

## Healthcare Provider Industry Short List: Ambulatory Electronic Health Records and Electronic Medical Records

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### Healthcare Provider IT Strategies

INDUSTRY SHORT LIST #HI213204

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### HEALTH INDUSTRY INSIGHTS OPINION

The ambulatory electronic health record (EHR) and electronic medical record (EMR) market is a crowded space, characterized by numerous vendors struggling to garner market share. With adoption expected to grow by more than 10% in 2008, according to Health Industry Insights data, the market for ambulatory EHRs and EMRs remains strong. Alongside other factors, the market dynamics that have made it impossible for providers to overlook the role of an EHR or EMR in their day-to-day patient care and which has driven investment in these important systems include:

- Public and government pressure on providers to use EHRs and EMRs is growing as the benefits to quality and delivery of care become better documented.
- Financial pressure on providers has driven the need for improved functionality and a subsequent replacement cycle for practice management systems, with add-on EMR functionality a compelling addition at the time of system upgrade. Financial benefits facilitated through tighter integration between practice management and EMRs include revenue cycle management capabilities, tools that facilitate participation in pay-for-performance (P4P) initiatives, and improved clinical documentation for coding.
- The relaxation of the Stark rule has created opportunities for large academic medical centers, IDNs, community hospitals, and providers to collaborate and leverage the extension of EMR and EHR to the ambulatory setting.
- EMR and EHR technology has improved, and providers can now access improved functionality sets at lower price points than in the past, enabled by Web-based and service-oriented application architecture.

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### Methodology

The methodology of this report is designed to provide an objective analysis of the ambulatory EHR and EMR space that will assist providers in determining the EHR and EMR technology and vendor best suited to their practices, existing IT environment, and business needs. Health Industry Insights has applied the Industry Short List methodology to compare technology providers with offerings in the EHR and EMR space that are directed at practices of all sizes. The Industry Short List methodology is based on three criteria we believe are essential in the selection of an inpatient EHR or EMR supplier: fact-based research, industry focus, and evaluation transparency.

In the course of developing this evaluation, we undertook the following steps:

- The scope of the market to be evaluated is defined, and the associated vendors to be evaluated are determined. Technology suppliers selected included those considered to be current or upcoming leaders in the market. Leadership is determined by the analyst and based on the supplier's current customer base, the technology offering, and the business model's viability.
- Criteria for evaluation are determined and weighted. A management review is undertaken to ensure the appropriateness of the evaluation and to minimize analyst bias.
- Vendors are notified of the upcoming evaluation and given the opportunity to provide data regarding their product offering and business model.
- Customers are interviewed, with up to three interviews taking place with customers of each vendor under evaluation; all such interviews were conducted during the past 12 months.
- The Health Industry Insights Industry Short List criteria and tool are used to evaluate each vendor and develop the Industry Short List evaluation.
- The Industry Short List evaluation is shared with participating vendors, which are given an opportunity to review the information and submit any comments or questions to the analyst for review.
- The Industry Short List evaluation is then published. It will be updated periodically as warranted by our evaluation of the market and new product offerings.

During the course of this evaluation, each participating vendor was contacted and provided with an opportunity to participate actively in the evaluation process. With scores of vendors participating in the ambulatory EMR/EHR market, the goal of this report is mainly to point out the characteristics of a handful of vendors and highlight some of the trade-offs involved in the selection decision. The sample was not meant to be all-inclusive of the market. Vendors that were invited but chose not to participate in the evaluation were PracticeOne, Greenway, CHARTCARE, Cerner Corporation, e-MDs, and Epic Systems Corporation. These vendors and many others are not covered in this report.

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## **Market Definition**

The definition of an ambulatory EMR is complicated and confusing as multiple terms and meanings are used to describe numerous, interrelated applications used in the ambulatory care setting. The term EMR is further complicated as it is frequently used interchangeably with the term electronic health record. In its April 2008 publication, *Defining Key Health Information Technology Terms*, the National Alliance for Health Information Technology ([www.definitions.nahit.org/doc/HITTermsFinalReport\\_051508.pdf](http://www.definitions.nahit.org/doc/HITTermsFinalReport_051508.pdf)) defined EMR and EHR as follows:

- **Electronic medical record (EMR).** An electronic record of health-related information on an individual that can be created, gathered, managed, and consulted by authorized clinicians and staff within one healthcare organization.
- **Electronic health record (EHR).** An electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be created, managed, and consulted by authorized clinicians and staff across more than one healthcare organization.

The main difference between the definition of an EMR and an EHR is that EMRs are designed for use at a single healthcare organization, while EHRs have interoperable functionality and can be used across multiple healthcare organizations. In the reality of the market, the two application types are not easily separated as the functionality of products branded as EMRs and EHRs is quite similar, with the exception of features related to or facilitated by the interoperability characteristics of EHRs. In most cases, EMRs refer to electronic records used to maintain clinical information captured by a single provider organization, while EHRs are summarizations of multiple records from multiple provider organizations. EHRs may also include electronic data from payers, pharmacy benefit managers, and patients and, as such, can have multiple data sources. Keeping these definitions in mind, it should be noted that crossover between the two application

areas and interoperability between systems are increasing concomitantly. In some cases, the same application can serve as an EHR and an EMR, with access controls, user roles, and rights controlling views of the application for different stakeholders of the multifunction product.

As the industry moves toward a greater emphasis on interoperability, traditional EMR products are increasingly adding functionality that allows for interoperability, and many of these products are headed in the direction of becoming interoperable EHRs.

### **Industry Short List Market Definition**

For the purposes of this report, we will refer to a combined ambulatory EHR/EMR application market defined to include applications that:

- Provide a digital equivalent of the legal, paper-based medical record used by providers to document patient encounters at an ambulatory care facility
- Facilitate a provider's documentation of patient encounters, including a record of the patient's demographic information and health history, a record of orders placed for tests and medications, test results, and documentation of clinical notes, diagnoses, and findings with regard to the patient
- Are licensed and maintained by provider organizations
- Organize and format information captured electronically in a computerized patient record or electronic chart but may also include digitized images of paper documents, diagnostic and clinical results, and other information created by third parties

### **Other Features of EMR/EHR Applications**

- **Clinical data repository (CDR).** The CDR is a repository for all clinical information contained in a patient record. The CDR aggregates a patient's EHR/EMR for multiple encounters, as well as EHR/EMR data across all patients. The CDR is essentially a data warehouse, and users can add data mining and business intelligence tools to the CDR to create clinical intelligence applications. The CDR is also available for reporting, such as performance reporting for providers monitoring their own performance or participating in pay-for-performance programs with payers.
- **Clinical decision support (CDS).** Clinical decision support functionality includes alerts, care protocols, and other decision support functionality to support ordering, creating, and following patient care plans and implementing other quality-improving clinical processes. The minimum requirement for CDS includes

drug-to-drug interaction and allergy alerts during the prescribing process, and the functionality is embedded in the ordering capabilities of the EHR/EMR.

## **SITUATION OVERVIEW**

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### **Vendor Overview**

The vendors included in this Health Industry Insights Industry Short List are a sample of the ambulatory EHR/EMR industry. In our research, we found more than 100 vendors of ambulatory EHR/EMR systems and were forced to narrow down the field to create a representative sample for this report. The goal of this sample is to point out the characteristics of a handful of vendors and highlight some of the trade-offs involved in the selection decision. The group of vendors covered in this report is not meant to be all-inclusive of the market, and many strong products and vendor offerings are not included. The vendors we chose to cover include leaders in the industry that were chosen for their market share and penetration, as well as several emerging vendors with novel technology. The vendors that are covered offer systems that are used in practices of all sizes in the United States.

