A. Overview:

The great visionary of health informatics, Lawrence Weed, M.D., first offered the remedy to these problems about 35 years ago in his computerized problem-oriented medical record. Some 25 years later, the Institute of Medicine's (IOM's) study, "Computer-based Patient Record Systems--The Essential Technology for Health Care," depicted a computer-based, longitudinal, lifelong, integrated patient record that included entries from all healthcare providers.

By 1995, however, most people recognized the discrepancy between the vision and the reality. Standards, workflow and user habits as well as technologies weren't ready for the grand vision originally put forth. Most of all, making a good-business case for EMRs was difficult. Practitioners could not be convinced to use computers in the exam room when costs, training and necessary system changes were difficult to justify. Hopes for many of the hyped new technologies, such as speech recognition and community health information networks, fizzled while traditional information systems grew enormously. For example, during the past decade, transcription services grew to an estimated $35 billion industry, involving 250,000 to 300,000 medical transcriptions.

As mentioned previously, the ability to document the quality of care being provided is crucial in today's environment. It is intuitive that a legible, well-formatted note makes caring for patients easier and more efficient for all involved. Few physicians, however, make the time to organize a chart. An electronic medical record (EMR) can facilitate this function. EMRs for office-based physician office offer a broad spectrum of functionality. At one end of the spectrum is a system akin to a typewritten chart. All the information is present as "text" with almost no structure and no ability for the computer to understand or take advantage of the information present. Some medical record systems can scan written documents, whereas others work with a dictation system or even a voice-recognition system to capture the information. The main advantages to this type of system are ease of use and cost. Few changes to the current work flow in the office are necessary, and the price of the system is less than the cost of more interactive systems.
B. Components of an EMR

The basic sections of this kind of EMR are the diagnosis/problem list, progress notes, medications, allergies, procedure notes, health maintenance or reminders, and the flow sheet. Each of these is discussed individually.

Problem Lists

The problem list, progress note, and encounter form should be integrated. One of the most tedious chores in a medical office is the completion of various forms. Often the information needed is organized in different formats. A good medical record system should allow the user to enter the information only once and still be able to complete multiple forms.

For example, when entering the patient's diagnosis for the first time, the system should provide an appropriate list of terms for the problem list. This should then automatically generate the appropriate billing or encounter form.

Most payers require the use of ICD-9-CM codes for the diagnosis and CPT-4 codes for the billable procedure. Because many physician office problems and diagnoses do not fit easily into the ICD-9 vocabulary, it is important to be able to change the description of the term while still allowing the correct code to be passed to the payer's form. An example of this, code 816 "fracture of one or more phalanges of hand," is not specific enough for a chart note and should be changed to "fracture of left first phalange." This change allows the correct billable code to be submitted while maintaining physician office relevancy. Similarly, when seeing a patient with a known chronic diagnosis, the problem should already be present as the default entry to save time and decrease errors.

Progress Notes

Including a list of all of the pertinent physician office aspects related to a particular diagnosis or problem in a template can improve both the rate at which an encounter is recorded and the quality of information recorded for the visit. An example of this may be a template used for sinusitis that includes questions concerning length, duration, and location of the pain; fever; chills; associated nausea; and physical examination findings such as nasal discharge, pharyngeal changes, and visual changes.
Documenting a thorough physical examination using a template contributes to a more complete legal document. Some medical liability companies offer 5% to 15% discounts on malpractice premiums for those practices that use these types of systems.

Additionally, many payers, including Medicare/Medicaid, require written justification for the level of care that is billed. An electronic chart template can be created so that all levels of visits have the requisite information recorded to justify the bill and may be tailored to each type of case.

An excellent study by Tierney and coworkers showed that when physicians were shown the cost of medications, they changed their prescribing habits without adversely affecting patient outcome. The prescription writer can be a significant time saver for the office. Because the medication history is maintained in the database, there is no need to write on duplicate prescription pads, and refills become significantly faster. At present, most states do not allow physicians to send a prescription to the pharmacist electronically; however, this is changing. Some drug store chains are now accepting an electronic order, although they still require the actual signed prescription before distributing the medication to the patient. This expedites the process considerably for the physician and is more convenient for the patient. There are regulatory changes in a number of states that will soon allow the prescription to be sent electronically.

**Medications**

A significant number of hospitalizations occur each year because of adverse drug reactions that could have been avoided. To help avoid adverse drug reactions, the EMR should include a prescription writer and a drug interaction checker, which includes a complete list of all medications available within the United States. In certain circumstances, a complete international list of medications may be needed. The drug interaction component should check drug-drug and drug-allergy interactions and provide the appropriate support information.

There are also a number of stand-alone drug information and drug interaction software applications. These programs have drug information on thousands of medications, and all have some form of drug interaction checking. Although they all have benefits, it is important to realize that the quality and quantity of information vary. Some programs have only information supplied from the manufacturer; others have Food and Drug Administration-approved indications, and the remaining include off-label indications as well. In addition, many include only prescription drug information exclusive of drug interactions with many
commonly used over-the-counter medications. Therefore, the needs of the practices must be considered when selecting a system.

Procedure Note

There are many practices that perform procedures in their office such as flexible sigmoidoscopy, colonoscopy, and removal of skin lesions. Because these are performed using a standard protocol, a template can be designed and placed in the computer record. This saves physicians time and decreases word processing for the office staff. There can be adequate flexibility in the template so that the form can be modified for any unusual physician office situation.

The EHR has different looks and views depending on who you ask. Based on the AC Group, the majority of the EHR vendors selected for detail review provide functionality in the following categories:

- Access to Local and Remote Information
- Alerts and Decision Support
- Authorized User Access
- Basic Functional Overview
- Billing, Charge Capture and Correct Coding
- Checks for E&M Compliance and Provides Required Documentation
- Clinical Data Repository
- Cost Measuring/Quality Assurance
- Dictations
- Document management
- Documentation
- Documents Clinical Reasoning and Rationale
- Drug Reference
- Electronic prescription writing
- Electronic Prescriptions
- EHR Functionality
- Ergonomic Presentation
- Facilitates Clinical Problem Solving
- Guarantees Confidentiality, Privacy and Audit Trails
- Input Mechanisms
- Integration and Interfacing
- Intelligently Supports Delivery of Care
- Internet access
- Laboratory data
- Links with Other Patient Records
- Measures Health Status and Functional Levels
- Medications
- Orders and Results
- Patient Education
- Patient Information Tracking
- Patient Self Management
- Patient tracking
- Problem Lists
- Procedure Notes
- Progress Notes
- Provider User Interface and Administrative Tools
- Provides Longitudinal and Timely Linkages with Other Pertinent Records
- Provides Problem Lists
- Receiving Alerts
- Renewing Prescriptions
- Reporting
- Reviewing Lab Data
- Security
- Simple organizational tasks
- Specialty Functionality
- Supports Automated History and Physical (H & P)
- Supports Direct Entry by Physicians
- Supports Existing/Evolving Clinical Specialty Needs
- Supports Icon Generated Text
- Supports Multimedia/Image Data Storage
- Supports Multiple Controlled Vocabularies and Coding Structures
- Supports Multiple Formulary Lists
Chapter 7
AC Group’s 2006 Annual Report
The Digital Medical Office of the Future
Level 5 – Electronic Medical Record

• Supports Multiple PMS/EDI Financial Links
• Supports Simultaneous User Views in the EHR
• System Architecture

Health Maintenance Reminders

The EHR should provide you a wide range of opportunities to enhance your practice’s health maintenance efforts. Because you can customize templates and create reports to assess areas of importance to your practice (such as comprehensive compliance with pediatric immunization recommendations or adherence to cardiology or cancer screening guidelines), you can subsequently develop programs to improve efforts and outcomes.

A flexible EHR application captures important data about each patient and can be customized to trigger alerts when preventive or maintenance visits are due. You can generate reports and assign staff to call patients for scheduling or you can use the system’s automatic document generation and e-mail reminder features.

You can also rely on an EHR to provide you with alternatives for patients who avoid specific health maintenance activities. When emerging therapies or approaches become available, you can identify patients who might be prime candidates. For instance, patients who refuse to undergo traditional endoscopies for cancer screening could be contacted when capsule endoscopies are introduced.

Fax Manager

Fax Manager increases efficiency and accuracy when information is shared between internal and external providers. The referral template compiles select information from the patient’s electronic record and faxes it directly to another care-giver — such as another physician for a referral, consultation, or transfer of care; a lab; a pharmacist; or a payer.

This ensures that all relevant information will be transferred accurately, eliminating the risk of losing documents during delivery or in the mail, of errors being made when information is re-keyed into another system, or that handwriting or other transcription errors could result in ineffective or compromised care.

