

# The Advantages and Disadvantages of Electronic Health Records

## 1 Background

Electronic health records is an evolving concept defined as a systematic collection of electronic health information about individual patients or populations<sup>4</sup>. It is a record in digital format that is intended to be shared across different health care settings and among a variety of health care providers. EHRs may include a range of data, including demographics, medical history, medication and allergies, immunization status, laboratory test results, radiology images, vital signs, personal stats like age and weight, and billing information<sup>4</sup>.

Research has shown that the potential benefits of EHRs are tremendous. With electronic health records, providers have the information they need to provide the best possible care, which will lead to better health outcomes and quality of patient care. Additionally, EHRs facilitate greater access to medical records that let health care providers diagnosis patient earlier and more effectively. EHR's can also allow patients to be more engaged in self-management of their health care needs by allowing electronic copies of their medical records to be accessible securely over the Internet.

It has been proposed that EHR adoption rates have been slower than expected in the United States due to initial costs, loss of productivity during EMR implementation, and a lack of efficiency and usability of EMRs that are currently available<sup>2</sup>. Compared with hospital settings, smaller health care settings, such as clinics or community agencies are even more affected by the high implementation cost and staffing productivity loss and as a result are unable to adopt EHRs into their workflow<sup>2</sup>.

On February 17, 2009, the American Recovery and Reinvestments Act (ARRA) provided a Medicare and Medicaid incentive for payments for "meaningful use" (MU) of "certified EHR technology" by eligible professionals (EPs) and hospitals to address the need for faster and more effective adoption of EHRs within hospitals and other health care settings<sup>5</sup>. The goal of meaningful use is to promote the spread of electronic health records to improve health care in the United States through 1) Complete and accurate information 2) Better access to information and 3) Patient empowerment<sup>5</sup>.

EHR implementation and meaningful use are still in the early stages of development. In the following literature review, I have highlighted several advantages and disadvantages of EHR records and the challenges that are foreseen.

## 2 Methods

In conducting my literature search, I utilized the PubMed, CINAHL, and MEDLINE electronic databases. I limited the search to English language articles published in peer-reviewed journals. I used keywords electronic health records, clinical decision support systems, medical records, and interoperable systems. With these criteria we identified 100 articles. I then searched the reference lists of the articles identified and found 35 more articles that met the criteria. After screening the articles, I picked 6 articles that included recommendations, advantages, and disadvantages of electronic health records in medical workflow processes and various health care settings.

## 3 Results

EHR systems can include many potential capabilities, but three particular functionalities hold great promise in improving the quality of care and reducing costs at the health care system level: clinical decision support (CDS) tools, computerized physician order entry (CPOE) systems, and health information exchange (HIE)<sup>6</sup>.

CDS system is one that assists the provider in making decisions with regard to patient care<sup>6</sup>. Some functionalities of a CDS system include providing the latest information about a drug, cross-referencing a patient allergy to a medication, and alerts for drug interactions and other potential patient issues that are flagged by the computer<sup>6</sup>.

CPOE systems allow providers to enter orders (eg, for drugs, laboratory tests, radiology, physical therapy) into a computer rather than doing so on paper. Computerization of this process eliminates potentially dangerous medical errors caused by poor penmanship of physicians. Previous studies suggest that serious medication errors can be reduced by as much as 55% when a CPOE system is used alone and by 83% when coupled with a CDS system that creates alerts based on what the physician orders<sup>6</sup>.

HIE is the process of sharing patient-level electronic health information between different organizations and can create many efficiencies in the delivery of health care<sup>6</sup>. By allowing for the secure and potentially real-time sharing of patient information, HIE can reduce costly redundant tests that are ordered because one provider does not have access to the clinical information stored at another provider's location.

### Advantages

EHRs, especially those with CDS tools, have been correlated with providers adhering to clinical guidelines. Some reasons for this non-adherence include clinicians not knowing the guidelines and clinicians not realizing that a guideline applies to a given patients<sup>6</sup>. The utilization of EHR systems have shown an increase of provider adherence specifically in preventive services, such as vaccine administration. For example, researchers found that computerized physician reminders increased the use of influenza and pneumococcal vaccinations from practically 0% to 35% and 50%, respectively, for hospitalized patients<sup>3</sup>.

Adhering to these guidelines keeps individuals healthy and provides optimal patient care. There has been a significant association between computerized reminders and pressure ulcer prevention in hospitalized patients. They found a 5% decrease in the development of pressure ulcers 6 months after the implementation of computerized reminders that targeted hospital nurses<sup>8</sup>. Another study found that computerized reminders as part of a CDS have been linked to an 11.3% increase in hypertension treatment in a primary care setting<sup>7</sup>.

Efficiency is the appropriate use of health care through the avoidance of wasting resources, such as redundant diagnostic testing. Evidence indicates that there is a significant an association between a decrease in redundant diagnostic testing and the use of an EHR and/or its components. Studies have shown through the use of EHRs a 18% decrease in tests ordered for medical visits in the emergency department, a 27% decrease in redundant laboratory tests of antiepileptic medication levels in hospitalized patients, and a 24% reduction in redundant laboratory tests in a hospital<sup>6</sup>.

Studies focusing on patient safety have frequently examined the effect of EHR components on medical or medication errors. In a widely cited study, experts found that a CPOE system was associated with a 55% reduction in serious medication errors in the hospital setting<sup>1</sup>.

### Disadvantages

Although there is an increasing body of literature that shows the benefits of EHRs, there are several concerns, which include workflow, temporary loss of productivity associated with EHR adoption, privacy and security concerns.

In a 2002 study conducted in a 280-bed acute care hospital, the projected total cost for a 7-year-long EHR installation project was approximately US\$19 million. In the outpatient setting, it is estimated an average initial cost of US\$50,000–US\$70,000 per physician for a three-physician office<sup>6</sup>.

In addition to implementation, maintenance and continual upgrades to software and training of providers can also be costly. According to one study conducted on 14 solo or small-group primary care practices, estimated ongoing EHR maintenance costs averaged US\$8412 per FTE provider per year<sup>6</sup>.

Another potential challenge with the implementation of EHR's is the disruption of work-flows for medical staff and providers. One study involving several internal medicine clinics estimated a productivity loss of 20% in the first month, 10% in the second month, and 5% in the third month, with productivity subsequently returning to its original levels<sup>6</sup>.

A further concern of EHRs is the risk for patient violations, due to the increased amount of electronic medical information exchanged over health information systems. Although several measure have been implemented to secure medical information, such as an audit function that allows system operators to identify each individual who accessed every aspect of a given medical record, no system is fully secure<sup>6</sup>.

## 4 Conclusion

In this literature review, I have highlighted several of the advantages and disadvantages of EHR implementation. The potential benefits of EHR adoption include improved patient safety and quality of care. For these benefits to be realized it is essential that a uniform and effective adoption of EHR records occur. It is hopeful that with the government's incentivized program of "meaningful use" that the transition to EHR will be seen across all health care settings, from hospitals to smaller clinic settings. As health care providers adopt EHR system, that are subsidized by the government, there will be a need to quantify these results and conduct further research.

## 6 References

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