### **CCHIT Certification**

In an effort to decrease confusion about the definition and requirements for an ambulatory EHR/EMR, we have adopted some of the definitions established by the Certification Commission for Healthcare Information Technology (CCHIT), which has an established Ambulatory EHR Certification program. CCHIT's certification program created minimum standards for the functionality, interoperability, and security of an EMR that are intended to provide an industry standard starting point for the evaluation of inpatient EHR products and are recognized as such by the U.S. Department of Health and Human Services (DHHS).

While all but one of the vendors covered in this report are CCHIT certified for 2006 or 2007, CCHIT certification was not a prerequisite for selection. A list of vendors that are CCHIT certified under the 2007 criteria is provided in Table 1. Some of the vendors listed have a "premarket conditional certification" from CCHIT, which the organization reserves for new products that will not be fully certified until their installation at a physician practice is verified. Two additional vendors covered in this report, athenahealth and Spring Medical Products, had 2006 certification but have not received 2007 certification. CCHIT certification is a costly and time-consuming process for vendors, and the version-specific certification is valid for three years, although some vendors choose to recertify more often.

**TABLE 1**

## CCHIT 2007–Certified Ambulatory EHR Systems

Vendor	Product	Certification Date
*ABELSoft Corporation	ABELMed PM-EMR v8	June 17, 2008
Allscripts Healthcare Solutions	HealthMatics EHR v2007.1	January 23, 2008
Allscripts	TouchWorks v11.1	April 30, 2008
*CareData Solutions Corporation	The CareData Solution v2.7	January 18, 2008
Cerner Corporation	Cerner Millennium PowerChart/PowerWorks EMR v2007	April 24, 2008
Community Computer Service	MEDENT 17	July 11, 2007
Conceptual MindWorks Inc.	Sevocity v5.0	May 5, 2008
Dairyland Healthcare Solutions	Physician Practice Documentation (PPD) v9.0.0	June 13, 2008
digiChart Inc.	digiChart OB-GYN v7.0	March 20, 2008
Doctations Inc.	Doctations v1	June 24, 2008
Doctor Oates Computer Systems (DOCS) (DBA SOAPware Inc.)	SOAPware 2008	June 12, 2008
eCast Corporation	eCast EMR v7.0	September 21, 2007
eClinicalWorks LLC	eClinicalWorks 7.6.15	August 10, 2007
e-MDs Inc.	e-MDs Solution Series 6.1.2	July 18, 2007
*Eclipsys Corporation	Sunrise Ambulatory v4.5C SP5	April 22, 2008
*Eclipsys Corporation	Sunrise Ambulatory Care 5.0 SP1 with Eclipsys Auditing Services 1.0 XA and Eclipsys Security Services 1.0 XA	June 27, 2008
EHS	CareRevolution v5.2	June 20, 2008
Epic Systems	EpicCare Ambulatory EMR Spring 2007	November 30, 2007
*GE Healthcare	Centricity EMR v9	June 24, 2008
*GE Healthcare	Centricity Enterprise v6.7	June 24, 2008
gloStream Inc.	gloEMR v4	June 17, 2008
*gMed Inc.	gCare v4, release 6.2	June 17, 2008

**TABLE 1**

## CCHIT 2007–Certified Ambulatory EHR Systems

Vendor	Product	Certification Date
**Greenway Medical Technologies	PrimeSuite 2007 release 2	June 22, 2007
HealthPort	HealthPort EMR v9.0	May 1, 2008
HIT Services Group	Acumen EHR 5	December 11, 2007
iMedica Corporation	iMedica PRM2008 Build 8.1	February 22, 2008
Ingenix	Ingenix CareTracker v6.2	June 11, 2008
Integritas Inc.	STIX EHR, release 9.0	June 5, 2008
Integrity On Site LLC (DBA DocuTAP)	DocuTAP EMR and Practice Management Solution 2.8.2	June 5, 2008
Intivia	NeoSys V 4.1	June 26, 2009
LSS Data Systems	Medical and Practice Management (MPM) Suite, v5.54 Client Server	June 27, 2008
McKesson Provider Technologies	Practice Partner 9.2.1	July 17, 2007
McKesson Provider Technologies	Practice Partner 9.2.2	July 17, 2007
MedAppz	iSuite v3.5	November 1, 2007
MedComSoft Inc.	MedComSoft Record vUE (v4.5)	May 15, 2008
MediNotes Corporation	MediNotes e v5.2	January 24, 2008
*Misys Healthcare Systems	Misys EMR v9.10	February 22, 2008
Misys Healthcare Systems	Misys MyWay v2008	February 22, 2008
***NextGen Healthcare Information Systems Inc.	NextGen EMR 5.4.29	June 25, 2007
***NextGen Healthcare Information Systems Inc.	NextGen EMR 5.5	June 25, 2007
*Nightingale Informatix Corporation	Nightingale On-Demand v8.2	February 22, 2008

**TABLE 1****CCHIT 2007–Certified Ambulatory EHR Systems**

Vendor	Product	Certification Date
Noteworthy Medical Systems	NetPractice EHR v6.0	January 17, 2008
*Ochsner Clinic Foundation	Ochsner Clinical Workstation, v1.9.8	June 30, 2008
PracticeOne	e-Medsys Electronic Health Record	November 30, 2007
Purkinje	CareSeries EHR 2.0	July 27, 2007
Sage	Intergy EHR by Sage v4	January 17, 2008
*SSIMED LLC	EMRge v7 release 1.0	June 20, 2008
STI Computer Services	ChartMaker v3.0.5	April 22, 2008
TransMed Network	TransMed CS v3	June 20, 2008
Wellogic and GBA Health Network Systems	Wellogic Consult v3.10 release 10 and GBA MEDfx v2.8	March 26, 2008

\* Indicates products with premarket conditional certification.

\*\* Certification Extension granted June 20, 2008 (Extension valid through September 20, 2008).

\*\*\* Certification Extension granted June 23, 2008 (Extension valid through September 23, 2008).

Note: CCHIT information is current as of June 26, 2008, per CCHIT Web site.

Source: [www.cchit.org/choose/ambulatory/2007/index.asp](http://www.cchit.org/choose/ambulatory/2007/index.asp)

**Industry Short List EMRIEMR Vendors**

The ambulatory EHR/EMR market is characterized by an exceptionally large number of suppliers, and more than 100 of these vendors were evaluated for inclusion in the report. Criteria for selection included:

- Market share
- 2007 revenue — with most vendors covered in the report indicating revenues in excess of \$10 million
- CCHIT certification

- Functionality — with attention given to vendors offering innovative functionality that has the potential to deliver exceptional levels of performance, usability, or productivity enhancements for practices
- Architecture — with particular attention given to vendors offering service-oriented architecture and/or software as a service-based applications

Vendors that serve the ambulatory EMR/EHR space are typically segmented on the basis of the size of the practices served as well as price, functionality, and integration with particular practice management systems either offered by the vendor or integrated via partnership.

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### **Comparison of Vendor Offerings**

The 10 ambulatory EMR/EHR vendors and their 12 corresponding products evaluated for this report are:

- Allscripts — TouchWorks and HealthMatics
- athenahealth — athenaClinicals
- eClinicalWorks — eClinicalWorks
- GE Healthcare — Centricity electronic medical record
- MediNotes — MediNotes e
- Misys Healthcare — Misys MyWay and Misys EMR
- NextGen Healthcare — NextGen EMR
- Purkinje — Care Series EHR
- Sage Software — Intergy EHR by Sage
- Spring Medical Systems — SpringCharts EHR

The vendors that were evaluated include those that serve all sizes of practices and all specialties. The characteristics of the vendors that were evaluated are summarized in Figure 1.