Voice Recognition

Besides using the electronic templates, an EHR should allow physicians to input data using voice recognition software. For those in your practice who might have less experience with technology, voice recognition can help ease the transition to computer literacy and promote support for adopting the EMR. With voice recognition technology, physicians can speak into a microphone connected to (or built into) the workstation. Progress notes,
letters to physician colleagues, and other documents can be entered verbally, with words automatically converted to text or action by the EHR.

**Patient Education**

As patients become better consumers of healthcare and play a more active role in maintaining wellness, patient education is of paramount importance. The EHR should provide a patient education module that supports you in this effort. Numerous vendors have more than 4,000 healthcare advisories and reference handouts housed in their data banks.

Physicians and other caregivers should be able to select specific materials within the system to customize education packets for each patient, ensuring that individuals receive information addressing their unique conditions and treatment options. The software generating the materials should be easy to use (benefiting your staff) and the materials should be easy to understand (benefiting your patients) and in multi languages. The breadth of information available through an EHR’s patient education module promotes successful patient outcomes and improves compliance by helping patients to comprehend and remember care instructions.

**Follow-up and Recalls**

Very few episodes of care end when the patient leaves the exam room. Many times, patients are given instructions for ongoing treatment of a disease or condition or receive orders for further diagnostic tests. Even when an appointment is a discrete event, health maintenance and preventive care protocols eventually require a return visit. An EHR should record follow-up recommendations and ongoing treatment requirements with just a few keystrokes. Once in the system, the information should be readily available to support staff, which can generate reports about which patients need follow-up appointments and additional testing.

This module should also be able to generate automatic recall lists and should allow prompting to generate reminder letters or postcards. Not only do these activities allow you to develop robust and responsive disease management and health maintenance programs for enhanced patient care outcomes, they help your practice generate revenue that might be lost when follow-up care is neglected or appointments are missed.

**How is a progress note created?**

- **Physician office Templates**: These represent pre-formatted progress notes that provide a standard protocol for documenting specific conditions. They allow for "point and click" entry or keyboard entry based on possible conditions that might be observed for a given patient. Templates represent a direct entry mode in which data is entered directly by the physician into the computer. Additionally, some application includes insert codes that automatically pull data from other parts of the chart (i.e. medication list, allergies, social & family history,
problem list, etc.) into the current progress note. The overriding design philosophy is to allow physicians to focus on data selection as opposed to data creation.

- **Dictation:** Many physicians, even after successful transition to the EMR, continue to prefer the familiarity of dictation as a means of creating progress notes. The benefit of transcription is that it allows physicians who are reluctant or uncomfortable with direct entry to fully embrace the EMR. A unique feature of an EMR is that the transcribed note automatically updates all of the relevant portions of the chart, such as medication lists, problem lists, vital signs, lab results, and allergies, from the data included in the progress note. In contrast, many systems store transcribed notes as a block of text without import or export of data items contained within the note.

- **Voice Recognition:** Voice recognition offers the promise of reducing the need for keyboard entry while providing a cost effective alternative to traditional transcription. Recent advances make voice recognition a viable means of data entry for certain practitioners.

**How secure is the EMR?**

EMR security is ensured by network access limitations and EMR access levels once individuals are logged on. An EMR system should offer highly granular security, allowing system administrators to define access and privileges according to the respective roles of the office staff. For instance, most EMR’s provide very detailed security and privilege levels, defining specific viewing, data entry, editing, and a myriad of other rights on an individual by individual basis.

**Is the record legally valid?**

Yes, the EMR offers a complete, medically legal record with an audit trail, allowing practices to track all changes to any textual record (progress notes and other physician office documents). This ensures document integrity within the organization and validates the record for medical legal purposes.

**Can a Physician’s office really go Paperless?** Going paperless is a step-by-step process that involves the following elements:

- **Utilizing the EMR as the primary means of physician office documentation.** Progress notes, prescriptions, vital signs, nurses’ notes, and all other handwritten or transcribed documentation should be entered into the EMR.
• **Establishing interfaces (particularly lab and dictation).** Interfaces allow information from either physician office or administrative sources to be loaded directly into the electronic medical record. This eliminates the need for manual entry of these values.

• **Establishing scanning protocols.** Some relevant physician office documentation will arrive via paper. These documents can be scanned and converted to text (using optical character recognition software) and then loaded into the chart. Companies like AIC (http://www.aicsoft.com) sites are careful to scan only those documents which are considered essential to the record.

• **Using physician office tools that support a paperless environment.** For instance, PC-based 12 lead ECG machines are available that can display, store, and interpret a patient's heart rhythm on a computer. This eliminates the need for scanning or storing paper ECG readouts and provides universal access to historical ECGs.

• **Retiring your existing charts in a steady and methodical fashion.** It is not necessary or practical to eliminate your paper charts from day one. Successful customers have tackled the transition by:
  - **summarizing the salient points of the paper chart for entry into the EMR.** This typically includes problem lists, allergies, current medications, selective lab results, and the most recent progress note. These summaries can either be transcribed and then downloaded into the chart or entered into the chart directly as you summarize.
  - **being selective about which charts to summarize.** Some physician offices will summarize the paper charts as patients make appointments. Others will select their high frequency patients. In either case, it is a methodical process accomplished over a period of 6 to 12 months, depending on patient volume. The summarized paper charts are then typically archived off site.

**How does the EMR interact with billing and scheduling products?**

If your practice currently has an existing medical billing and appointment scheduling functionality that is satisfactory, the EMR will function side by side with these applications. Ideally, an interface will be established between the existing practice management software and the EMR to transfer patient demographics. This process then creates electronic charts within the EMR that are ready for entry of physician office information. For new practices, or practices that are discontinuing use of their billing software, there is some advantage to integrated systems: software that includes billing, scheduling, and the EMR from the same vendor. These systems typically offer greater transfer of information between applications and also help simplify support and training.
C. Effects of Patient Documentation on Health Care

Traditionally, healthcare documentation’s primary role was to support an individual practitioner’s memory regarding a patient. In modern healthcare systems, the primary role has changed from being an “aide memoire” to a tool for sharing and interacting. The importance of high quality patient care documentation becomes increasingly evident when we consider the impact of poor quality documentation on five major areas of health care:

Public Safety

Public safety, as a component of public health issues, is diminished by the inability to collect information in a coordinated, timely manner at the provider/practitioner level in response to emerging epidemics and the threat of bioterrorism. While there are reports of public health departments and other organizations beginning to address these issues, insufficient attention is being paid to the collection of information at the emergency department and provider/practitioner level. A public safety system can only be effectively implemented when such information is captured accurately in digital format and then can be distributed to and managed by public health centers (regional, state, or national) within seconds or minutes. This requires:

- A consensus on the means by which to achieve timely, point-of-care capture of relevant information that can indicate an epidemic outbreak or a bioterrorism attack.
- Identification of specific information sets that can alert public health authorities of a threat.
- Rapid adoption of documentation methods that allow electronic capture and dissemination of relevant information.
- Creation of an information infrastructure that:
  - Involves all emergency departments and practitioners from whom such information is to be collected.
  - Transmits such information electronically and securely to the relevant public health centers.
  - Has adequate funding, including appropriate computer systems for practitioners who will have to collect and report data.

The concern for public health in cases of epidemic outbreaks or as a response to terrorism requires use of the “Essential Principles of Healthcare Documentation” at the provider level. While appropriate considerations are under way to improve the public health infrastructure at the state and federal levels, immediate consideration should be given to the healthcare provider’s setting as well. Information must be captured and reported in a timely manner. Appropriate data sets should be identified, and means of electronic communications must be developed and implemented. Without systems in place that adhere to the “Essential Principles of Healthcare Documentation,” delays and errors in communicating information important to public safety may occur. For example:
Without electronic methods, such information cannot be collected in a timely manner. Transmitting handwritten information via facsimile, for example, would be cumbersome and ineffective.

Without unique patient identification, the same patient may be reported more than once to public health authorities.

Without interoperable systems, data cannot be readily integrated and indications of epidemic outbreaks may be delayed or missed.

Threats to public health cannot be accurately interpreted if information is not accurate or timely.

Time-, date-, and place-stamps are essential in reporting information to public health authorities in order to establish and evaluate patterns related to either epidemics or bioterrorism.

Information reported to public health authorities must have the source clearly identified, must be authenticated, and must be auditable if the information is to be trusted.

Even in cases of public health threats, a patient’s rights to confidentiality and security must remain of high concern at all levels, with exceptions, if any, properly authorized and recorded. A widespread public debate is needed about the extent to which reporting is necessary, with due consideration given to patient privacy.

