can become a complete electronic medical record and take the place of a paper chart. One exception would be if you made a huge financial and staffing commitment to make that transition immediate. Our financial commitment has been large, but I think with a larger initial outlay, the transition can be quicker.

◗ *Question:* To date, have you been documenting information to support a return on investment for the electronic medical record? What are those results?
◗ *Answer:* We have been utilizing the electronic medical record now for approximately 10 months. We have been trying to follow our expenses to help us see our return on our investment. One of the biggest costs that we have been tracking has been transcription costs, which actually increased initially and now are decreasing. I would say other administration costs have actually increased in this short-term implementation, but we expect some of these to reverse.

◗ *Question:* In terms of revenue, has the practice realized any improvement and can you indicate what percentage of revenue improvement has been realized?
◗ *Answer:* It is too early to tell if there has been any revenue improvement by the system.

EMR should be able to profile patients by any combination of diagnosis, procedure code (including E&M codes), and patient instruction. For example, an EMR should be able to identify all diabetic patients who have not had an office visit within three months if they were instructed to return then. Further, the EMR should be able to identify all diabetic patients who have not had a Hemoglobin A1C test within three months.

Standard Information
• The EMR should be able to insert standard language into patient records (procedure notes, descriptive phrases customized by the physician, etc.).
• The EMR should allow importation of text files and images from outside sources. For instance, patient educational material should be importable from Word files you can edit as desired.

• The EMR should be able to generate addressed form letters or electronic messages to patients and referring physicians, including a combination of standard language and elements of the patient record like lab results, diagnosis, and medication lists.

External Data Entry by Scanner or Voice
• Review the data entry process for scanning information into the EMR. Can multiple pages of information be added at one time? Can the images be modified (enlarged, contrast adjusted, rotated) for optimal viewing in the EMR? How many keystrokes are required to complete scanning and filing of an image?
• How and where are scanned images named and filed in the EMR? Can documents be given customized names? Can folders and subfolders of scanned documents be created?

Template and List Construction
• What components of the EMR use templates and lists (for instance, ROS, physical exam, physiologic data, assessment and plan)?
• How easily can the lists and templates be built and modified by physicians and office staff? For instance, how easy is it to organize and amend a customized pick list of 5-digit ICD-9 codes sorted by organ system for use in the A&P documentation area? How easy is it to modify a template for a routine gynecological examination or for a respiratory review of systems?
• When custom lists are built, what base tables support the process? Is there a comprehensive list of diagnosis codes, chief complaints, medications, etc., from which to select? Can a selection be added to a base table, allowing it to be queried and reported like the other selections in the table?
• Can lists and templates be shared by different users?
• What pre-constructed lists and templates are available through the EMR vendor? How specific are they to your area of medicine?

Shopping Tips
Since the selection process for information systems and technology is very well documented throughout the literature, the thoughts identified below are

those that require special attention during this turbulent time in the marketplace. The major phases of the selection process when shopping for your EMR include:

- Vendor and proposed product information
- Standards and integration strategy
- Site visit
- Additional vendor review for finalist(s)
- Contract negotiations

For each category, we are sharing those questions that were most pertinent to really understanding products at both the broader strategic level and the functional, tactical level.

Vendor and Proposed Product Information.

- How large is the company, and where is it located? Being within driving distance of the company can offer some advantages with regard to hardware support and training.
- What is the company's track record (how many installs and where, what kind of offices, what size offices, specialties that have implemented)?
- How old is the company and is it privately or publicly held?
- Is their ambulatory EMR the company's primary product?
- Did the company develop or acquire the code for the proposed product?

Standards and Integration Strategy.

Today's standard for office applications is Microsoft Office, with Word, Excel, Access, PowerPoint, and Outlook. Current EMR software should operate in Windows NT or Windows 2000 and should allow network users to employ Microsoft Office applications through a file server. Pay attention to the compatibility of the EMR (and practice management software) with Office applications.

- Can Word documents be imported into the EMR?
- Does Microsoft Outlook scheduling and messaging relate to the EMR?
- Can Microsoft Access tables be used to populate the EMR, for instance, listing referral physician demographic information?
- If the EMR product is from a vendor other than the existing practice management product, what is their

experience with interfacing the two products? Call these references and understand what their experience has been to date. What tool, if any, is used to interface the two (i.e., is an interface engine used to facilitate the interfaces between these information systems)?