**FIGURE 1**

Industry Short List: Characteristics of Ambulatory EMR/HER Vendors



Source: Health Industry Insights, 2008

**Vendor Assessment**

Each technology provider evaluated in the Industry Short List is assessed based on how well its product fits market needs and on our confidence that the technology provider will provide the customer with a satisfactory ownership experience. The assessment criteria fall into two categories, the criteria that assess the application's fit to market needs and the criteria that assess ownership confidence. Each category has individual criteria that are rated and then weighted to calculate a score, which is the basis for the analysis.

**Rating Process**

Each criterion is rated as 1, 2, or 3. Definitions for 1, 2, and 3 ratings vary according to each criterion and are listed in Table 2. Each criterion takes on the weighting of 0, 1, or 2, which determines the overall importance of the criterion in the composite rating. For example, if feature/functionality is determined to be a critical criterion in the assessment of the vendor's ability to fit the market's needs, the criterion will receive a weighting of 2. If the vendor has significant

gaps when mapped to other applications in this product category, then the analyst will rate the vendor as 1 for this criterion. Therefore, the equation will follow as:

$$2 \text{ (weight of criterion)} \times 1 \text{ (vendor rating for this criterion)} = 2 \text{ (vendor score for this criterion)}$$

When presenting the criterion graphically, the rating for fit to market needs is plotted on the x-axis, with low to high moving from left to right. The rating for ownership confidence is plotted on the y-axis, with a low-to-high movement from the center outward. Those IT suppliers that are best positioned are located in the upper-right quadrant, which represents a strong fit with market needs and a high likelihood of a positive ownership experience.

**TABLE 2**

Industry Short List for the Ambulatory Provider EHR/EMR Market: Definition of Ratings for Fit to Market Needs (X-Axis) Attributes

Rating Category	Definition of 1 Rating	Definition of 2 Rating	Definition of 3 Rating	Weighting
General feature/functionality	Product is not CCHIT certified and/or has significant gaps when mapped to other products in this product category	Product is CCHIT certified and/or presents substantially all the features and functionality that other products within this product category have	Product has several significant advances in features and functionality not offered by other products in this product category	2
Reporting and decision support feature/functionality	Reporting limited to canned reports or requires an additional third-party product; operational and financial reporting	Some performance-reporting capabilities; limited configurability	Full-featured performance reporting integrated with decision support to facilitate participation in internal or provider-sponsored programs such as pay for performance	2
Integration capability — interoperability	Product is not CCHIT certified and/or has limited integration options	Product is CCHIT certified and/or provides support for enterprise application integration	Product provides business process-level application integration via service-oriented architecture technology, including XML and Web services	2
Integration capability — practice management	Minimal provisions for integration to practice management systems	Integration to practice management systems, without automated charge capture	Products offered in conjunction with, or with integration to, a practice management system, facilitating charge capture across applications	2

**TABLE 2**

Industry Short List for the Ambulatory Provider EHR/EMR Market: Definition of Ratings for Fit to Market Needs (X-Axis) Attributes

Rating Category	Definition of 1 Rating	Definition of 2 Rating	Definition of 3 Rating	Weighting
Architecture	Client/server	Thin client	No client; Web-based technology requiring no installation of code on the client machine	1
Scalability: Providers	Less than 10 providers	10–50 providers	More than 50 providers	2
Breadth of services	Limited capabilities — maintenance, support, implementation, and training	Broad capabilities (Those defined for 1 rating plus integration with major applications)	Full-service capabilities (Those defined for 2 rating plus strategic consulting and change management)	1
Service quality	Inferior service quality; vendor may be the only service provider for the product	Average service quality	Extensive service offering; vendor guarantees performance and is willing to gain share/accept penalties	2
Pricing arrangements	Complex user purchase requirements; multiple products and licenses required for each user	User-based pricing; single price for all required components	Enterprise pricing; simple administration	1
Implementation cost	High cost of implementation; >3 times the license cost	Implementation cost average relative to industry; 2–3 times the license cost	Low cost of implementation; <2 times the license cost	1

Source: Health Industry Insights, 2008

### **Weights Applied to Criteria**

The weights applied to criteria are indicated in the rightmost column of Tables 2 and 3. Weighting measures are 0, not important; 1, somewhat important; and 2, very important.

### ***Fit to Market Needs***

The fit to market needs (x-axis) assessment is a weighted total of 10 criteria that assess the strength of a product in terms of feature/functionality, interoperability, architecture, quality of service and support, and cost. The criteria for the fit to market needs assessment and the weights attached to them in the analysis for the ambulatory EHR and EMR market are summarized above (refer back to Table 2). Specific criteria are addressed in the following sections.

## **General Feature/Functionality**

The features and functions available from EHR/EMRs range from very basic to sophisticated clinical decision support functionality. The CCHIT standards for EHR/EMR certification are used as a baseline from which to evaluate extended application functionality.

The list of functions evaluated by CCHIT is highly specific, and although certainly as comprehensive as possible at the time of development, it may not always represent all of the functions necessary for optimum performance at a specific facility and may include other functions that are not necessary for a particular care setting. CCHIT certification is only granted when applications meet 100% of the base CCHIT functionality requirements. It is expected that subsequent releases of CCHIT guidelines will likely become more extensive and sophisticated. A listing of CCHIT-certified applications has been provided earlier (refer back to Table 1).

CCHIT certification was taken into account in this assessment, but the application functionality was also assessed independently. Ratings were as follows:

- **Rating of 1.** For purposes of this assessment, products that are not CCHIT certified and/or have significant gaps when mapped to other products in this product category were assigned a rating of 1.
- **Rating of 2.** A rating of 2 was assigned to products that are CCHIT certified and/or present substantially all the features and functionality that other products within this product category have.
- **Rating of 3.** Ratings of 3 were reserved for products with functionality that delivered several significant advances in features and functionality not offered by other products in this product category. The advances given a rating of 3 included particularly strong customer assessments on the usability of an application, advanced and effective approaches to physician and nursing notes documentation, decision support and care planning functionality, and portals that allow patient access to information.

## **Reporting and Decision Support Functionality**

One of the main goals of EHR/EMRs is to allow providers to aggregate information across medical records for reporting on operational performance, compliance with guidelines for quality of care, and metrics for clinical performance, such as those required for participation in pay-for-performance programs. The ratings in this category are made both on the basis of available functionality and on reports of actual use of the functionality by customers. In some cases, applications offer functionality on paper, but reporting can be tedious and difficult to use in practice. The useable level of reporting

functionality reported by customers is what is assessed by the following ratings:

- **Rating of 1.** Applications with reporting use limited to canned reports and/or operational or financial reporting were granted a rating of 1.
- **Rating of 2.** Applications with some performance reporting functionality were given a rating of 2. For applications granted a rating of 2, customers reported use of some reporting functionality but with difficulties in configuring reporting for their needs.
- **Rating of 3.** Applications granted a rating of 3 provided full-featured performance reporting, with clients reporting use of functionality for internal performance reporting, payment of provider bonuses, or participation in pay-for-performance programs.

#### **Integration Capability — Interoperability**

The CCHIT standards for EHR certification have provided a baseline from which to evaluate EHR interoperability, and this is evaluated here as one component of integration capability. The CCHIT interoperability concerns take into account compliance with available standards, but these are limited and may not correspond to integration requirements at an individual facility.

The CCHIT criteria for interoperability were considered in the rating for integration capability. Ratings were as follows:

- **Rating of 1.** A rating of 1 was granted to products that are not CCHIT certified and have limited integration options or are functioning as an EMR for a single healthcare organization without EHR functionality.
- **Rating of 2.** A rating of 2 was granted to products that are CCHIT-certified EHRs and provide support for enterprise application integration.
- **Rating of 3.** A rating of 3 was granted to products that are both CCHIT-certified EHRs and offer business process-level application integration via service-oriented architecture technology, including XML and Web services.