It must be recognized that providers have few incentives to spend resources for public health information. National legislation or regulations must be established that will mandate (with funding) that information for public safety be electronically captured at the practitioner/provider level and communicated to the appropriate public health database(s).

### Continuity of Patient Care

Continuity of patient care, a highly desirable objective for quality health care from all perspectives, can be compromised because of the inability of providers to obtain timely and shareable patient information. Traditionally, providers have relied primarily upon the documentation they create for their own patients. To achieve continuity of care, the patient’s health information must be shared among various authorized practitioners within the same organization and across healthcare systems. However, current systems lack the secure interoperability necessary for sharing this information.

This is due to many factors, including poor information capture and report generation methods, technical incompatibility, and differences in terminology. The goal must be to create full interoperability that facilitates the integration of information across systems. Examples of how poor healthcare documentation affects continuity of care include:

- Multiple providers may order the same tests if they do not know what has already been done.
• Physicians may prescribe medications that cause adverse reactions with other medications that the patient has neglected to mention or doesn’t think are important to report to the second physician.

• If the practitioner does not complete transcribed documents in which the transcriptionists left blanks, the report may lack important information for subsequent users.

• When information is not recorded in a timely manner, it is not available for subsequent users.

• When unauthenticated information is read, the provider may inappropriately rely on it—or not rely on it—to the patient’s detriment.

• If patient confidentiality is violated, the patient may be harmed and/or may subsequently withhold information that is crucial to future diagnosis and treatment decisions.

The IOM has described a vision of the computer-based patient record (CPR) that would capture information related to all medical care provided to a patient. While interoperability problems prohibit realistic implementation of this vision in the near future, the goal of continuity remains a key element for better quality health care, higher efficiency, and improved economics. Uniform documentation is one of the milestones toward achieving interoperability among healthcare information systems.

To improve continuity of care, there must be:

• Universal guidelines and standards for healthcare documentation that enable interoperability.

• The creation and mandated adoption of a Discharge Care Plan for ambulatory and acute care, providing a summary of care given to a patient in a specific provider setting and combining it with a recommended care plan that can be easily accessed when the patient is seen by a new provider.

• Development of positive incentives, legislation, or other mandates to effect these changes.

Healthcare Economics

Healthcare economics are adversely affected by poor documentation quality. In the United States alone, the cost of information capture and report generation is estimated to be over $50 billion annually. A significant portion of this cost is likely due to inefficiencies. In the United States, reimbursement requirements have influenced what is documented and how it is documented. Poor documentation and administrative inefficiencies can result as payers and providers spend excessive time communicating what is needed to justify reimbursements.

It should be emphasized that decisions based on the cost at the point of care (POC) may stimulate increased overall cost. For example, what may seem to be economical to a practitioner, such as handwriting, can result in substantial costs because information cannot be shared or integrated into a system, potentially resulting in medical errors or in additional costs for repeated tests.
Other examples of how costs can increase when documentation methods do not adequately meet the “Essential Principles of Healthcare Documentation” are:

1. **Accuracy**: High costs may occur in remedying situations where incorrect data leads to incorrect treatment with adverse effects (e.g., writing 1.0 mg of a medication and having it interpreted as 10 mg).
2. **Completeness**: Missing information due to incomplete recording (e.g., not recording a patient’s blood pressure) or insufficient data availability can result in higher costs if inappropriate treatment is given as a result.
3. **Timeliness**: When information is not recorded in a timely manner, tests and procedures may be repeated, resulting in duplicate costs. Additionally, valuable time may be lost, delaying treatment.
4. **Interoperability**: Patients receiving care at emergency departments and specialists’ offices often receive duplicative tests (e.g., x-rays for fractures) that could be avoided if test results from other locations were made available.
5. **Retrievability**: When free text is used and there is excessive documentation, practitioners often cannot find the relevant information within the reams of paper or the many screens of data available to them. In such cases, the cost of excessive free-text recording can be substantial.
6. **Authentication and accountability**: When information is not authenticated, its source may be questioned, leading the next provider to duplicate processes, tests, and procedures, resulting in duplicate costs as well.
7. **Confidentiality and security**: Breaches of confidentiality and security can be costly to the caregiver as well as to the healthcare institution in the form of legal costs and monetary penalties as well as the public’s loss of confidence in them.

**Clinical Research and Outcomes Analysis**

Clinical research and outcomes analysis are also dependent on healthcare data. We are at the beginning of a transition to an era where such data will be directly derived from routine patient care documentation. This will require that uniform documentation be implemented. Additionally, standards and systems should be created and implemented to enable better data collection. Encouraging uniform documentation for clinical research purposes, including the use and analysis of structured/codified data, will enhance the science of medicine.
D. EMR Platforms

EMRs software applications can operate on a variety of different hardware platforms. The hotly contested debate whether the EMR of the future will operate primarily on the desktop computer, internet or portable device may be mute, as newer systems take advantage of all three platforms matching the optimal technology with the functional requirements. Initially, vendors designed their product to operate primarily on the internet, stand alone portable devices, or the desktop. However, today with the rapid evolution of these technologies and their diffusion through the marketplace, newer companies are building their EMR to operate in all these environments.

For many years the PC has been the foundation for EMRs, with only a few companies focusing on portable devices and web-based applications. The desktop offers the advantages of larger screen real estate for easier review of the medical record and a full size keyboard suited for data entry. The obvious disadvantage has been the lack of portability, disruption of eye contact with the patient and the cost of hardware upgrades every few years.

The initial excitement with PDAs was tempered by their limited screen size, restricted battery life, limited potential for data entry and viable voice recognition, and often by their lack of integration with full EMR and PM systems. Improvements in integration, battery life, storage memory, wireless connectivity, touch screen technology and now enhanced screen size has greatly expanded the uses of portable devices in medical office practice. The smaller hand held devices are still best suited for storing and viewing basic patient profiles (problem, medication, allergy lists and demographics), for order entry of prescriptions and testing, for charge capture. The voice chip can be used for relay to medical transcription, or in some cases for voice recognition.

The future of the ASP or web-based EMR is in transition. It is certainly well suited for provider’s remote EMR use, for patient centered applications (self-scheduling, patient generated health/medical profiles), large data files, decision support, and graphics. It is important to keep in mind that many practices do not want to give up control of having patient records on their own office-based servers, instead of off site vendor owned databases. The recent discontinuation of a prominent web-based EMR product with controversies over who owned the data and who was responsible for the cost of its transfer to a new EMR highlights the complexity and relevance of this issue.

The addition of the notepad may dramatically alter the landscape and definition of portable devices. The larger screen, wireless function, touch screen keyboard data entry, and slim laptop profile facilitating eye contact with the patient may greatly expand the role of a portable device both in the office and on rounds.
E. ASP EMR Platform

In the acronym-laden world of healthcare, ASP (application service provider) is one of the most frequently heard—being the most popular member of a vocabulary categorizing the various service providers that have come into existence as a result of the Internet. As the tech phenomenon continues to shake out, successful service providers are settling into a role of broader responsibility in their customers' organizations, thereby demonstrating their true value. BSPs (business solution/service providers) are the next step in evolution of the ASP model. These companies let healthcare organizations outsource entire segments of their business, not just one certain aspect, allowing them to concentrate on their core competencies.

Growing market demand for time-share services will encourage healthcare IT vendors to offer other types of applications via Application Service Provider or service bureau model. We believe group practice management systems (GPMS) and Electronic medical Record (EMR) is another area vendors will target for time-share offerings, because many medical practices do not want to make major investments in new GPMS and EMRs, and they lack in-house IT skills to support turnkey applications.

The advantage of ASPs

ASP offers many advantages, particularly to small organizations. They allow IT spending to take place in increments rather than in one large licensing and implementation expense. Since they're a new, Web-based technology, ASPs are more likely than some technologies to be compliant with new privacy regulations directed by the federal Health Insurance Portability and Accountability Act (HIPAA).

But perhaps their biggest benefit is that they permit tremendous flexibility. Organizations are able to implement solutions quickly; affect plan, privacy and functionality changes fairly quickly; and even change technology providers without delay. Because of the advantages offered by this flexibility, ASPs have made inroads in many parts of healthcare.

Application service providers (ASP) have been pushing the idea of hosted applications—and it’s slowly catching on. ASPs have signed numerous new customers in recent weeks, evidence that the “rent-an-app” approach is taking hold (due to aggressive marketing, over promising, vendor willingness to subsidize deals to gain market share, etc). The early adopters are mostly small and midsize hospitals and healthplans that don’t have the IT resources or deep pockets to implement enterprise software packages on their own. We believe that outsourcing selected enterprise applications not only makes good business sense, but ultimately gives a healthcare organization a competitive edge. But, beware of vendors’ (especially new ones) over promises and operational immaturity. Expect extensive ASP consolidation in 2 to 3 years.
Is the healthcare industry ripe for ASP adoption?

