Building the Next Generation of Healthcare EHR Applications

eGuide

The healthcare industry has undergone a radical transformation in recent decades. Despite their reputation for being slow to adapt to technological change, medical providers of all sizes have implemented a variety of software solutions in an ongoing effort to enhance the quality of care and overall patient outcomes. In this first eGuide, we'll take a look at how Electronic Health Records have evolved over time and examine how they can continue to improve in the future to drive better efficiency for practices and produce better medical results for patients.

WHAT ARE ELECTRONIC HEALTH RECORDS?

An electronic health records (EHR) system allows healthcare providers to enter and access information related to a patient's medical history and ongoing care. Originally developed to replace paper-based medical records, EHRs take a broader view of patient care and incorporate information from a wide range of sources.

Patient health information found in EHRs can include:

- Overall medical history
- Patient demographics
- Clinical diagnoses and notes
- Medication regimens
- Treatment plans
- Immunization history
- Known allergies and reactions
- Radiology images
- Laboratory and other test results

One of the most important features of EHRs is that they allow different healthcare providers to easily share patient information in real-time. That's because EHRs follow the patient as they move between medical specialists, hospitals, and care facilities, even if they cross state lines. Since providers can easily access a comprehensive view of a patient's medical history, they can make more informed clinical decisions regarding treatment and ongoing care. Patients can also access these records at any time, which allows them to manage their own care more effectively.

BENEFITS OF EHR SYSTEMS

The two primary goals of EHR systems are to streamline the administration of care by eliminating paper processes and improve clinical outcomes by providing access to better information about patients.

On the administrative side, a good EHR system should make it much easier to schedule patient visits, manage workflows, update medical records, access data, and track insurance claims. By cutting down on the amount of time support staff and clinicians spend on handling paper records and endless forms, they can place more focus on providing better service and care. They can also devote more time to expanding their practice by bringing in new patients.

When it comes to sharing medical information, EHRs eliminate redundancies that can delay care and create confusion among providers. Without access to EHR data, a clinician may not know what tests were performed or which medications have been prescribed in the past. This helps to avoid the problem of calling for unnecessary procedures and ensures that patients receive prompt, well-informed treatment no matter where they go.

EHR vs. EMR

The term "electronic medical records" (EMR) is often used interchangeably with EHR. While there are many similarities between the two, they are not quite the same and it's important to call out the distinctions. An EMR also contains a patient's medical and treatment history, but that information is confined to a single practice and does not "follow" the patient when they visit a different provider or specialist.

Most of the early digital medical records systems adopted in the 1980s and 1990s are properly considered EMRs. These systems helped to replace cumbersome paper processes, but since they didn't communicate with external systems, practices still had to print and fax records to share them with other providers. It wasn't until the early 2000s that government health agencies began to incentivize healthcare providers to implement systems that promoted true digital interoperability.

EHR TRENDS

Since the passage of the Health Information Technology for Economic and Clinical Health (HITECH) Act in 2009, healthcare providers have rapidly adopted EHR systems. In 2009, only 12.2% of acute care hospitals had a basic EHR system in place, but that number jumped to 83.8% by 2015. According to the US Department of Health and Human Services, 96% of all hospitals and 86% of physician offices had access to an EHR system of some kind as of 2017.

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However, that broad adoption belies some of the challenges EHRs are still working to overcome. A 2018 Stanford study found that 59% of primary care physicians believed that their systems needed a significant overall. Part of the challenge has to do with the amount of time physicians are spending on EHR-related tasks. A 2017 study found that clinicians were spending nearly six hours each day interacting with their EHR system, which the researchers believe contributes to the high levels of stress, burnout, and dissatisfaction among US physicians.

ENHANCING USABILITY

These trends are prompting developers to put more emphasis on the user experience of EHR applications. Historically, physicians themselves were not regularly asked for feedback on EHR features or enhancements. Deloitte's 2018 US physicians survey found that only 34% of respondents were invited to share their views on how to improve EHR systems.

Today's leading EHR developers are zeroing in on ways to improve design and accessibility to save time per patient and increase documentation accuracy. Implementing more robust data capture with machine-readable character recognition and forms processing capabilities can help to eliminate much of the manual data entry that takes time away from actually interacting with patients. Barcode capture software is another proven tool that can help to streamline workflows and document processing burdens.

IMPROVING INTEROPERABILITY

If there's one area where EHR developers and physicians strongly agree, it's the ongoing need to increase interoperability when it comes to patient health data. According to Deloitte's 2020 US physicians survey, **84% of physicians** believe that sharing patient data in a "secure, streamlined, and timely way" will become standard care practice within the next five to ten years.

In order to make good on that prediction, however, EHR systems will need to continue to improve when it comes to accessing and viewing that data. Medical records can come in a variety of forms, ranging from structured forms to scanned physicians notes. High-resolution radiology images often require powerful viewing applications that aren't natively supported by most operating systems. Enhancing the viewing and conversion capabilities of EHR systems will make it easier for essential patient data to be shared securely across multiple providers, each of whom may be using different EHR software.