#### **Integration Capability — Practice Management**

The integration of ambulatory EHRs and EMRs with practice management systems plays a major role in the ability of an EHR/EMR to demonstrate a return on investment for the practice by facilitating charge capture across applications. It also adds efficiencies to installations by preventing the need for double-data entry of charges

into a separate practice management system, by eliminating the use of charge sheets outside of the EHR/EMR environment, and by reducing the need to support staff to facilitate billing and reimbursement. It facilitates regulatory compliance by providing documentation of charges in conjunction with clinical encounters. Ratings were as follows:

- **Rating of 1.** A rating of 1 was granted to products that are offered with minimal provisions for integration with practice management systems.
- **Rating of 2.** A rating of 2 was granted to applications that offer integration with practice management systems that pass information between them, but which do not offer automated charge capture.
- **Rating of 3.** A rating of 3 was granted to products offered in conjunction with or with integration to a practice management system and facilitating automated charge capture across the two applications, using application logic to distill charge data directly from clinical data entered and not requiring a separate data entry path.

### **Architecture**

While ambulatory EMR systems have been marketed for as long as 15 years by some of the vendors under evaluation, the market has been slow to mature. Because of this, EMR solutions represent varying origins, evolution, age, and platforms, which can affect the available functionality, nature of the user interface, ease of integration, and support and maintenance expenses. The acquisition and installation of EMR solutions has lagged far behind availability, and productive use of the systems has lagged far behind implementation as providers resist efforts to place orders and/or document clinical notes electronically, making EMRs less efficient. The persistence of paper components of medical records or the wide-scale incorporation of scanned document content reduces the overall efficiency of the EMR.

Most applications in the EHR/EMR space that are discussed in this report have technology that can be placed into one of three categories:

- **Rating of 1.** The *client/server* platform has a range of architecture requirements, depending on the amount of installed software required to use the client on a machine. Client/server applications are generally more flexible than legacy systems and offer some embedded clinical and quality functions by design. Like legacy systems, client/server-based EHRs and EMRs are also usually closely tied to practice management systems and allow facilities to leverage an existing practice management system provided by the vendor while adding clinical functionality. Clinical functionality in

client/server applications can be more cumbersome to use than Web-based applications developed for clinical use, but this depends on the age and nature of the system. Server-based processing can limit the configuration options and performance for individual users, particularly for clinicians who wish to utilize customized forms and order sets. System upgrades typically require downtime. Thin- and no-client systems expand the capabilities for remote access to those comparable with a Web-based system.

- **Rating of 2.** These client/server applications (3-tier/n-tier) use a *thin-client* architecture with a requirement for installed applications on the client machine.
- **Rating of 3.** *Pure Web-based* applications require no installation of application-specific code on the client machine. Web-based EHRs and EMR systems generally began development after 1999, and they leverage Internet technology to deliver connectivity to the EHR across the organization and into the community. Internet-based EHRs have the advantage of being readily available for wireless use without a VPN and are more accessible for advanced functionality, such as provider and patient portals that offer remote access to information. While they are dependent on the performance of the Internet connection in use, they can offer performance and security options that are superior to those of client/server systems. Hardware requirements can be lower than for other types of systems as standardized systems are not required and downtime is not required for system upgrades. They are currently available in software-as-a-service offerings. These applications were granted a rating of 3 in the architecture criteria.

#### **Scalability: Providers**

The scalability for providers was assessed on the basis of both the theoretical scalability claimed by the vendor and the actual scalability demonstrated in reference conversations. The scalability assessment is measured in terms of number of physicians (providers), although other system users may include clinical staff and administrative users of the applications in the practice. Ratings were as follows:

- **Rating of 1.** Systems demonstrated to support 10 providers or fewer were granted a rating of 1 in this criteria.
- **Rating of 2.** Systems with demonstrated support for implementations of 10–50 providers were granted a rating of 2 for this criteria.
- **Rating of 3.** Systems that support more than 50 providers were granted a rating of 3.

## **Breadth of Services**

The breadth-of-services rating comes from information provided by vendors as to the specific services they offer. They were queried about their available services for installation, implementation, hosting, integration and data migration, help desk, maintenance, training, and consulting services. For each service category, they were asked about the services that were provided by their own teams as well as those that were delivered by partner organizations. End users were also asked in interviews about their experiences with the service organizations.

Based on this information, vendors were ranked on the breadth of services they offered. Ratings were as follows:

- **Rating of 1.** Vendors that were ranked 1 offered minimal services, mostly surrounding installation.
- **Rating of 2.** Vendors that were ranked 2 offered a breadth of services comparable to most of their competitors.
- **Rating of 3.** Vendors that received a rating of 3 offered a complete service portfolio, with ongoing services following implementation.

## **Quality of Service and Support**

End users were asked in interviews about their experiences with the service organizations. Based on this information, vendors were ranked on the quality of services they offered. Ratings were as follows:

- **Rating of 1.** Vendors that were ranked 1 offered minimal services, mostly surrounding installation, and had some client dissatisfaction with the services offered.
- **Rating of 2.** Vendors that offered average quality services were ranked 2.
- **Rating of 3.** Vendors that received a rating of 3 offered a complete service portfolio, with exceptional levels of customer contact, implementation services that included consulting and process improvement professional services, ongoing services following implementation, and customer involvement in user groups and ongoing application planning and upgrade processes.

## **Pricing**

End users and vendors were asked about the pricing arrangements offered and used in practice. Reference feedback was solicited regarding value of vendor offerings. Ratings were as follows:

- **Rating of 1.** Complex user purchase requirements; multiple products and licenses required for each user. High cost of acquisition relative to perceived value of functionality.

- **Rating of 2.** User-based pricing; single price for all required components. Average cost of acquisition relative to perceived value of functionality.
- **Rating of 3.** Enterprise pricing or software as a service; simple administration. Low cost of acquisition relative to perceived value of functionality.

### **Implementation Cost**

The assessment of cost is based on customer experiences with the costs associated with implementation, installation and data migration, hardware, and ongoing maintenance and perceived cost of ownership. Vendors were ranked as follows based on the cost of their applications and products:

- **Rating of 1.** Implementation costs are exceptionally high, particularly relative to the licensing costs, with long, drawn-out implementation processes and multiple teams required. An inaccurate implementation assessment may result in costs beyond those expected by the facility. Upgrades are required within the first year following implementation. Implementation costs exceed three times the license cost.
- **Rating of 2.** Implementation costs and ongoing maintenance are average relative to industry. Implementation costs are 2–3 times the license cost.
- **Rating of 3.** Implementation costs are low, <2 times the license cost, and, as estimated by the vendor, with infrequent unexpected overruns. Vendor may offer software as a service with remote training and implementation service that are effective and lower than the cost of implementation for the practice. Customers cite the value associated with maintenance and support offerings. Ongoing support costs are low as the application uses commodity hardware and requires no upgrades in the first 12 months of use.

### **Ownership Confidence**

The ownership confidence (y-axis) assessment is a weighted total of six criteria that assess the soundness of a technology supplier's strategy, financials, commitment to an industry, and customer satisfaction. The ownership confidence assessment criteria for the clinical electronic medical record market are summarized in Table 3.