The answer is maybe. Although those in the healthcare sector are moving somewhat cautiously, many are recognizing the value that ASPs can bring to the table, primarily in that they eliminate the need to buy costly computer systems outright. Although we believe the healthcare industry is really beginning to gravitate toward Web-based technology, and even are warming up to the idea of ASPs, it is still moving slowly. That isn’t necessarily a bad thing, either. They want to have any concerns quelled before they leap and understandably want to make sure that the decisions they make are best for their business — not just now, but well into the future.

What are some of the greatest benefits of the ASP model?

Increased opportunity to access applications that were previously not affordable and the opportunity to have an IT department that is matched up with their needs are primary benefits for the customer. Many companies can’t find IT personnel right now so they need to find an alternative. An ASP scales one IT professional across three or four companies, depending on the application and the complexity. Another obvious benefit is the total cost of ownership. It’s a lot less costly to run equipment in an ASP model than having to have everything in-house. Another key advantage is you can get work done more quickly. Physicians can make a decision and know it’s going to be done and dealt with right away.

What are some of the drawbacks at the moment?

Performance, reliability and security are some of the key issues that need to be better addressed. Based on studies we’ve conducted both in the U.S. and abroad, security is the number one concern of customers, followed by performance and responsiveness to issues and inquiries. In order to be successful, ASPs have to meet those criteria. They can meet it by any means, with any solution they want as long as the application has value and relevance to the end user’s business. The point is very simple: If I can deliver a service that’s secure to the point that I have your trust, if I can demonstrate that security to the point that you buy in, if I answer the phone when you call me with questions and concerns and give answers that are plausible to you, and I have a service where the business model can draw more from you than what it costs me to produce, then I have a viable ASP. Those are the primary things the end user is concerned about today, which should be the focus of any ASP.
Is an ASP model sustainable?

Many ASPs have not yet fully developed a business model that can be cookie-cutter. That is, any start-up business needs to have a business model they can implement that makes them money within that contract and then can be repeated again and again within a market. It's true with any business, though. Just look at the dot-coms. If you don’t have a business model that makes money, you can’t scale it and make money because you don’t make it up in volume. You have to come up with a good business model. There is a study that says that 60% of ASPs that exist today will not exist in the future. Presumably, they will either be acquired or will go out of business. Still, that means 40% of ASPs will stay in business. I believe ASPs will be exceedingly successful. Whether the ones that are making headlines today will be the ones that will be around ten or 15 years from now is still anyone’s guess. That certainly proved to be true in the PC era, which I believe was the last big shift. Of the 15 PC companies that were around in 1978 and 1979, there is only a couple that actually made it. Apple was one of them and IBM was the other. Compaq and Dell didn’t exist yet. Companies like Commodore didn’t make it. Some went out of business altogether and some got acquired. I think it’s reasonable to assume that many of those companies will get purchased or go out of business and that the applications that will be successful will be the ones we haven’t even heard of yet. I don’t think that’s a prediction that’s hard to figure out. All you have to do is look back on history.

ASP offerings from EMR vendors:

The majority of vendors that have tried an ASP model have failed. Technology did not fail - the revenue and sales model failed. In regards to revenue, companies would rather sell a $50,000 system to a physician than collect $1,000 per month. In 90% of the cases, the large ASP vendors have exited the healthcare market within two years, mostly because the sale cycle is long and the initial sales cost is too high for the expected revenue and profitability that a large vendor expects and in most cases demands. Companies like Bell South, Siemens, GE Medical, Siemens, McKesson, IBM, and Pfizer have all entered and left the ASP physician market.

In a recent survey my AC Group, of the 56 EMR vendors that meet the basic functionality of the Institute of Medicine, 82% will offer their EMR application in an ASP model. However, only 18% only offer an ASP version. According to the survey, four companies provide the best functionality for the price. These vendors include ProPractia, Hamilton Scientific, Ltd, and eClinicalWorks, Nextgen, and Allscripts Healthcare Solutions. All of these vendors received functionality scores above 85% and can provide their application in an ASP hosted environment.

1 Source: Survey of Healthcare ASP offerings, 1999-2003, AC Group, Inc.

2 Source: Six Levels of Healthcare IT Report, November 2002, AC Group, Inc.
ASP Pricing Models:

The ASP pricing model, like everything else, varies based on the services that are provided. In most cases, a physician can contract for a flat monthly fee of between $400 and $1,000 per month for a complete EMR application. However, the price varies for installation, training, and initial configuration. Some vendors require “consultative” fees upfront, instead of building into the monthly contract. Of course you still have all of the hardware and networking requirements. These are traditionally included in the monthly software costs, but can be added as a monthly lease cost. In all cases, physicians must look at a 3-year total-cost-of-ownership model when considering either a purchase or an ASP model.

The jury’s still out

As with much of today’s technology practices, a verdict on the ASP movement has not been reached. As the Internet matures from a relatively new communications device to a more stable business platform, service providers will also mature, and leaders will undoubtedly emerge by carving out their own niche.
F. Consolidation of EMR Vendors

Over the past 20 years, there have been over 1,000 different companies that offer technologies to physician practices (3). Currently the AC Group tracks over 130 product categories unique to healthcare, over 2,500 information technologies selling in the healthcare market, and more than 10,000 different applications to choose from. The majority of these companies have remained relatively small (less than $1M in annual revenues) or have been purchased by one of the national vendors including McKesson, Siemens, GE Medical, EPIC, Meditech, Cerner, Misys, Allscripts Healthcare Solutions and NextGen. Companies like IDX, Per-se (Lytec and MediSoft), Misys and Medical Manager still dominate the Practice Management application marketplace. However in the EMR marketplace, NO vendor has a majority share. There are no “large” providers of EMR technology. Companies like Medicalogic (purchased by GE Medical in 2002) were known as one of the dominate EMR vendors back in 1995-2000 with approximately 4% of the market. However, their market share has slipped in the past two years, partially because of new products that have entered the market in the past four years. These new and upcoming vendors include, NextGen, eClinicalworks, Medical Communication Systems, iMedica, Allscripts Healthcare Solutions, Practice Partner, a4Healthcare, and others. Given the number of vendors, Industry leader’s project that over 40% of existing companies will be consolidated or closed within the next three years. (4) This trend highlights the importance of choosing an EMR not only based on its functions and performance, but on the long term track record of the parent company and its prospects for financial viability.

A number of the larger vendors that have launched and maintained successful EMR products, have priced and marketed their product primarily to larger medical groups. This further narrows the field of potentially sustainable vendors with products suitable for small office practice. In the past 2-3 years with the downturn in the economy, collapse of the .com industry, and tightening of available venture capital funds, many of the stand alone hand held companies as well as those promoting primarily application service provider (ASP) models of EMRs have either closed their doors or gone dormant until additional funding is available.

G. History of the RHIO

There is a growing belief that progress is likely to include some combination of state or local governance, information technology, new incentive structures, and evidence-based medicine. Indeed, over 600 local coalitions throughout the U.S. have formed spontaneously to improve their healthcare system. Nationally, substantial emphasis, financial commitments and progress have been made with respect to healthcare information technology. Medicare, private insurers and employers are experimenting with many different incentive structures. These efforts are intended to create new models for organizing and delivering healthcare in the U.S. that can be replicated across

---

3 Presentations by Mark Anderson and Vince Hudson during the TEPR 2006 conference in Baltimore, May 2006.
4 AC Group Study, 2006
the country. The Federal government has stepped up to help facilitate this groundswell effort, launching an initiative known as the Framework for Strategic Action which aims to transform healthcare through information technology.

A cornerstone of the Framework involves the creation of Regional Healthcare Information Organizations (“RHIOs”) which are essentially regional collaborations that facilitate the development, implementation and application of secure health information exchange across care settings. The benefit to a local/regional community of this Federal initiative is twofold: 1) a great deal of thought and energy has gone into how to accomplish intelligent healthcare reform on a regional basis and this thinking can be leveraged and tailored to the unique needs of the community, and 2) the Federal government is highly supportive of such efforts, including providing partial funding to many projects.