INCREASING PATIENT ENGAGEMENT

One of the great promises of digitizing health records was the idea that patients would be able to access their essential health information from anywhere, at any time. Online customer portals are the primary means of connecting to EHR data, and there is some evidence to suggest that patient portals help to reduce the number of medical errors, increase medication adherence, and improve patient-provider communication. Making those portals as secure and user-friendly should be a key priority for EHR developers as they continue to refine their applications.

Increasing the versatility of these systems will help to make them more accessible for patients. Ideally, patients should be able to submit updated information in a variety of formats and easily view records, test results, and medical images without having to rely on any external software. By providing them with the tools to easily manage their health information, EHR developers can put more power in the hands of patients so they can manage their care effectively.

ESSENTIAL EHR FEATURES

Although every EHR platform is unique, they are all designed to provide a similar level of functionality to every medical practice. In 2003, the Institute of Medicine (IOM) identified eight essential features that every EHR system should possess.

1 **Patient Health Information and Data:** The system must provide essential data on a given patient's diagnoses, medication history, known allergies, and lab work results so that medical professionals are able to make sound clinical decisions.

2 **Results Management:** Test results should be accessible by all providers in order to improve efficiency and eliminate redundant testing.

3 **Order Entry and Management:** The system should make it possible to enter and track orders for prescriptions, tests, and other medical services to enhance efficiency, avoid redundancy, and minimize errors.

4 **Decision Support:** Computerized systems that deliver prompts, reminders, and alerts need to be in place to help drive better clinical performance in terms of prevention, diagnosis, and treatment.

5 **Electronic Communication and Connectivity:** Providers and patients should be able to communicate efficiently, securely, and readily to improve continuity and timeliness of care.

6 **Patient Support:** Patients should be able to access their health records, obtain information related to their diagnosis, and secure the necessary resources to care for chronic conditions effectively.

7 **Administrative Processes:** Standardized scheduling, billing, and content standards should be in place to help providers to deliver better access to timely care with less delays, confusion, and burdensome paperwork.

8 **Reporting and Population Health Management**: The system should utilize a uniform data standard for reporting key quality indicators related to patient safety and public health.

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THE EHR MARKET

As of 2019, two companies, Epic and Cerner, made up 54% of the EHR market for US hospitals. It's important to note, however, that hospitals have incredibly expansive requirements when it comes to their EHR systems. That's because hospitals need to be able to accommodate information regarding multiple procedures and tests while also handling complex data and security requirements across multiple distinct departments.

Smaller, more specialized practices, on the other hand, typically require more focused systems that address their unique practice needs. Speed and efficiency are critical for these practices because they need to be able to schedule appointments and access patient records quickly. A small general practice, for instance, may want a system that puts more emphasis on streamlining the new patient intake process with data capture tools rather than on converting and compressing high-resolution radiology images or DICOM files.

A developer trying to determine which features are essential should start by asking what sort of practice they intend to focus on. Breaking into the extremely competitive hospital EHR marketplace will require applications that provide broad care management capabilities and stress interoperability. Smaller practices, however, are more concerned with how EHR systems will make their internal operations more efficient and allow physicians to spend more time interacting with patients rather than doing data entry.

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EHR OPPORTUNITIES

As developers continue to enhance their EHR applications to better meet the diverse needs of the healthcare industry, they can save time and development costs by turning to SDK and API solutions. Implementing proven features provides a tremendous opportunity for software teams to focus more of their resources on crafting a superior user experience for physicians and patients alike. Rather than building key features from scratch, they can quickly integrate a powerful solution that will set their EHR application apart from competing platforms.