**TABLE 3**

Industry Short List for the Ambulatory Provider EHR/EMR Market: Definition of Ratings for Ownership Confidence (Y-Axis) Attributes

Rating Category	Definition of 1 Rating	Definition of 2 Rating	Definition of 3 Rating	Weighting
Supplier's market share	Not a top 10 share	Top 10 vendor in segment	Top 3 vendor in segment	1
Supplier's profitability	Not profitable	Profitable/private held/publicly held on a minor exchange	Profitable/publicly traded on major exchange	2
Supplier's R&D investment level	<15% of annual revenue	15–19% of annual revenue	>19% of annual revenue or 15–19% of revenue with exceptionally well-targeted investment	2
References	Vendor has difficulty producing positive references	Small number of positive reference accounts	Most customers rate implementation positively	2
Customer satisfaction with support	Vendor has difficulty producing positive references, support issues cited by customers	Small number of positive reference accounts	Most customers rate ongoing support positively	1
Customer satisfaction with product	Customers cite delays in product development, missing functionality that was promised	Average satisfaction with product	Customers cite exceptional levels of product satisfaction, responsive development, and no missing functionality	1

Source: Health Industry Insights, 2008

## EVALUATING THE VENDORS

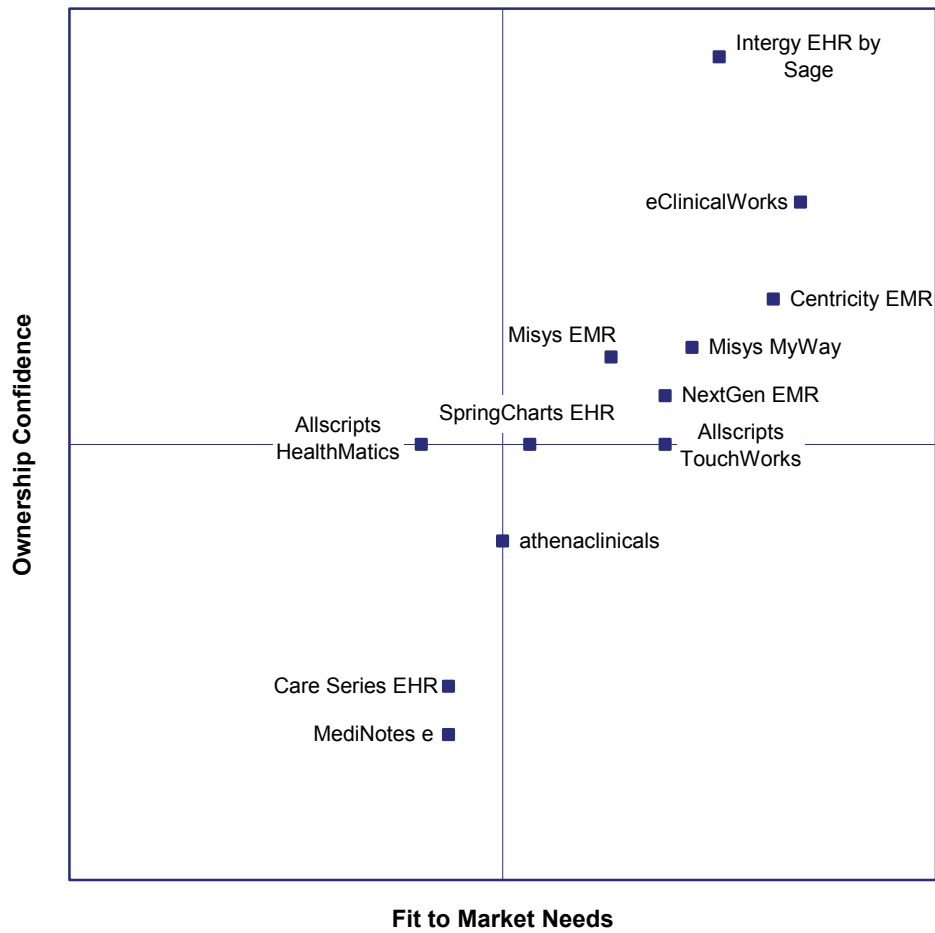
### Industry Short List Evaluations

Figure 2 outlines the relative position of each vendor, based on its total ranking by ownership confidence and fit to market, factoring in the weighting.

Tables 4 and 5 outline the criteria used in the fit to market needs and ownership confidence that are incorporated into the Industry Short List evaluation figure.

**FIGURE 2**

Industry Short List: Ambulatory Provider EMR/EHR Market



Note: Those IT suppliers that are best positioned are in the upper-right-hand quadrant, which represents a high fit to market needs and a high likelihood of a positive ownership experience.

Source: Health Industry Insights, 2008

**TABLE 4**

Industry Short List for the Ambulatory Provider EHR/EMR Market: Vendor Ratings for Fit to Market Needs  
(X-Axis) Attributes

	General Feature/ Function	Reporting and Decision Support Function	Integration/ Interoperability	Integration with Practice Mgmt.	Architecture	Scalability: Providers	Breadth of Svcs. and Support	Quality of Svcs. and Support	Pricing	Implementation Cost
Allscripts TouchWorks	3	2	2	2	2	3	2	3	2	2
Allscripts HealthMatics	2	2	2	2	1	1	2	2	2	2
athenaClinicals	2	2	1	1	2	2	2	3	3	3
eClinicalWorks	3	2	3	3	2	3	3	2	3	3
Centricity EMR	3	3	3	3	1	3	3	2	2	2
MediNotes e	2	2	2	2	1	2	1	2	2	2
Misys MyWay	3	2	2	3	3	2	2	2	3	3
Misys EMR	2	2	2	3	2	3	2	2	2	2
NextGen EMR	2	3	2	2	2	3	2	3	2	2
Care Series EHR	2	3	2	1	2	1	1	2	3	2
Intergy EHR by Sage	2	3	2	3	1	3	3	3	2	2
SpringCharts EHR	2	2	3	1	2	1	1	3	3	3

Note: See Table 2 for an explanation of the scale for each attribute.

Source: Health Industry Insights, 2008

**TABLE 5**

Industry Short List for the Ambulatory Provider EHR/EMR Market: Vendor Ratings for Ownership Confidence (Y-Axis) Attributes

	Supplier's Market Share	Profitability	R&D Spend	References	Customer Satisfaction with Support	Customer Satisfaction with Product
Allscripts TouchWorks	2	3	1	2	2	2
Allscripts HealthMatics	2	3	1	2	2	2
athenaClinicals	1	2	1	2	3	2
eClinicalWorks	3	2	2	3	3	3
Centricity EMR	3	3	1	2	3	3
MediNotes e	2	1	1	1	2	2
Misys MyWay	2	3	1	2	3	3
Misys EMR	2	3	1	2	2	2
NextGen EMR	3	3	1	2	2	2
Care Series EHR	1	1	1	2	2	2
Intergy EHR by Sage	2	3	3	3	3	3
SpringCharts EHR	1	2	2	2	3	2

Note: See Table 3 for an explanation of the scale for each attribute.

Source: Health Industry Insights, 2008

## Selected Vendor Profiles

### **Allscripts Healthcare Solutions — TouchWorks and HealthMatics**

Allscripts ([www.allscripts.com](http://www.allscripts.com)) is a publicly held company headquartered in Chicago, Illinois, that markets a number of products directed at the provider market, including two ambulatory EHR products — TouchWorks and HealthMatics. The company does not market products outside the healthcare provider vertical and claims to serve more than 40,000 physicians in 4,000 clinics and 700 hospitals in the United States. Historically, Allscripts has served the large provider market with a premium product offered via its partnership with IDX, now owned by GE Healthcare, which allowed it to sell EMRs into IDX's large practice management customers. The alliance with GE was instrumental in helping to build Allscripts' current EMR market presence.

The TouchWorks EMR is targeted at the large provider market (25–200 providers), while the HealthMatics EHR product is aimed at the small and midsize provider market (less than 25 providers). TouchWorks has Web-based architecture and a strong user interface, emphasizing adaptive workflows and clinical decision support for large practices. HealthMatics is an installed client-server application that provides EHR capabilities to small provider groups with an emphasis on creating a paperless environment via wireless connectivity and scanning capabilities. Neither of Allscripts' products are provided as software as a service.

On March 18, 2008, a planned merger was announced between Allscripts and the healthcare division of Misys plc. Upon the close of the transaction, expected six months following the announcement, a new, Nasdaq-traded company will be created called Allscripts-Misys LLC that is majority owned by Misys, the United Kingdom-based parent company of Misys Healthcare. The impact of the merger on the eventual product portfolio of the combined company is unknown and is of concern to many customers.

