Evaluating the epic electronic medical record system: A dichotomy in perspectives and solution recommendations

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Abstract

Objectives: Electronic Medical Record (EMR) systems have become an integral part of patient care, in both inpatient and outpatient settings. The objective of this paper is to propose a set of recommendations on how the Epic EMR system can be used to improve patient care. To this end, we present findings on the use of the Epic EMR system in the University of Virginia (UVa)'s Health System.

Target audience: Healthcare organizations implementing electronic medical record systems and health technology managers.

Methods: Face-to-face interviews with 30 of UVa's hospital personnel and others in the Epic department at UVa.

Results and conclusions: Three key areas are discussed to determine the feasibility of improvement including a decrease in medical errors and the resulting parallel improvement in patient safety, inter-disciplinary collaboration, and a decrease in the overall cost of healthcare. We identified many discrepancies between the Epic EMR system's intended use, and the workaround system that clinicians have used to document patient care. In addition, we discuss a dichotomy in perspectives amongst the Health System and Technology Services department at UVa, and healthcare staff end users, with regard to the intended functionality and the usability of the Epic EMR system. In light of our findings, we provide a set of recommendations on how to decrease the gap between the intended and actual use of EMR systems, in general

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Introduction

With the passing into law of the Health Information Technology for Economic and Clinical Health (HITECH) Act, every

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private and public healthcare institution in the United States (US) is now required to use an Electronic Medical Record (EMR) system to store, integrate, and consolidate patients' protected health information, or PHI [1]. Specifically, Section 4101(b) of the HITECH Act states that beginning January 1, 2015, healthcare organizations that do not have an EMR system will be subject to a "negative adjustment" [1, p. 2]. The National Alliance for Health Information Technology (NAHIT) defines an EMR as "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"[2]. As a result of the recent legislation, nearly every hospital in the US now uses an EMR system for storing and processing patients' health information. Much of this effort has been accomplished through incentives provided by the government, but also through the movement of healthcare organizations toward more technologically-based care [3]. The EMR system should support and enhance the work of healthcare providers working with these advancing medical technologies but such is not always the case. Among the challenges that hospitals face when implementing EMR systems is the need to improve usability, ensure interoperability, and keep costs affordable. This is often not feasible as healthcare institutions, already striving to afford the care they provide, often struggle to budget for the hefty costs of purchasing, implementing, and maintaining an EMR system [4]. Maintenance and education are often overlooked when considering the initial and ongoing costs of EMR implementation. If the ongoing costs are not budgeted for then follow up education and support is often limited, which, in turn, constrains the overall success of the EMR system in practice [5, 6]. As the government continues to push for the "Meaningful Use" of EMR systems nationwide, the need to train healthcare professionals and the costs required to do that will continue to grow [6]. "Meaningful Use" criteria are milestones that were put forth by the US government to incentivize healthcare institutions to adopt EMR systems and, more broadly, health information technology (HIT) [7].

In an effort to better explore the opportunities and challenges of EMR implementation as they relate to patient care, we look in this paper into the workings of the Epic EMR system in the University of Virginia (UVa)'s Health System. Specifically, we conducted interviews with employees of various roles who have used the Epic EMR system at UVa, and with employees at UVa's Epic department, with the goal of collecting information that would shed light into the actual practice, use, and implementation of EMR systems, particularly the Epic EMR system. Epic is known for its excellence in customer service and its ability to be used across healthcare settings (http://www.epic.com/software-index.php); however in practice some of this is not as apparent to the Epic's end users.

In the remainder of the paper, we first review the extant literature and identify salient research streams. We then discuss UVa's setting and their Epic implementation, and present our data collection methods. Next, we present our results, followed by a discussion of our findings. In the last section of the paper, we provide a summary and a set of recommendations, and we subsequently discuss some of our study's limitations and finally conclude.

Literature review

A comprehensive literature review was performed using an EBSCO database for recent peer reviewed articles that were published after 2010. The following search qualifiers were used: "Electronic Medical Records," "Implementation," "Hospital," and "United States." This search originally returned 97 articles, but after removing duplicates, a total of 56 articles remained. The articles were reviewed and 35 were omitted because they were not relevant to the research topic. After carefully reading the articles further, we excluded another 8 papers for their limited scope and/or lack of applicability, leaving a total of 13 relevant articles.

Review of these 13 articles revealed that providers are generally cautious about adopting an EMR system and often find that productivity decreases after implementation, at least in the short term; however financial incentives and potential penalties from the government have caused most healthcare institutions to acquire an EMR system despite potential setbacks [6-9]. We found that prior research has focused on three major themes: (1) the effect of an EMR system implementation on mitigating/exacerbating medical errors/patient safety [4-6,8,9,11-14]; (2) the effect an EMR system has on interdisciplinary collaboration and increased communication, particularly amongst, but also within, disciplines [4-6, 9,11,12,15,16]; and (3) the effect of implementing an EMR system in relation to overall healthcare costs [3-8,12,16]. Our findings from reviewing the literature are summarized in Table 1.

While some articles reported that the implementation of an EMR system could result in an increase in medical errors if clinicians choose to circumvent system controls so as not to adjust their workflow [14], the majority of the reviewed articles found that, by decreasing medical errors, EMR systems have had a positive impact on patient safety and quality of care. In particular, Estrada and Dunn [11] reported that the use of an EMR system allowed nurses to better individualize patient treatment plans. Other articles found that the use of an EMR system improved clinicians' workflow, which in turn benefited patient safety and reduced the cost of providing care [4,6,9,15,16]. Similarly, some other articles reported that the use of an EMR system improved clinical outcomes, resulting in improved quality of care [4,6,12]. Further, many of the reviewed articles found that improved documentation, faster and more informed decision making, and improved medication safety are especially beneficial [4,5-8,11-13]. In particular, Hsieh [8] and Palvia et al. [6] found that EMR systems improved patient safety by safeguarding patients' health information through more streamlined documentation. Similarly, Estrada and Dunn [11] and Shen et al. [4] found that the use of an EMR system improved the accuracy of documentation. Palvia et al [6] and Cook et al. [5] found that quality could be improved with the use of technology-driven clinical decision support systems and computerized physician order entry (CPOE). A similar intervention that has been found to improve patient safety is an automated electronic provider alert, which scans the medical record for specific identifiers and brings these to the attention of healthcare providers [13]. EMR systems were also found to improve medication safety in some way [4,5,12,13]. Cook et al. [5], for example, identified the EMR system as a tool that allowed