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## Clinical Informatics in Physiatry

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### Have Electronic Health Records Improved the Quality of Patient Care?

#### CASE SCENARIO

You are a partner in a medium-sized physician practice that has several outpatient locations with primary care physicians, as well as several specialists, like yourself. Your practice currently uses a basic electronic health record (EHR) that displays demographic information, diagnostic and medication lists, and allergies. The system also has online access to dictated clinic notes and clinician schedules. Imaging and test results as well as externally-generated, patient-related documents are still stored in paper charts. The practice is affiliated with a local hospital that is offering to subsidize a significant portion of the costs to convert to a more advanced EHR, which will allow for improved interoperability among all local providers. The more advanced EHR offers more comprehensive clinical documentation, electronic prescribing, full viewing of all laboratory and imaging data, and improved ability to access clinic schedules and full patient records across all practice sites and remotely. Several partners are interested in upgrading to the new EHR, while other partners are skeptical and are concerned that the new EHR will depersonalize the patient care experience and decrease their efficiency without any clear benefit to quality of care being delivered. As the group meets to make a final decision on the proposal, what position would you take on how an EHR impacts patient-care quality and the patient experience?

#### Louis Krenn, MD, Responds

The benefits of an electronic health record (EHR) cannot be understated [1]. EHRs offer many advantages for physicians: improved office efficiencies, centralized access to patient information and improved data retrieval, decision support to improve safety, improved data collection and analysis to manage larger patient populations, and improved ability to communicate with patients and fellow providers. I will address each of these benefits separately.

#### Improved Office Efficiency

EHRs have alleviated many of the inconveniences seen previously in physician offices. Before the implementation of an EHR, providers and their staff spent large amounts of time collating chart documents, searching through faxes, locating lost notes, and deciphering handwritten notes. Providers who have been using EHR systems are quick to forget the countless hours spent trying to complete those activities [2]. All members of a clinical practice appreciate these gains in efficiency. These efficiencies gained within a practice

also can lead to improvement in overall provider productivity [3]. Legibility and the completeness of documentation also can lead to more accurate and timely billing, thus providing a financial incentive to implement a dynamic EHR. Several studies have demonstrated the cost-benefit of EHRs. One study demonstrated a net benefit to a practice to be up to \$330,900 by decreasing expenditures associated with drug use and laboratory use, improved charge capture, and decreased billing errors [4]. Another study showed that an EHR system was associated with improvement in physicians' charge-to-collection ratios [5].

#### Centralized Data Access and Data Retrieval

The EHR allows for faster access to patient records and information. Clinical documents are stored in an easy-to-retrieve filing system. Integrated document management systems alleviate the need for staff to determine the best location for a particular document in a chart, leading to improved efficiencies. The integration of laboratory, radiology, and other diagnostic

testing directly into the chart further centralizes access to patient-related information. Laboratory data are particularly suited for functions of an EHR in allowing providers to graph results showing trends in data that otherwise may be missed. The data stored within the EHR also can be (1) presented to the clinician in a more organized fashion for data interpretation and analysis such as in table or graph format; (2) grouped in logical arrangement and associations; and (3) used with embedded clinical decision tools [6]. Images are accessible routinely via a direct-link within the EHR, improving provider efficiency and eliminating the need to access and log on to multiple programs. Information retrieval also is enhanced with an EHR. Many systems incorporate search engine functions, further enhancing the speed and accuracy of locating documentation. Finally, the availability of the EHR beyond the physical location of a clinic or hospital is a feature that cannot be matched with a paper system. Providers performing on-call duties no longer have to rely solely on their memory of a patient's conditions or medications in making decisions. A majority of providers cite remote access as one of the key benefits of having an EHR [7].

### Medication Management

Medication management is streamlined in an EHR. An EHR allows providers to maintain a comprehensive and accurate list. This is especially useful in a shared chart environment in which each provider contributes to the accuracy of the medication list. In addition, multiple care team members, including nurses and pharmacy technicians, also are able to assist in medication reconciliation to ensure the highest degree of accuracy possible. Electronic prescribing affords time-saving benefits to both the provider and patient. The accuracy of prescribing is enhanced greatly when electronic prescribing is used. Many systems offer real-time feedback specific to a patient's formulary. In using this feature, providers are more likely to prescribe a covered medication, increasing the patient's likelihood of filling and adhering to appropriate medical therapy. This feature also decreases staff and patient frustration in minimizing pharmacy callbacks and prior authorizations. Historical prescribing data provided by a patient's pharmacy also are visible in many EHRs, further enhancing coordination of care and accuracy of medication lists.

### Decision Support

EHRs contain several important safety features not available in a paper charting system. Clinical decision support (CDS) built into an EHR enhances safe and effective care. An EHR is a beneficial tool in the care of our aging patient population. With approximately 50% of adults having at least one chronic disease [8] and 59% of the population taking at least one chronic medication

[9], the use of an EHR system to manage their care is invaluable. Clinical alerts, point-of-care references, and patient reminders can be effective tools for a provider in managing the care of complex patients. These tools provide safeguards against potential adverse events [10]. Without the decision support tools in an EHR, the sheer volume of information (laboratory and radiology data, medication interactions, allergies, preventative care requirements, etc) being synthesized at each patient visit would make it difficult to provide safe care to patients.

Advanced CDS also presents providers with opportunities to further improve care by assisting with adherence to evidenced-based medicine. EHR systems also have been shown to decrease the total cost of care by encouraging the use of appropriate medical testing and avoiding adverse events [11]. An EHR also can be used to improve providers' adherence to evidenced-based prescribing, such as decreasing inappropriate antibiotic use [12]. Many institutions have embraced the promises of CDS in the hopes of improving clinical care in their institution [13]. Although concerns about alert fatigue have been established, a process of careful review and evaluation of clinical alerts can address this concern.

### Population Management

The management of groups of patients with a specific diagnosis such as diabetes, heart failure, and stroke can be an onerous task without an EHR. Providers and hospitals are placing more emphasis on population management and performance improvement projects due to mandates by board certification as well as expectations of health insurance payors. Furthermore, with clinical quality measure mandates and cost comparisons from the newly enacted Centers for Medicare and Medicaid Services Quality Payment Program, improving outcomes in patients with specific diagnoses is tied to physician reimbursement. EHRs allow for data aggregation and analysis at the point of care to assist with effective patient management. Providers increasingly are required to know their patient population at levels never expected before, and effectively managing the health of a patient population can be enhanced by using an EHR [14].

### Coordination of Care

Health care is transitioning to a team-based approach. EHR systems allow members of the patient's care team to share the same record and contribute to the overall clinical picture of the patient. The sum of each provider's limited interaction with the patient is aggregated within the EHR to complete the full medical history and treatment plan. Individually, each member would otherwise have a fragmented, incomplete view of the patient, leading to duplication in therapy or adverse events due to conflicting treatment recommendations.

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