#### ***athenahealth — athenaClinicals***

athenahealth ([www.athenahealth.com](http://www.athenahealth.com)) is a publicly held company founded in 1997 and headquartered in Watertown, Massachusetts. athenahealth markets products exclusively to healthcare providers. Its initial software products, athenaNet and athenaCollector, are centered around facilitating service-based practice and revenue cycle management offerings. The company recently added EMR capabilities under the brand athenaClinicals in 2007 and currently claims to have about 400 live providers using the EMR, with an average practice size of 1–3 providers.

athenahealth's unique value proposition centers around the services provided in conjunction with its applications. The company's initial product, athenaCollector, served the physician revenue cycle management market with service-based billing functions and a practice management platform that resulted in strong levels of customer satisfaction and revenue enhancement for its customers. athenaClinicals is positioned as building on this service model by adding an EMR platform and services that automate the management of medical record-related functionality for practices. Automated functionality includes following up on orders and diverting incoming paper-based information to athenahealth's service center for scanning and incorporation into the EMR. The EMR is template based and hosted by the company, at no additional charge when a practice uses athenahealth's medical records service.

The service-based business model for athenaClinicals provides an opportunity for physicians to move to EMR relatively painlessly as the approach minimizes the disruption of implementation. The value

proposition is particularly strong when considered in conjunction with the financial benefits providers have seen from using athenaCollector. However, this is undermined by the company's failure to implement integration at the charge capture level in currently used versions of athenaClinicals. This integration is currently under development. The company is focused on providing strong decision support and reporting and plans to eventually add benchmarking capabilities for its providers across the user community. athenaClinicals has 2006 CCHIT certification but has not yet received certification on the 2007 criteria.

### **eClinicalWorks — eClinicalWorks**

eClinicalWorks ([www.eclinicalworks.com](http://www.eclinicalworks.com)) is a privately held company founded in 1999 and headquartered in Westborough, Massachusetts. eClinicalWorks is focused entirely on the ambulatory EMR and practice management space, and its product suite is marketed under the company name. eClinicalWorks is focused on providing low-cost, intuitive functionality to outpatient ambulatory practices of all sizes, and the company has strong penetration among large practice groups and networks of practices. The product suite includes an EMR and integrated practice management application.

The eClinicalWorks EMR is Internet based and can either be installed at customer sites or accessed as software as a service, supplied as an ASP by eClinicalWorks. eClinicalWorks integrates with numerous third-party hospital systems via XML data transfer. eClinicalWorks provides its own implementation services using an in-house team and a templated 12-week implementation process. eClinicalWorks is enabled for use on wireless devices and optimized for use with tablet PCs. Reporting is ad hoc via Crystal Reports or Cognos and is individualized for the needs of the large provider groups that make up the majority of the company's customer base. eClinicalWorks reporting is used for participation in pay-for-performance programs by a number of its clients and has met the requirements for reporting by federally qualified health centers.

eClinicalWorks has experienced rapid growth in the last 18–24 months and currently serves more than 18,000 providers, in practices averaging 4–10 providers. Customers include networks of federally qualified health centers in Virginia, Connecticut, and New York as well as the New York City Department of Health and Mental Hygiene, a contract signed in 2007 through which the company eventually expects to supply 1,300 providers with EMRs, the Massachusetts eHealth Collaborative (MAeHC), and the Electronic Health Records of Rhode Island (EHRRI).

### **GE Healthcare — Centricity EMR**

GE Healthcare ([www.gehealthcare.com/emr](http://www.gehealthcare.com/emr)) is a publicly held company headquartered in the United Kingdom and is a subsidiary of the General Electric Company. The GE Healthcare business unit

accounts for \$17 billion in revenue worldwide and has 46,000 employees. GE Healthcare's ambulatory EMR product is a component of the company's Centricity Practice system. GE Healthcare markets an extensive set of electronic equipment, diagnostic and imaging systems used in the healthcare industry, in addition to information technology products, such as the firmware used by these systems, and adjunct applications, such as the Centricity EMR.

In addition to offering Centricity EMR as a standalone application, GE offers Centricity Practice Solution, which adds practice management functionality to the EMR. GE's ambulatory EMR products include the Centricity EMR as well as Centricity Practice Solution. These products have their origins with several acquired companies and products and serve practices of all sizes and specialties. The average practice size served is 25–50 physicians but the application can scale to support practices with more than 250 providers and 1,000 or more users. GE claims to serve 30,000 U.S. providers in 1,400 unique practices with its ambulatory EMR solutions.

The Centricity EMR can be integrated with GE's Centricity Practice Management system or third-party practice management tools. The application has template-based patient encounter documentation, order entry, and integration with pharmacies, labs, and radiology for execution of physician orders placed in the EMR. Centricity EMR offers decision support for instituting and monitoring guideline-based clinical performance programs, including embedded NCQA guidelines and extensive reporting options. Third-party technology is integrated and sold by GE for Centricity's patient portal, which uses Kryptiq's technology, as well as secure messaging, document imaging, and ePrescribing capabilities.

Customers of Centricity's ambulatory products report that the application is flexible and has many configuration options but that this flexibility can sometimes be cumbersome for users, particularly new ones. The decision support and reporting options are well regarded by customers, who make use of the embedded NCQA guidelines and automated reporting. The patient portal offering is one of the strongest seen. As with any single product offered by a large, horizontal vendor with multiple lines of business, Centricity customers may expect both constraints and advantages as a result of larger corporate infrastructure and a large customer base.

### ***MediNotes — MediNotes e***

MediNotes Corporation ([www.medinotes.com](http://www.medinotes.com)) is a privately held company headquartered in Des Moines, Iowa. MediNotes offers the MediNotes e EMR. MediNotes is currently in the process of absorbing Bond Technologies Inc.'s practice management functionality following the acquisition of the company in March 2008. While MediNotes has historically provided only EHR functionality to its customers, the

acquisition of Bond Technologies and planned integration of Bond Clinician (renamed MediNotes Clinician) adds practice management functionality to the vendor's product portfolio.

The MediNotes e standalone EMR is targeted at physician groups with 1–15 providers, and the company claims to serve more than 4,700 practices nationwide.

### ***Misys Healthcare — Misys MyWay and Misys EMR***

Misys Healthcare is a division of the publicly held, United Kingdom–based Misys. Misys Healthcare markets two EMR products, Misys MyWay and Misys EMR, which are designed to serve different segments of the market. Misys MyWay is a software-as-a-service offering that targets small and midsize practices with an integrated EMR and practice management offering, while Misys EMR is a client/server EMR application aimed at larger practices that are customers of Misys' practice management systems. Misys' claims its practice management and EMR systems currently serve 110,000 U.S. physicians, about 20% of whom also use Misys EMRs.

Misys MyWay is Misys' newest product and was launched in 2007 as an on-demand, ASP-based solution. The MyWay technology is sourced from the vendor iMedica, which also markets its own version of the product. MyWay offers integrated practice management with EMR capabilities for small practices at a low price point, is delivered over the Internet, and has simplified implementation and configuration offerings. The practice management component of the MyWay offers significantly less functionality than Misys' other practice management systems as it is designed specifically to support small practices with straightforward business models. Because of customer demand for use with its more complex practice management systems, Misys has indicated plans to offer an EMR-only version of MyWay for use with its standalone practice management systems.