- If the vendor has no experience with interfacing to your practice management product, have they interfaced to any other similar products? What is the experience for these clients?
- What safeguards and remedies will be put in writing (i.e., contractual commitment) to ensure any required interfacing required between an EMR and the practice management product?

Site Visit.

After you have seen a demonstration of the EMR by a sales representative, arrange for a site visit where the EMR is being used. There is great value to investing in a site visit, but the preparation for it and a clear understanding of the objectives to be achieved by it are key.

- Ensure that you understand the business characteristics of this client (i.e., number of practitioners, the number of EMR modules in production, the length of time the product has been deployed, and whether the ambulatory practice has all clinical users live on the product at this point in time).
- If possible, meet with office representatives at the site without having the vendor sales representative present.
- In addition to reviewing the functionality of the software, pay particular attention to the performance of the system (how long between screens?) and the stability of the system. Does the office complain about down time and system crashes?
- After the site visit, meet with the sales representative and review the product again in more detail and address any items that were brought to your attention through the site visit, reference calls, or further review of information gathered to date.

Additional Vendor Review for Finalist(s).

If you are seriously interested, visit a vendor's corporate facility and

meet the development staff, training staff, in-house clinical advisors, and hardware people. If you are not technically oriented, find someone to accompany you who understands network and hardware issues.

- When you have received a hardware/software proposal from the company, arrange to discuss hardware recommendations with their technical staff as well as the sales representative.
- Be sure you have reviewed recommendations for servers, scanners, and wireless devices with hardware representatives who understand your office requirements.
- Be clear about network proposals (for instance, will the network be set up in thin client or fat client configuration?).
- How web-enabled is the system? Is the system HLA-7 compliant?
- Does the system allow asynchronous communications with personal digital assistants like Palm Pilots?
- How can the system be accessed remotely and at what expense?
- How open is the architecture of the system?
- What underlying database structure is used?

Contract Negotiations.

If you progress to contract negotiations:

- Be sure you understand what off-site and on-site service is provided under contract and how much it costs.
- What training will be provided? (Request detailed information for both the implementation period and any post-implementation audit option.)
- Does the vendor provide assistance in managing your local network beyond use of its software?
- Does the vendor recommend you have local hardware support in addition to the vendor's services?
- In an era when technology firms are evolving so rapidly, does the contract offer you any recourse if the EMR product is sunsetted? What provisions are in place to protect you if the company is bought out?
- Is the contract clear about ownership of the data contained within your EMR?
- If interfaces are required between the EMR and another software com-

Debunking the Myths

For some ambulatory practices and physicians, there are still serious concerns that prevent the acquisition of an electronic medical record.

Myth: I will wait until the product with all our requirements is released.
Reality: There will always be products with some elements of functionality missing but, by and large, the existing products can neatly address the majority of relevant issues related to documenting ambulatory patient care.

Myth: A product must be easy enough to learn in five minutes.
Reality: Some products are more intuitive that others, so that cursory learning can be completed in a few minutes. The overall understanding and facility with the new clinical practice tool, the EMR, will take two to six months or more to master and really integrate into all aspects of a practice's workflow. The rate of learning varies by physician or staff member. This needs to be factored into the major impact that the practice will undergo with this particular type of information system. It is meant to be integrated into clinical practice, so mastery will obviously require effort, practice, and growing knowledge that is always related to time and rate of learning.

Myth: The EMR product will improve practice operations within a short period of time.
Reality: This can only be true if the primary project designers understand the workflow as it is today and initiate a change in policies and procedures that will directly support usage of the EMR. Products overlaid onto existing chaotic environments that are inappropriately documented can never lead to success.

Myth: There must be a return on investment fairly immediately.
Reality: Most practices that have successfully implemented an EMR can confirm that revenues may be impacted for two to three months upon switching to an EMR, since patient schedules are reduced to ensure that physicians can take the necessary time to input their clinical documentation. All of this is dependent on the level of automation to be completed relating to patient care. Anecdotal evidence from other practices indicate that revenue increases realized over time can range from 25 to 40 percent within the first year. This requires adherence and compliance to the automation of processes and eliminating redundant or inadequate policies and procedures.

Myth: There is not that much effort required to deploy an EMR.
Reality: Without any question, the enormity of integrating an EMR into clinical practice cannot be underestimated. The most successful implementations result from an understanding that additional cost and labor would be required from all involved parties to make this tool ubiquitous in their environments. Compliance by all physicians is also a critical element to transitioning away from the paper-laden current state. One physician, who shared his story at a workshop, indicated that one of the group's physicians was asked to leave when, after the implementation was initiated, he refused to learn and participate in the EMR deployment.

pany, such as a practice management system or a lab system, which party is responsible and what guarantees are in place? Are interfaces two-way or one-way?