**Key Success Factors for Locally-Driven Solutions**

A number of inter-related factors are critical to the success of healthcare system modernization and reform, including:

- **Agreement** – This is unquestionably a lynchpin and a highly challenging area. Local, volunteer efforts are often doomed because any stakeholder group can effectively block change it does not support. A foundation for consensus can be achieved by first articulating a shared vision of the desired end-state and the benefits to each stakeholder group. Broad-based inclusion is critical. Equally critical is the ability to navigate potential roadblocks through the presentation of solid business case analyses and a clear and actionable strategic plan.

- **Commitment** – There are three distinct forms of commitment necessary for success: First, there is the time and human resources commitment from every stakeholder/participant. Second, there is organizational commitment which must be supportive of the strategic implementation plans that are ultimately created, including data sharing. Finally, there is financial commitment. In many respects this is the ultimate form of “buy-in” as certain public and private entities invest capital in the modernization process.

- **Business Case** – A detailed business case analysis which takes into consideration different strategic alternatives, demonstrates which approaches are optimal and quantifies the net benefits to the system and to individual stakeholders is required to gain agreement and move forward. Such analyses help maintain directed and rational thinking among the stakeholders/participants, and provide a documented plan that gives confidence to funding sources that they should invest in the program.
• **Process** – This begins with consensus and coalition building, but follows through with creation of clear strategic plans for all to follow. Many previously-formed RHIO organizations have found that a neutral, expert advisory group is critical to the process of moving otherwise-entrenched parties toward common ground and innovative solutions.

RHIOs May Represent a Market Alternative. The health care industry is moving and being driven toward automation, universal data sharing, and information standardization. RHIOs are attempting to create uniform data environments and facilitate data exchange among providers, payors and consumers. RHIOs establish an integration platform to which individual providers or provider groups, including IPA’s, can connect.

Technology companies may be able to position their technologies in the RHIO platform as an alternative to marketing at the IPA or provider level. The Center for Health Transformation issued a report that contained the following information about emerging RHIOs: The diversity of successful RHIOs operating throughout the country shows that there is no single prototype for a health information exchange. Models range from a co-op of organizations actively sharing consumer data, to a single provider institution offering technology services and EMR access via an Application Service Provider (ASP) model, to a consortium that serves as a facilitator for competing providers and payors in a single area.

On the technical side, interoperability is in many ways the most complex and most important requirement in the formation of a RHIO. At the tactical level, every RHIO must address technical issues to ensure that participants can efficiently and effectively transfer electronic data from the bedside to the caregiver across town. As RHIOs link the disparate systems of public and private healthcare providers, and even some health plans, they need to ensure that their systems are interoperable and can communicate with each other. Some RHIOs have met the interoperability challenge by partnering with a single technology vendor to build a homogeneous system, ensuring that software supporting care in the doctor’s office readily integrates with the EHR in acute care settings.

Interoperability will be an increasing prerequisite as the nation moves towards a national health information infrastructure. Heterogeneous models that have brought together providers using a variety of systems from different vendors and service oriented architecture software find ways to structure the data, or to overlay existing standards such as HL7 in order to promote data exchange. The establishment of true nationwide interoperability standards, and incentives for their adoption on both the industry and provider side, are the key requirement for long-term viability of RHIO organizations and the technology that supports them... RHIOs that develop EHR’s spanning the care continuum will enable providers to better track outcomes across inpatient and ambulatory visits and assess the actual value of the care provided. In addition, efforts by the government to reform Stark and Anti-kickback statutes and other laws that unintentionally restrict RHIO development will help open private funding sources to support these initiatives.
Grant Opportunities. Various government and non-profit organizations have grant programs available for HIT initiatives. The Department of Health and Human Services (HHS), through the Centers for Medicare and Medicaid Services (CMS), has a program seeking “to improve the quality of care and services delivered to Medicare beneficiaries through system redesign that fosters best practice guideline usage; continuous quality and patient safety improvement; shared decision making between providers and patients; and the delivery of culturally and ethnically appropriate care. The demonstration will encourage coordination of Medicare services and reward eligible health care groups for improving health outcomes. A competitive process will be used to select 8 to 12 health care organizations (i.e. physician group practices, integrated delivery systems, and regional coalitions of physician group practices and integrated delivery systems) to participate in the 5-year demonstration.” The deadline for submitting a letter of intent to participate in Phase 2 of the selection process was January 30, 2006, although the deadline for submitting proposals is not until September 29, 2006. Most grant opportunities target community and non-profit groups or scientific research initiatives.

Legal Matters. There are legal constraints to prevent providers from receiving financial benefits for making referrals. The Anti-Kickback laws prohibit hospitals, home health providers, nursing homes, and other providers from giving or receiving “remuneration,” or financial incentives, to physicians and others in exchange for referring patients to their facilities. The Stark statutes prohibit physicians from referring their patients to a hospital, urgent care center, laboratory, or other facility with which they (or a family member) have a “financial relationship,” be it as an investor, contractor, or owner of the facility. There are exceptions that carve out legitimate business practices from prosecution and for physician recruitment and retention, charitable donations and rural healthcare. There have also been several efforts to create exceptions for health information technology. Regulations issued in March 2004 clarifying the Stark created an exception for community-wide health information systems.

There have been ongoing debate and questions about these regulations, specifically seeking to facilitate the deployment of HIT within and across health care communities. HHS is currently reviewing the public comments it received in late 2005 to the most recently proposed changes. In general, it appears that integrating health care providers by including them in networks is being encouraged. Providing uniform access and avoiding financial arrangements that reward the volume or nature of referrals should minimize any legal risk.
List of Regional Health Information Organizations (RHIO’s) Compiled by The Center for Health Transformation

**CalRHIO.** CalRHIO started in January 2005 as a project of the Health Technology Center to support RHIO efforts around California. As an umbrella organization, CalRHIOs approach is incremental: first, to catalog existing RHIOs; to support new and existing RHIOs by acting as a clearinghouse for best practices; and to provide a neutral environment that will foster discussion among stakeholders and incubate the development of new RHIO projects. California’s sheer size – both in terms of geography and population – means that CalRHIO encompasses an unmatched range of rural and urban settings.

**CareSpark.** In rural central Appalachia, CareSpark is building a secure network that allows physician offices, hospitals, public health departments, pharmacies, laboratories, and imaging centers to communicate electronically. Historically, the region has a high rate of chronic illnesses such as diabetes, asthma, and heart disease, and a correspondingly high death rate for people under the age of 65. CareSpark grew out of a decade-long effort by a local non-profit citizen organization to develop collaborative processes to improve the health in the community. Today, CareSpark receives support from nearly 30 organizations, from BlueCross BlueShield of Tennessee and Eastman Chemical Company to John Deere Health and East Tennessee State University.

**HealthBridge.** HealthBridge began in 1997 as a community-wide physician portal for the greater Cincinnati area with funding from five health systems and two insurers. Since then, the organization has added clinical messaging functionality, public health and physician alerts, and syndromic surveillance, and is in the process of implementing electronic order entry in ambulatory offices. As a result, HealthBridge’s participants have documented substantial outcomes in patient safety, clinician efficiency, and cost savings. Encompassing 14 counties in three states, HealthBridge is a truly regional effort, defining its reach by the medical referral area, rather than by political boundaries.

**Indiana Network for Patient Care (INPC).** This network is a collaboration of hospitals, physician practices, laboratories, radiology centers, health departments, and other stakeholders. Initial funding came from federal grants, but in 2004 the not-for-profit Indiana Health Information Exchange (IHE) was created to establish sustainable business models around the INPC. IHE plans to create a common, secure, electronic infrastructure that expands communication and information-sharing among participating providers, hospitals, public health organizations, and other healthcare entities.
Massachusetts SHARE. MA-SHARE is a regional collaborative initiative operated by the Massachusetts Health Data Consortium. With funding from various state entities, including several payors, the organization serves as facilitator of statewide initiatives. MA-SHARE supports projects that explore healthcare data connectivity to develop, pilot, and demonstrate new healthcare information technologies across communities and enterprises.

Nebraska Telehealth Network. Working with the governor’s office, a coalition of healthcare organizations has developed a broadband network to support telehealth capabilities (distance learning and clinician-to-clinician communication via videoconferencing). The network will support efforts to combat a potential bioterrorist attack or other public health crisis, and also will be valuable to improving overall quality of care across the state. Six of Nebraska’s major hospitals are serving as hubs for the network, with smaller clinics benefiting from the reasonable cost structure. In addition, stakeholders are also moving forward on plans for electronic patient data exchange.

PeaceHealth. PeaceHealth, an integrated delivery network in the Pacific Northwest, offers technology services and access to its comprehensive community health record (CHR) via an ASP/ISP model. Smaller, rural clinics and physicians that otherwise may not have the resources for significant IT investments can securely access the network for a modest market-based fee. Since the program began, 54 independent practices have signed on to use its EHR services, and more than a thousand authorized clinicians have full password access to PeaceHealth’s CHR to support patient care. The CHR includes approximately 1.5 million patient records.