MyWay's differentiators include the Internet-based platform as well as the template-less format of the EMR's data capture functions. The application uses service-oriented architecture, .NET, and XML technology, and the user interface makes heavy use of Internet-style personalization options, links, and drilldowns. The template-free clinical data capture uses what the company calls "palettes" to automate the workflow of patient visit documentation. In essence, this is a dynamic, menu-driven system that uses adaptive learning to automate and default to the most frequent workflow patterns of a provider. Early adopters of the system report strong usability and that the application's use of adaptive learning removes the need to configure the application to the practice workflow prior to installation. The MyWay EMR also has the ability to synchronize patient data to a client machine for offline access to patient files. Extensive Internet-based training is offered via Misys Academy.

The Misys EMR is an installed client/server application designed for use by the larger practices that use Misys' practice management applications. This application is designed to scale to support practices with more than 250 providers and up to 1,000 users. Integration with third-party applications is via custom enterprise application integration. Misys claims that the EMR currently serves 1,851 practices in the United States.

Misys is currently in the process of acquiring rival EMR vendor Allscripts in a transaction that would create a new, Nasdaq-traded company called Allscripts-Misys LLC. The company will be majority owned by Misys, and the merger is expected to close in the next 2–4 months. The impact of the merger on the eventual product portfolio of the combined company is unknown and is of concern to many customers.

### ***NextGen Healthcare Information Systems — NextGen EMR***

NextGen Healthcare ([www.nextgen.com](http://www.nextgen.com)) is a wholly owned subsidiary of Quality Systems Inc. and is headquartered in Horsham, Pennsylvania. Quality Systems is a publicly traded company, and the NextGen Healthcare division represents 89.4% of its revenue. Quality Systems' other products comprise dental and medical practice management software. NextGen Healthcare was acquired by Quality Systems in the mid-1990s. NextGen Healthcare markets under the company name a suite of electronic medical record and practice management tools that are targeted at midsize and large practices. As a result of its product acquisition history, NextGen Healthcare was forced to undertake a major development effort to integrate its products in the 2003–2005 time frame. The company currently offers its practice management solution and EMR in an integrated solution using a single database.

The NextGen EMR uses a client/server architecture and the Windows operating system. The EMR is targeted to large practices, and the company claims to serve 30,000 U.S. doctors in 1,800 practices, with an average practice size estimated at 40–60 providers. The NextGen EMR product offers particularly strong decision support and reporting capabilities, and customers report successful participation in pay-for-performance programs with integration into the EMR's clinical workflow and reporting capabilities. NextGen's EMR offers the Internet-based NextMD patient portal with its EMR that allows providers to offer practice services to patients over the Internet. While hosting is available, the EMR application is usually installed onsite at practices, with the exception of the NextMD portal, which can be hosted separately. The patient portal offers online services and physician communications, although it is not e-Visit capable. Practice billing services are available through NextGen's Practice Solutions offering.

NextGen EMR offers a competitive solution tailored to the needs of large practices. The company is growing strongly and continuously improving its products and technology.

### ***Purkinje — Care Series EHR***

Purkinje is a privately held company founded in 1995 and headquartered in St. Louis, Missouri. Its Care Series EHR has been marketed since 2001, although the company was renamed following the merger with St. Louis-based Wellinx in 2005. The company has a Canadian market presence and offices in Toronto.

The Care Series EHR is provided as an ASP by Purkinje, lowering the initial investment for its users that include small practices and solo practitioners. The Care Series EHR is differentiated by its proprietary clinical content and the availability of an integrated medication dispensing solution. The clinical content compilation service is aimed at driving improvements in care via the use of decision support functionality. Purkinje's decision support team includes about 30 medical professionals who work to develop and incorporate decision support capabilities into the product. The medication dispensing solution allows providers to add a revenue stream to their practices by dispensing prepackaged medications in their offices. The company maintains distribution relationships that allow its providers to offer a formulary of frequently prescribed, high-margin medications at a low cost to patients without involving payer reimbursement. Additionally, the company offers a "Plus" service option that includes an outsourced billing service.

Purkinje is a small but innovative vendor. The Care Series EHR is provided at a low cost on a monthly service basis for small and solo practices.

### ***Sage Software — Intergy EHR by Sage***

Sage Software Healthcare Division ([www.sagehealth.com](http://www.sagehealth.com)) is a part of Sage Software, the U.S. arm of the United Kingdom-based Sage Group plc. Sage Software is a horizontal IT vendor with a 30-year history of serving multiple industries in addition to providing business management, practice management, and electronic health records to healthcare organizations. The Intergy EHR is targeted at large medical practices but has a strong market share with smaller practices. The average practice size served by Sage is 4–10 providers, and the current customer base includes 635 practices with 5,000 unique providers.

Intergy offers strong clinical functionality and integrated practice management. Charge capture, billing and reimbursement, financial reporting, and other associated practice management capabilities are integrated with the EHR. Intergy's reporting and decision support functionality is particularly notable; customers report using Intergy to

track internal performance metrics and participate in pay-for-performance programs. Decision support capabilities can be enabled that integrate clinical best practices metrics into the physician's workflow. Intergy uses a client/server architecture to deliver its functionality. Computerized physician order entry is available for all types of orders but, as with all ambulatory environments, must be integrated with the destination for the order. The large practices served by Sage tend to have internal lab facilities, and the application works well with these internal orders. Interfaces are readily available to commercial and national laboratories and custom developed for in-house and local labs and radiology. A provider portal is available and a patient portal is in development.

Sage's pricing is per provider for installed applications, and hosting by Sage is available. Sage also offers service options and onsite maintenance for both installed applications and hardware owned by practices.

### ***Spring Medical Systems — SpringCharts EHR***

Spring Medical Systems ([www.springmedical.com](http://www.springmedical.com)) is a small, privately held company headquartered in Houston, Texas. Spring Medical markets the SpringCharts EHR, whose primary differentiator is its support for running the EHR on the Mac OS X operating system. SpringCharts is targeted at small and solo provider practices, primarily in the general internal and family medicine specialties. The company does not offer its own practice management system but integrates with multiple practice management systems that serve its core market, including Macintosh-based systems. Apple hardware can be used for client and server machines, and users can export data to iPod or iPhone devices. Planned capabilities include development of SpringCharts ePrescribing for the iPhone.

SpringCharts customers report the application is easy to use and offers intuitive functionality. For the solo and small practitioners that the company serves, this is particularly important. The company offers implementation services and staged implementations to prevent practice downtime. The application facilitates a paperless environment for the small practice using electronic ordering as well as document scanning. The small size of the vendor allows for close relationships with customers and enhances customer satisfaction with service and support.

Physicians using SpringCharts on the Mac report high levels of performance, combined with flexibility and reliability. SpringCharts is targeted at small and solo practitioners with low budgets and little access to IT support, who prefer to use Apple hardware. SpringCharts has 2006 CCHIT certification but has not yet received certification on the 2007 criteria.

## **FUTURE OUTLOOK**

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### **Market Impact**

Electronic medical records have been in use for almost 40 years, but it is only in the past 10 years that the technology has matured to levels of function and usability that make them viable tools for the ambulatory care setting. In the past 3–5 years, a surge of support for the use of electronic medical records from the public, government, and consumers has driven new awareness of their benefits, while Internet-based technology has allowed applications to reach levels of utility not previously attained. For this reason, the market has grown considerably but, at the same time, the spectrum of vendor-supplied products has also exploded.

The ambulatory EMR systems selected for this report, as well as many others available in the marketplace, provide tools for improving patient safety and administrative efficiencies in the ambulatory setting by reducing medical errors and better documenting care. For practices without an EMR, this is the time to adopt. Those that have already adopted EMRs should be looking at their functionality with a critical eye to ensure that they have the right capabilities installed to assist their staff to provide care in the safest and most efficient means possible, and that they have invested in architecture that positions them to take advantage of advances in core technology.