Words of Wisdom for Physicians Who Are Contemplating Their EMR Strategy

This article represents one physician's viewpoint, but comments were also solicited from other colleagues who have taken on the EMR as an integral strategy for the delivery of patient care. A few

very specific thoughts from this EMR implementation immediately follow. Then three physicians have graciously shared their thoughts in the hope that this information might assist other colleagues during their EMR efforts.

There is no doubt that it would have been very helpful to have a basic education in managing and administering a Windows NT local area network. My office lacked expertise in setting up the levels of security, configuring Microsoft Outlook, and installing a firewall for our Internet connection. In retrospect, it

would have been beneficial to have provided my office manager (and myself) the right introductory course work about network management. After shopping around, an excellent local company was identified to provide additional LAN expertise for the practice's non-EMR applications. If you plan to use your network and server for much beside your EMR application, be sure to find the necessary local expertise. As with all things technical, it is important to honestly assess whether this becomes an "in-house" skill set or whether it is more economical to contract for these services.

While our typing skills were reasonably sound, daily usage of the EMR has pointed out user limitations. Certainly watching how fast my teenagers send electronic mail messages, the stark realization came to light that there is no substitute for developing better typing skills. While there is not continuous typing required with our EMR, there are a number of necessary tasks that would enhance the amount of automation across all the practice. As a result, an off- the-shelf typing program was selected and 15 minutes per day has been allocated. There is a noticeable difference with this one action. Until voice recognition is more reliable, we all need to use the keyboard, when necessary, in a more effective manner. It's just as important as learning to suture! Too often the updating of existing skills is ignored, yet with a simple education strategy, the remedies are quick and valuable.

The transition from a paper-based environment, including the all-pervasive sticky note culture, has taken a little time. The office staff has accepted the challenge of using the electronic messaging system creatively to get the job done efficiently and well. There are still times when a paper note gets stuck on the front of my PC, but the number of these notes has significantly dwindled and it is typically only an urgent message that breaks this policy.

While it does take slightly longer to document certain parts of our patients' records electronically, the realization is apparent that we save a large amount of both physician and staff time to perform the myriad of daily tasks such as locating medical records instantaneously, refilling prescriptions quickly, and messaging efficiently. By virtue of the gained efficiency, it is affordable for a

physician to interact a little slower than with a pure transcription system, especially since the documentation is so thorough and complete.

The secret to our success in the EMR implementation is directly related to our controllable environment. The complexity of installing an EMR increases exponentially as the size of the ambulatory practice increases. If a larger office is going to tackle a rapid conversion to full-scale electronic documentation, there is much to be said in favor of assembling a small, fully committed group of both front and back office personnel, championed by one or two physicians, to share the responsibility and obligation to pilot the software prior to universal practice usage.

As an alternative, some practices might consider components of an EMR for implementation throughout an office (for instance, prescription management) without undertaking a complete EMR conversion. It is, however, important to note that the overall strategy toward an EMR should be considered so that there are not false expectations of purchasing multiple products from a variety of ven-

dor with the eventual hope of patching them together to yield a cohesive patient documentation system. Some of these purchases may constitute temporary solutions that may or may not be maintained long term if the practice moves forward toward a comprehensive EMR solution.

Overall the office staff has been very enthusiastic and cooperative in adapting to our electronic environment and this is truly the single most important contribution to our success. In this same vein, it is important to expect that use of an EMR will change the makeup of your office staff since previous tasks such as pulling and filing charts, transcription, etc., will be made obsolete. One strategy to address this evolving need for skill sets is to ensure that your personnel are cross-trained and ready and willing to assume other responsibilities in the medical practice of tomorrow.

Conclusion

While current statistics show that only three to five percent of ambulatory practices have undertaken implementation of an electronic medical record, the person-

al experience shared in this article points to the fact that even a single practitioner can successfully implement it and integrate it into practice. The possibilities of improving practice through this tool are many, and the single key is to know those clinical processes that define your practice. That exercise creates the framework on which the selection process is based. There is no doubt that an electronic medical record requires dedicated attention, staffing, and commitment during the preparation and actual implementation phases. In addition, there is no substitute for physician involvement and representation in these early stages of the project, as well as on an ongoing basis for the life of this tool. As in everything in our profession, you will reap what you sow and success is possible today.

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