Taconic Health Information Network and Community (THINC). THINC is a multi-stakeholder, community-wide data exchange among physicians, hospitals, reference laboratories, pharmacies, payors, employers, and consumers in the Hudson Valley region of New York State. It provides clinical, insurance, administrative, and demographic information for more than 600,000 patients via a secure Internet infrastructure incorporating standards for data exchange. Unique to THINC is the local, ongoing support provided by MedAllies, which provides training and support to community clinicians and their office staff members to drive adoption.
Chapter 8
AC Group’s 2007 Annual Report
The Digital Medical Office of the Future
Return on Investments

A. Cost Justification

Can a physician afford to spend an additional $15,000 on technology over the next six years? The answer is becoming very clear! YES. According to Dr. James Holly, five years ago, Southeast Texas Medical Associates, LLP, determined that the complexities of medical decision making and the continuity of care over an enlarging range of services was impossible with a paper record. Therefore, they adopted electronic patient records (EMR) and quickly moved toward achieve electronic patient management (EPM).

Almost five years later, they had achieved a great deal, all of which has value to their patients, to their practice, to payers and to other health care providers. Integrating delivery over a wide ranging network is unusual for a private medical practice but is the hope of the future. Whether the patients are in the office, in the physical therapy department, in the home health, in the hospital, in the ER, in the lab, or whether the health care provider is at home, in the office, in the hospital or on vacation in Europe, the patient’s data base should be accessible in a HIPAA compliant environment.

This means that quality of care has improved and that the cost of that care has decreased. The value to the practice has been documented in a recent Microsoft Case Study on Return on Investment certified and verified by Mark R. Anderson with AC Group, Inc. Overall, SETMA was able to document a 24% decrease in cost of in-patient care. Due to EPM, they have one of the few successful IPAs in the country and they participate in one of only two PSOs approved by CMS. They believe that their PSO is being very successful because of the systems infrastructure which they have at SETMA. The results of their ROI study showed:

- After 90 days, the average number of Patient visits per physician remained the same after the installation on the EMR Product.
- The EMR application help cut Medical Transcription costs from $5.93 per visit in 2000 to an average of $0.25 per visit in 2001.
- Based on the number of visits in 2001, SETMA saved more than $340,000.
- The EMR application helped improved E&M coding and thus, increased average billable charges for office visits by 4.23%.
- After installation of the EMR application, coding and charge capture improved. The clinic’s overall average charge per patient visit increased from $171 to $206 (a 20% increase) and the average collection increased from $80 to $104 (a 30% increase). These coding improvements added more than $150,000 in billable charges per year.
- Based on the number of patients seen in 2001, total billable charges increased by $2.1M and overall collections increased by $1.4M.
- Through the creation of an Electronic Patient Record, the number of administrative staff required to handle the patient’s chart decrease by 76.7% ($2.65 per visit down to $0.62).
- The new procedure saved the clinic more than $120,000 per year in administrative costs.
- The average man-hour cost to establish a chart decreased 85% from 8.0 minutes per new chart to 1.2 minutes, an annual savings of more than $22,000.
- The amount of time required to handle phone call inquiries that required the chart has been reduced by 73%. The number of tasks decreased from 18 down to 2. Total annual savings exceed $103,000.
- The average cost for administrative supplies decreased from an average of $8.00 per patient to $0.97, a decrease of more than 87%.
- Based on the number of actual patients (55,000), the practice saved more than $380,000 in paper and supply costs.
- Because of better charting, the number of claim denials has decreased 26%. This has help reduce days in accounts receivables by 7 days, thus increasing actual revenues by $102,000.
- With improved charting and documentation, the number of successful audits has improved and in the last year the clinic has passed 100% of their required audits.
- Electronically calling patients each day to remind them of their appointments has decreased "no shows" by 65%. This has resulted in an 8% increase in number of daily visits without increasing practice size.
- At an average reimbursement of $100 per visit, this represents a $60,000 per month increase in revenue.
B. The Business Case for the EMR

Making the transition to an electronic medical record (EMR) is a major undertaking for any physician office. It not only involves an expenditure of both human and financial capital, but it also requires a fundamental change in the way that a physician office conducts itself. This raises a very simple but profoundly important question: does it make sense from a business perspective?

Most experts in the field look at four specific categories within a medical office where an EMR can make a significant difference, and within each category we will provide concrete examples of benefits realized by physician offices across the country. Each example, in its own direct or indirect way, has either top line (increased revenue) or bottom line (increased profitability) implications for the physician office. It should be stated that the electronic medical record is a tool with a broad set of features and capabilities that are utilized in many different ways by different physician offices. Also, the benefits of an EMR are optimized when the physician office is able to fully transition to the electronic chart (as opposed to running dual paper and electronic systems).

- Cost Reduction

The definition of cost reduction is simple: you spend less on these items after the deployment of an electronic medical record than you did before. The extent of savings is variable, according to the size, geography, and practice patterns of the individual physician offices. The extent of these savings is also dependent on how an individual site deploys their EMR; research has shown that sites that pursue a paperless implementation will in general be more cost efficient. The following outlines ways in which physician offices lower their costs after implementing an EMR.

**Reduced Transcription Costs:** Physician offices that eliminate transcription by having physicians enter all data directly into the electronic medical record can save a significant amount of money. Transcription costs range from $300 to $1000 per month per physician. However, it is not necessary to force all physicians to give up transcription in the post-EMR era in order to lower transcription costs. Particularly for physician offices that use in-house transcription services, an EMR can have a significant impact on transcription efficiency. The reason: an EMR provides instantaneous access to all charts. Therefore, transcriptionists spend more time transcribing and less time searching for, assembling, reassembling, and filing charts.

**Reduced internal and external copying expenses:** Many physician offices use copying services to copy records requested by attorneys, insurance companies, and other physicians. An EMR allows you to print the records directly from a networked PC, eliminating the use of an outside service or the time-consuming in-house process of locating, disassembling, copying, reassembling and re-filing the chart. The ease of printing the electronic chart translates directly into labor savings and reduced copying costs.
Labor Savings: Paper-based charting systems require a high allocation of administrative labor dedicated to the retrieval and management of charts. Additionally, paper systems impose labor inefficiencies on the daily operations of physician offices because the chart is not universally and instantly accessible to both administrative and physician office staff at the many points during the day that the chart is required. Because the EMR can be accessed from any networked workstation, a fully implemented EMR site will realize labor savings and improved administrative efficiency (as detailed in the Improved Administrative Efficiency section below). These efficiencies translate into re-deployment or reduction of staff, which translates into fewer FTEs required to support each provider. Many post-EMR physician offices have been able to expand the number of physicians without hiring new administrative staff.

Successful EMR physician sites are more efficient than traditional offices. As a result, the number of FTEs required to support physicians is lower than at paper-based offices. Practices with EMR’s report 2.0 to 2.5 FTEs per doctor, compared to the MGMA average of 4.0. These improvements can be attributed to the following:

a) Fewer chart pulls and less filing  
b) Universal access to the chart (by more than one person at a time) and less searching for lost charts  
c) Reduction in phone tag  
d) Improved internal office communication  
e) Fewer call-backs from pharmacies

However, for small practices (1 to 3 physicians) the economics may not be the same. With minimal staffing, it would be impossible for a practice to reduce staffing just because of the installation of an EMR application. In reality, the staff may be able to perform other activities, but overall staffing cannot and should not decrease below the minimal level.

Malpractice Insurance Savings: Insurance carriers are beginning to recognize that practices with an electronic medical record offer an improved risk profile based on both quality of care and quality of documentation. Some malpractice insurers are beginning to reduce their premiums for practices utilizing an EMR. These premium reductions typically run around 5%, offering significant annual savings per physician. As an important side note, some carriers will refuse to defend practices in which the chart is not legible.

Lower Paper Chart and Storage Expenses: Making the transition to an electronic medical record means reducing the expenditures that are required to support a paper-based system. These costs range from paper supplies and filing systems to the dedicated office space required to store paper charts. Particularly for new practices that have not yet invested in the hardware and space for filing charts, the potential savings are considerable. For existing
practices, the primary payback is a reduction in supply costs (the cost of chart folders, dividers, and filing cabinets are estimated to average $3 per chart). In addition, the EMR offers the potential of reclaiming—over time—office space that was once dedicated to filing charts.