DOCUMENT AND IMAGE VIEWING

Integrating a dedicated document viewer into EHR software not only makes it more convenient to open and read various types of medical records, but also enhances security. Without a built-in viewer of some kind, files would need to be downloaded to be viewed. This could create serious security vulnerabilities if the file is accessed over an unsecured connection or on a public device. By keeping viewing within the EHR platform, developers can also provide a consistent viewing experience. Physicians could also easily access and share documents with patients during their visit without having to switch between applications.
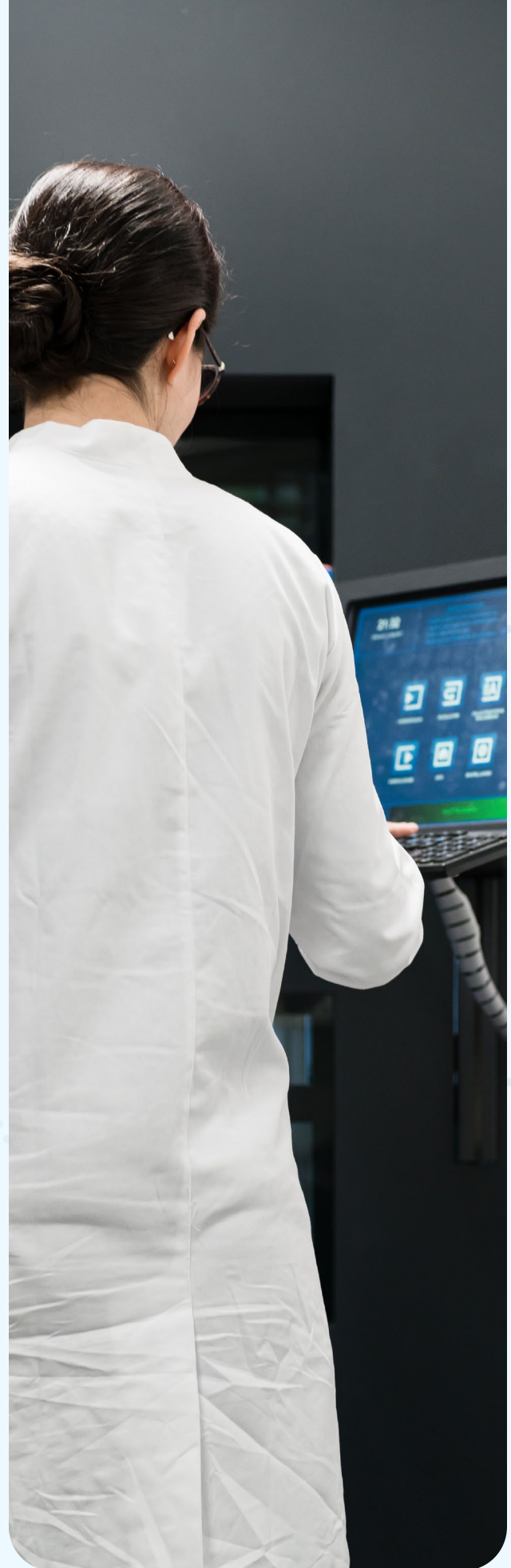
COLLABORATION

One of the promised benefits of interoperability is collaboration between healthcare providers. Ideally, EHR systems can provide not only a means of sharing records with another practice, but also a way to discuss aspects of the patient's care. When a CT scan is shared, for instance, annotations could be made to the image to call out certain aspects or to relay additional information to another physician. The ability to leave comments and other marks on various medical records simulates the same paper-based documentation process that most physicians are already familiar with, which would help to improve usability.

FORMS PROCESSING

Anyone who has ever visited a hospital or physician's office knows that forms are a ubiquitous feature of the healthcare industry. Forms detailing personal, medical, and insurance information make up a sizable portion of medical records and can quickly overwhelm an office without the support staff to process them. While EHR software is supposed to reduce the reliance on paper documents, many practices still manually enter forms information into their EHR platform. By incorporating automated forms processing into their applications, EHR developers can help practices to stamp out this vestige of manual workflows and quickly file digitized forms in their proper place.

DATA CAPTURE

A close companion of forms processing, data capture is an essential component of any document or information management system. Whether it's automatically extracting data from digital form fields or applying zonal character recognition to read text, data capture technology can gather valuable information automatically to streamline healthcare workflows. Barcode capture software is also increasingly being used to track medications and help manage medical device inventories, so building barcode recognition capabilities into EHR systems can greatly enhance practice efficiency.

FILE COMPRESSION

Given the large size of medical imaging files, compression is often necessary to store them efficiently. A single CT scan, for instance, could easily be 30-35 MB, and there could be several of them contained within one DICOM file along with annotation data. By compressing files, EHR systems can make them easier to manage, but they must utilize compression technology that can shrink images down without compromising their integrity. Losing integrity on a medical image can severely impact a diagnosis as key information could be distorted or damaged.

REDACTION

Few industries face more significant privacy compliance requirements than the healthcare sector. If a provider's EHR system doesn't allow them to protect personally identifiable information (PII), it opens itself up to potential liabilities in the event of a data breach. The ability to redact sensitive information from documents and image files is vital, especially if providers need to share clinical information for educational purposes or when consulting with another provider who is not directly involved in the patient's care.

FILE CONVERSION

The ability to view documents and images may be an essential feature for an EHR system, but it will be severely limited if the application lacks the ability to convert files as well. Most organizations are accustomed to working with a few specific file types, but they frequently receive files in different formats. Having the ability to convert those files quickly and easily can reduce confusion and ensure consistency across the organization. This is especially important when it comes to sharing files, since some providers may only accept files in a particular format. Image conversion capabilities are also critical for managing DICOM files, which frequently need to be converted into another format to be viewed on a regular computer.

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CONCLUSION

Despite its widespread adoption throughout the healthcare industry, EHR systems are still very much in their early days. This creates a tremendous opportunity for resourceful developers to build a new generation of EHR software that benefits both medical providers and patients. One of the driving goals will be to enhance the overall user experience so physicians can spend less time on data management and more time working directly with the patients in their care.

Many of the features that will make these easier-to-use systems possible can be integrated using existing SDK and API solutions. In our next eGuide, we'll take a closer look at some of the innovative ways these integrations can help to transform the physician-patient experience and improve the effectiveness of EHR systems.

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