## **ESSENTIAL GUIDANCE**

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### **Actions to Consider**

Ambulatory practices face a high level of complexity in selection decisions and need to consider numerous issues including:

- **Technology.** Technology choices include decision about architecture and delivery, as well as user interface style. These decisions affect the implementation process, cost of the application, and the eventual experience of the practice in the day-to-day use of the application.
- **Workflow and user interface.** Unlike many of the other applications used in the ambulatory setting, such as practice management and billing applications, ambulatory EMRs are used by the providers themselves and not by the office staff. As they use the EMR to document clinical encounters, the application will be used for long periods of time, every day. Most EHR applications use a template-based user interface, although variations and dynamic applications of templates can affect the workflow of the application and the user experience; in some cases, one user interface may be a better fit for a particular practice than another.

Providers need to be intimately involved in the selection process to ensure that the workflow and style of the application fits their needs.

- **Readiness of the practice and providers.** The success of an EMR implementation and the level of eventual use of ordering functionality, particularly by providers, are tied to the readiness of the organization and approach to implementation. Readiness happens in degrees — some teams may be ready only for ePrescribing whereas others may be ready for a full EMR. Customizing the solution and implementation approach to the practice, specialty, and team are key variables that lead to acceptance and use of systems.
- **Clinical staff buy-in.** Physician and nurse buy-in, participation in system selection and implementation, and configuration options for ordering can be make-or-break functionality for EMRs. In situations where providers resist efforts to place orders and/or document clinical notes electronically, the EMR is less efficient and benefits do not accrue as significantly to the practice. The persistence of paper components of medical records or the wide-scale incorporation of scanned document content reduces the overall efficiency of the EMR. Physician and nurse participation in system selection can help identify electronic documentation and ordering solutions that have simple and intuitive functionality that meets the needs of the practice. Participation can also help clinical staff to better understand trade-offs that need to be made during the decision process and lessen the likelihood of widespread resistance to adoption. Regardless of the actual functionality, leadership and acceptance of the EMR by providers with a stake in the future of the practice are critical.
- **Integration options — orders.** Practices need to consider the types of orders they place and the internal and external suppliers they use to fulfill orders when considering application and integration options. While two-way integration for all orders is the ideal scenario for facilitating physician order entry, practices need to take into account the cost/benefit relationship for integration as it relates to their volume of orders for a supplier. In some cases, scanning/paper solutions may be necessary as interim or permanent solutions for laboratory and/or radiology orders. For practices with internal labs, the existing system of the lab and the interface options available needs to be considered. If no system is in place for the internal lab, automation options should be considered. Practices that use national labs, such as Quest or LabCorp, need to look for vendors with out-of-the-box, two-way interfaces to place orders and receive lab results from these vendors. Practices that use local labs need to look for vendors that offer service-oriented architecture in order to facilitate interfaces to these labs. The local environment in terms of pharmacy readiness needs to be considered when selecting an ePrescribing solution.

- **Integration options — practice management.** Existing practice management systems represent investments that can be leveraged during EMR implementation. However, changes in the provider needs for revenue cycle management capabilities, the introduction of healthcare savings accounts and pay-for-performance programs by payers, have changed the needs related to practice management and billing capabilities for providers. These types of programs increasingly require more integration across revenue cycle and clinical data in a practice. In many cases, an EMR implementation will go hand in hand with the replacement of outdated finance/billing and revenue cycle management products. This can extend and add complexity to the implementation. However, many of the practices we spoke with reported significant financial benefits from the integration of charge capture and E&M coding documentation with clinical documentation using an EMR. The integration with clinical documentation allows for more accurate coding with built-in documentation of complexity levels, removing the need to code conservatively and improving reimbursement. In addition, EMRs can be used to highlight opportunities when clinical guidelines may be relevant to add-on services a practice offers, again increasing revenue in conjunction with the quality of care.
- **Process improvement and clinical transformation.** The ability of an organization to meet the goals of an EMR project is closely tied to the facility's underlying ability and readiness to transform its administrative and clinical processes. Appropriate change management processes, including strong leadership and team-based approaches, must be in place to assist this. Organizations should recognize that outside change management services may be required, and expert advice on best practices may be key to making changes happen successfully. In many cases, EMR implementations that fail, don't hit adoption targets, or face strong resistance from staff, failed to provide the underlying support in the form of training, preparedness, and support during the initial stages of implementation.
- **Budget.** The cost of acquiring, implementing, and maintaining an EMR remains a high hurdle for many practices. Pricing of ambulatory EMR systems varies widely and is not always proportional to the product's functionality and value. Small practices should look for vendors that offer software-as-a-service options for delivery, integrated practice management, and vendors that specialize in the small practice space for simple, easy-to-use applications that meet their needs. Large and multispecialty practices should consider vendors that allow them to integrate practice management functions and achieve their operational goals while meeting the clinical documentation needs of all their providers. All of the costs that will be incurred need to be considered in addition to license fees. An application that is easy to

use can lower the opportunity costs of implementation by getting staff using the application sooner and reducing downtime for the practice (usually operating at a reduced schedule) during implementation.

- **IT support availability.** Support cost and complexity should be carefully weighed. Service-oriented architecture can save on integration costs, and service-based delivery models, such as hosting and ASPs, can be explored to lower up-front acquisition costs and ongoing support charges. Providers need to understand the implications of housing an EMR server onsite, such as the physical environment, backup, and disaster recovery options, when making the decision to install a mission-critical EMR application onsite.
- **Outside pressures.** For ambulatory practices affiliated with inpatient facilities, the relaxation of the Stark antikickback statutes may create opportunities for accessing financial assistance from hospitals to buy ambulatory EMRs. Practices still need to take into account their own needs and the above factors when making the decision to bring ambulatory EMR in-house.

With numerous applications available, practices of all sizes need to consider their clinical EMR needs through the lens of their organizational goals, their own strengths and weaknesses, the functionality they have already invested in, the architecture and infrastructure they can readily support, and the resources that have available for projects. It is important for practices to select the application and architecture that provides the functionality their practice needs, without adding unnecessary complexity or demanding customization that an organization is not capable of maintaining.

## **LEARN MORE**

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### **Related Research**

- *ePrescribing: Moving Beyond Limitations to Build Benefits* (Health Industry Insights #HI211339, March 2008)
- *EMRs, Their Current State and Future Direction, Part 2: Ambulatory Care* (Health Industry Insights #HI210696, February 2008)
- *U.S. Health Industry Provider 2008 Top 10 Predictions: The Use of IT in the Provider Landscape* (Health Industry Insights #HI210302, January 2008)
- *EMRs, Their Current State and Future Direction, Part 1: Hospitals* (Health Industry Insights #HI208878, October 2007)

- *RHIO/HIE Market Players: Delivering Better Healthcare Through Connected Applications* (Health Industry Insights #HI207480, July 2007)
- *The PHR Maturity Model: The Road to Interoperability* (Health Industry Insights #HI206237, April 2007)
- *Healthcare Provider IT: 2007 Spending Priorities* (Health Industry Insights #HI205327, February 2007)
- *Feds Announce Regulatory Revisions Designed to Spur Physician IT Adoption* (Health Industry Insights #HI203172, August 2006)
- *U.S. Electronic Health Records Spending 2006–2015 Forecast and Analysis* (Health Industry Insights # HI202444, July 2006)
- *Electronic Medical Records and Electronic Health Records Defined* (Health Industry Insights #HI202322, June 2006)

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## **Synopsis**

This Health Industry Insights report provides an objective analysis of the ambulatory electronic health record (EHR) and electronic medical record (EMR) space and available technology, as well as the IT environment and business needs of U.S. ambulatory care practices. The ambulatory electronic health record and electronic medical record market is a crowded space, characterized by numerous vendors struggling to garner share in a growing market.

According to Health Industry Insights research manager Judy Hanover, "It is impossible for providers to overlook the role of an EHR or EMR in their day-to-day patient care, and this has driven investment in these important systems."

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