**Decreased Pharmacy Costs:** The EMR is a powerful medication management tool. For instance, the Patient Records prescription writer automatically notifies physician offices of the recommended medication based on the formulary for patients' insurance carriers—each time a prescription is written. Since many practices are tracked according to their pharmacy costs, this provides a convenient means of adhering to formulary recommendations.

- **Revenue Enhancement**

An EMR also offers a variety of different ways in which a practice can increase revenue. The potential for revenue enhancement involves many factors, including current billing practices, patient population, and the mix of managed care and fee-for-service in the region. Some of the ways in which the EMR affects a practice's top line are as follows:

**Health Maintenance - A Tool to Increase the Number of Services You Offer.** Health Maintenance refers to age- and gender-specific care reminders. An EMR provides built-in tools to help a practice provide these services in a more efficient manner than traditional paper systems. For instance, every time a chart is accessed, Patient Records provides a reminder of overdue health maintenance items in the chart summary section. Additionally, some EMR systems allow the practice to specifically search for all patients who are overdue for recommended services, allowing the practice to send reminder letters. In a fee-for-service environment, this offers the potential of insuring better care for your patients while also increasing the volume of services offered. In a capitated environment, an EMR can help demonstrate quality practices and therefore help an office qualify for a capitation premium when compared to other practices in the area.

**Improved Accuracy of Coding:** Coding levels are correlated not only to the level of services provided during a particular patient encounter, but also to the completeness of documentation for those services. Services rendered that are not documented may be subject to dispute. In the current environment, many physician offices are conservative regarding coding, because of the additional documentation burden required. Industry estimates for the amount of money lost by inaccurate coding range from 3 to 15 percent of total practice revenue. An EMR assists by making it easier to provide complete documentation for a visit. This is accomplished through the use of templates, physician office macros (detailed blocks of text that can be inserted into a note with a button push), and the ability to automatically pull information from other portions of the chart into the current note. Additionally, billing clerks are able to quickly match coding against the note since they have access to the chart. Many physician offices report greater confidence in coding after the implementation of an EMR.
• **Improved Administrative Efficiency**

Effective management of paper charts requires a great deal of clerical effort and administrative management. As a practice makes the transition to electronic records, it is freed from many of the labor-intensive tasks inherent in managing paper charts. Most of the benefits are directly correlated to the degree to which practices are able to make the paper record obsolete (which therefore should become key criteria in the EMR selection process).

**Fewer Chart Pulls and Less Filing:** A primary attraction of the EMR is the decrease in the chart pulls and filing required to keep charts current. For practices that successfully transition to the EMR, each networked workstation is the chart rack, accessible to anyone with network privileges. In addition, one of the unique features of the EMR is its ability to automatically incorporate outside data into the patient chart without the staff manually having to enter the data. With electronic interfaces from such external sources as laboratories and hospitals, incoming data can be downloaded directly into a patient's chart, eliminating the time-consuming and staff-intensive filing chores that are required with a paper-based system.

**Universal Access to Charts (by more than one person at a time) and Less Searching for Lost Charts.** The paper chart is inherently limited by its physicality; it can only be in one place at one time. Due to the sheer volume of charts that practices deal with, there is the frequent problem of the lost chart—common sources of frustration for even the most efficient paper-based practice. An electronic medical record offers the distinct advantage of being available at any workstation, whether it's at the office, hospital, or home. And since multiple people can view an individual's chart at the same time, the daily work of the practice—whether administrative or physician office—is never inhibited by the fact that someone else has the chart.

**Reduction in Phone Tag:** The EMR offers a tremendous improvement in efficiency for the numerous daily phone tasks that require information from the patient chart. Because the EMR offers instant access to charts, both administrative and physician office staff can handle incoming calls on the fly, improving efficiency and customer service.

**Improved Intra-Office Communication:** An important benefit to some EMR systems is the integration of email messaging as part of the system. This greatly enhances the speed, efficiency, and quality of intra-office communications between staff and providers. Email messaging allows messages to be delivered and received instantly from any workstation. It also allows staff to automatically document any sent or received message directly into the patient's chart.
Chapter 8
AC Group’s 2007 Annual Report
The Digital Medical Office of the Future
Return on Investments

**Fewer Call-Backs from Pharmacies: Patient Records** incorporates a prescription writer that prints all prescriptions, insuring their legibility. The system checks for drug-to-drug interactions prior to printing of the prescription. And with fax server technology, prescriptions can be sent directly to pharmacies. These features serve to minimize the common inefficiencies experienced between office and pharmacy.

**Easier Compliance with Chart Requests and Chart Audits:** To accommodate the requests for copies of patient charts with paper systems, physician offices must pull, disassemble, copy, and reassemble the chart. This time-consuming process can be eliminated with an EMR, since the entire chart can be printed from any networked PC. Complying with chart auditors is simply a matter of sitting them down in front of an available PC, since each workstation is the chart rack. And since an EMR results in better documentation and better organization of the chart, EMR practices typically pass chart audits with flying colors.

- **Improved Physician office Efficiency, Patient Care, and Service**

**Higher Quality Documentation (legible, organized, and complete):** An EMR helps standardize chart quality across a practice, minimizing problems that result from poor handwriting or inconsistencies in documentation.

**Built-in Protocols and Reminders (including Health Maintenance):** EMRs can provide physician offices with important information at the time of documentation. Diagnosis-specific templates can help guide and remind providers of special protocols and tests for certain conditions. Additionally, an EMR incorporates age, sex, and disease-specific health maintenance reminders that are flagged each time a patient chart is accessed. Practices can proactively evaluate and improve their performance on routine health maintenance, by querying the patient database for all patients with overdue items and sending reminder letters.

**More Efficient Signing of Charts:** Paper-based systems require the physical presence of charts for signing. With an EMR, all unsigned components, whether progress notes or lab results, can be signed electronically from any workstation—at the office or at home. This allows fast and efficient review at times and locations that are convenient to the provider. Additionally, some EMR systems provide the administrator with reports on all unsigned notes—an excellent tool to help insure chart quality across providers.

**Patient Education and Involvement:** Many physicians utilize the EMR as a tool to engage patients more actively in their care. For instance, patients on weight loss, blood pressure, or cholesterol reduction programs respond to graphical representations to their progress that can be readily created using the EMR. EMR systems also offer access to specialized patient education handouts that can be printed for patients directly from the point of care.
Electronic patient education also allows for more conditions to be covered with less cost, than with traditional paper handouts.

**Summary** - The electronic medical record is one of the few technologies that has an impact on both the physician office and administrative aspects of the practice. The Business Case for EMR is based not only on its ability to lower costs, increase revenue, and improve the efficiency and operation of a practice, but also on its role as a tool to enhance the quality of services provided. Additional benefits can accrue when the system is fully integrated with the scheduling and billing functions of the practice. While the decision to transition to an electronic medical record requires a commitment of significant capital, human resources, and leadership at the physician level, there are very few other investments that offer a greater return.
A. How do on select the right Ambulatory EMR

The current pressures in the industry for increased efficiency and better care delivery, coupled with significant advances in technology and applications, have enabled EMRs to take center stage. The challenge with EMRs is that it is very difficult for the average physician practice to effectively evaluate its' options. To assist the physician community, AC Group, Inc. has developed a methodology that quantifies six specific components necessary to insure that a physician or a group of physicians have made the right choice. The components include:

- **Product Functionality** – How well a product meets the basic requirements of a comprehensive EMR based on the guidelines of the Institute of Medicine and the detailed comprehensive survey of functionality based on AC Group’s 2,300+ EMR functionality questionnaire.

- **End-User Satisfaction** – Demonstrates how well a company performs in relation to “End-User Satisfaction” surveys conducted by independent analyst firms like KLAS and AC Group.

- **Company Financial Viability** – The strength of a company in relationship to their annual revenues, profitability, and percentage of revenues that are placed back into future development.

- **Client Based** – The strength of the company’s EMR client based and their ability to understand and meet the needs of their current and future clients.

- **Technology** – The strength of the EMR’s use of proven technology that enables a practice to become a digital office of the future.

- **Price** – The total price of the solution should be considered when making a decision – not just the price of the software. Practices should determine the “Total Cost of Ownership” (TCO) when evaluating the numerous potential solutions.

The AC Group selection methodology provides physicians with a simple methodology that they can use to help reduce down the number of choices. According to our research, the number of vendors that state that they sell an ambulatory EMR is currently over 250 – too many for any one physician to consider. Through the use of this methodology, practices can reduce the number of potential choices to the top 5 to 10 EMR products – based on their specific requirements.

### The Selection Methodology:

- **Product Functionality:**
  
  a. The EMR marketplace is overwhelming to most physicians. For the average physician, the question is not who provides technology, but rather who provides the “richest functionality”. To assist physicians, a detailed study was conducted by AC Group, Inc. during the Spring of 2002-06 and then updated again in the Fall of 2003-05. The AC Group annual EMR report is based on 48 month of research and the cumulative results of our 90-page questionnaire which included 2,300 functional questions divided into 47 categories.

  b. The purpose of the detail analysis is to determine which vendors meet the functionality to be considered a “Validated EMR” today and to determine which vendors who, with future development, could have a “Validated EMR” in the next couple of years.

  c. Vendor Products that receive a minimum rating of 80% are considered “Validated EMR” by AC Group. Other vendors have excellent charting systems and document imaging systems, but in many cases, do not have the necessary clinical alerts, clinical knowledge based databases, and
may not have the clinical decision support systems necessary to improve care and to document improvements in clinical outcomes. They still provide excellent benefits, but should NOT be considered a Clinically driven EMR.

d. Vendor applications that meet a minimum of 90% of the requirements receive 10 points, products with 80% to 89% receive 5 points, and vendors with 70% to 79% receive 3 points.

e. The selection Methodology formula is:

<table>
<thead>
<tr>
<th>Points</th>
<th>10</th>
<th>5</th>
<th>3</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Functionality</td>
<td>Over 90%</td>
<td>80 to 89%</td>
<td>70% to 79%</td>
<td>60% to 69%</td>
</tr>
<tr>
<td>Future Functionality within the next 12 months</td>
<td>Over 95%</td>
<td>85 to 95%</td>
<td>80% to 84%</td>
<td>75% to 79%</td>
</tr>
</tbody>
</table>

- **End-User Satisfaction:**
  - Demonstrates how well a company performs in relation to “End-User Satisfaction” surveys conducted by independent analyst firms like KLAS and AC Group.
  
a. Product functionality is very important, but if clients are not satisfied, physicians should be concerned.
  
b. When looking at end-user satisfaction, the satisfaction level should be based on the company’s ability to meet their client needs, the company’s ability to respond to problems, and the number of clients that are satisfied.
  
c. One problem physician’s face is finding enough independent sources to determine “real” client satisfaction. One company, KLAS, is an independent firm that evaluates company and product end-user satisfactions.
  
d. Another way of evaluating end-user satisfaction is to call physicians to determine their overall satisfaction levels. The minimum number of client contacts should be 10.
  
e. The selection Methodology formula is:

<table>
<thead>
<tr>
<th>Points</th>
<th>10</th>
<th>5</th>
<th>3</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>End-user Satisfaction</td>
<td>Over 90%</td>
<td>80% to 89%</td>
<td>70% to 79%</td>
<td>Below 70%</td>
</tr>
<tr>
<td>KLAS Rating</td>
<td>Over 8.00</td>
<td>8.00 to 8.99</td>
<td>7.00 to 7.99</td>
<td>Below 7.00</td>
</tr>
</tbody>
</table>
Company Financial Viability:

- A major concern is a company’s strength of a company in relationship to their annual revenues, profitability, and percentage of revenues that are placed back into future development.

- Physicians should be concerned about a company’s financial viability because studies have shown that if an EMR product is discontinued because a company closed or if the company elects to “sunset” (Eliminate) the EMR application, the physician will generate $80,000 in additional costs and operational inefficiencies.

- The selection Methodology formula is:

<table>
<thead>
<tr>
<th>Points</th>
<th>10</th>
<th>5</th>
<th>3</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Company Revenues</td>
<td>$100M</td>
<td>$50M to $100M</td>
<td>$5M to $49M</td>
<td>&lt; $5 M</td>
</tr>
<tr>
<td>Annual Revenues specifically allocated to EMR</td>
<td>$50M</td>
<td>$25M to $50M</td>
<td>$5M to $24.9M</td>
<td>&lt; 5M</td>
</tr>
<tr>
<td>% of revenues that is used for future development</td>
<td>&gt; 25%</td>
<td>10.1% to 25%</td>
<td>5% to 10%</td>
<td>&lt; 5%</td>
</tr>
</tbody>
</table>

Client Based:

- The current client based is important to determine the company’s ability to understand and meet the needs of their current and future clients.

- If the vendor only < 10 EMR clients fully operationally, the risk factor increases by 10 fold. The risk increases because the vendor’s long-term viability is dependent on their current client base and the ability to convince others to install their application.

- Additionally, vendors with a low installed base means that they have not experienced the issues and difficulties that other companies with 10 fold installs have faced.

- Vendors with a low installed base could still have an excellent product, but the risk is higher because

- The selection Methodology formula is:

<table>
<thead>
<tr>
<th>Points</th>
<th>10</th>
<th>5</th>
<th>3</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Practices that are using the EMR in their daily operation</td>
<td>&gt; 250</td>
<td>100 to 249</td>
<td>50 to 99</td>
<td>10 to 49</td>
</tr>
</tbody>
</table>
Technology:

- The strength of the EMR’s use of proven technology that enables a practice to become a digital office of the future is always a concern.
- If the product is character based (non windows or web browser), the product will not meet the needs of the digital office of the future.
- The product should utilize one of the commercially acceptable relational databases like Oracle, MS SQL Server, Cache, or Sybase.
- The EMR product should be fully integrated into “one” patient database with the company’s Practice Management System (PMS) and Document Image Management (DIM) solutions.
- If the product is not fully integrated into one database, the vendor should have proven reliable interfaces with multi PMS or DIM applications.
- The application should be configured and tested to be used in a wireless environment using a Table PC.
- The selection Methodology formula is:

<table>
<thead>
<tr>
<th>Points</th>
<th>10</th>
<th>5</th>
<th>3</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relational Database</td>
<td>Oracle, MS SQL Server</td>
<td>Cache, or Sybase</td>
<td>Other Relational Databases</td>
<td>Non-Relational Database</td>
</tr>
<tr>
<td>Integration</td>
<td>Fully Integrated with PMS and DIM under one Database</td>
<td>Fully Interfaced with a minimum of 10 PMS or DIM vendor applications</td>
<td>Fully Interfaced with a minimum of 5 PMS or DIM vendor applications</td>
<td>Limited interface with &lt; 5 other PMS vendors</td>
</tr>
<tr>
<td>Flexibility</td>
<td>The EMR uses open architecture and can be interfaced with any HL7 product</td>
<td>The EMR uses open architecture and can be interfaced with a minimum of 5 HL7 compliant PMS products</td>
<td>The vendor does NOT recommend outside interfaces with other PMS applications</td>
<td>The product does not allow interfaces with multi PMS applications</td>
</tr>
<tr>
<td>EDI</td>
<td>The EMR product provides intelligent charge capture, connection to the practice’s PMS, and can transmit to any third party clearing house</td>
<td>The EMR product provides intelligent charge capture, connection to the practices EMR, but most and can transmit to any third party clearing house</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Price:

- The total price of the solution should be considered when making a decision – not just the price of the software.
- Practices should determine the “Total Cost of Ownership” (TCO) when evaluating the numerous potential solutions.
- The TCO is calculated by adding the cost of the EMR software and components; the cost of the main computer server; the cost for installation and training; the cost for interfaces to a Practice Management System, the cost for interfaces to a lab reporting system; and, the maintenance contract for the first 36 months.
- The TCO does not include the cost for the workstations and printers.
- The selection Methodology formula is:

<table>
<thead>
<tr>
<th>Points</th>
<th>10</th>
<th>5</th>
<th>3</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cost per Physician</td>
<td>&lt; $30K</td>
<td>$30K to $50K</td>
<td>$50K to $99K</td>
<td>Over $100K</td>
</tr>
</tbody>
</table>

Calculating the Practice’s Risk Factor.

Once a practice has collected the appropriate information about each vendor, the next step is to determine the amount of “Risk” a practice is willing to take. If a practice is willing to take a risk with their EMR selection, then the factors change. The selection Methodology formula is:

<table>
<thead>
<tr>
<th>Points</th>
<th>10</th>
<th>5</th>
<th>3</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Factor</td>
<td>Prefer NO Risk</td>
<td>Willing to take a slight risk</td>
<td>Considered a Risk Taker and is willing to replace the software if the product goes not meet the practices needs</td>
<td>Willing to become a BETA or Alpha Site</td>
</tr>
</tbody>
</table>

Calculating the Right EMR for the Practice

All the practice has to complete record the data in a spreadsheet. The system will then calculate the selected vendor’s overall rating based on the six categories, the importance of the category, and the risk factor the practice is willing to take. Once the information is imputed, the practice should look at the results and select the top 3 – 5 vendor EMR applications for on-site demonstrations.