Current Roles and Applications of Electronic Health Record in the Healthcare System

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ABSTRACT

Electronic health record (EHR) has been shown to play major roles in the healthcare system. The main drivers for the increasing role and application of EHR in healthcare systems include the need to improve efficiency in healthcare service delivery, patient safety, increase access to health care services, and more importantly, the need to reduce the costs of medical expenditures. The main goal of this paper was to review current trends in the roles and applications of EHR in the healthcare system. EHR has been very useful in various ways in the healthcare system ranging from clinical care application to administrative function to clinical research function, to financial application, and reporting in the healthcare system. EHR is not just a digital form of a paper medical record, but it provides the following clinical functions: physician order entry, integrated view of patient information and data, access to knowledge resources, clinical decision supports, and integrated communication.

Keywords: electronic health record, uses, roles, applications, electronic medical record, digital health record
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INTRODUCTION

In recent years, there has been a growing interest in EHR adoption in many countries. This is due to an increasing recognition that a stronger health information technology (HIT) is crucial to achieve a higher quality care at lower costs. EHR has been identified to be an important integral part of an efficient health care information system that guarantees positive health outcomes [1-3]. According to the International Organization for Standardization (ISO), EHR is defined "As a repository of patient data in digital form, stored and exchanged securely, and accessible by multiple authorized users. It contains retrospective, concurrent, and prospective information and its primary purpose is to support continuing, efficient, and quality integrated health" [4].

It plays significant roles in the healthcare system and it has been applied in various ways in the healthcare system. Many studies conducted in different health care settings have indicated that broad and appropriate application of EHR in the healthcare system will assist health professionals to reduce medical errors, achieve better effective care coordination, improve patient safety and care quality, and decrease health care costs [1, 3, 5]. For example, by making a significant patients' information available electronically, health care information systems can help to prevent ordering of duplicate tests and procedures, thereby reduce patients' expenditures on health care service [6-8]. Additionally, availability of patient information in digital form will decrease the expenditures on storage, retrieval and transportation of patient charts in the health record department [6-7].

Healthcare systems, similar to other business entities, are information intensive enterprises [6]. Health care workers need adequate data as well as tools to manage information to make accurate decisions, both while managing and running the enterprise and while caring for the patient to document and communicate plans and activities, and to meet the regulatory requirements of the accrediting organization [6]. The main goal of this paper was to review

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current trends in the roles and the applications of EHR in the healthcare system. This is important as it provides valuable information in understanding the different usages and EHR functions/roles/ applications in the healthcare system. This review has provided collated information that can be used to make an informed decision on how to attain a more meaningful use of EHR functionalities in different aspects of the healthcare organization.

MATERIALS AND METHODS

A literature search was conducted on the PubMed and OvidSP electronic databases. The Google scholar search engine was also utilized. Hand searching was also conducted to look for relevant books. In order to facilitate the search the following keywords: clinical application of electronic health record, uses/roles/applications of electronic medical record, and administrative applications of electronic health record were adopted. Only original papers, review articles, and articles available in full text and published in English in the last twelve years were included. Sixty-seven papers were initially retrieved. However, only 10 met the inclusion criteria and were finally reviewed.

RESULTS

Currently, the roles and applications of EHR in the healthcare system include clinical care application/functions, financial function, clinical research function, reporting, and administrative function. The following section presents the details of EHR applications/functions.

Clinical Application of EHR in Healthcare System
One key area of the EHR application in the healthcare system is in the use of clinical patient care. EHR provides clinical functions which are health information and data, results management, order entry and support, and decision supports. The main objective of the EHR in the healthcare system is to manage the information that health personnel require to do their work efficiently and effectively [3, 6-8].

EHR assists in the organization of patients' medical information and record keeping [3, 6-8]. It provides timely access to patients' clinical information, for example, radiology results and laboratory test results, thereby reducing redundancy and improving healthcare service quality [3, 6-8]. Similarly, the availability of significant medical information at the point of healthcare service delivery with clinical decision support systems like those for drug order entry will reduce drug adverse effects and medical errors [3, 10-15]. Furthermore, through a secured EHR, patient information could be shared among many authorized users in the healthcare settings [3, 6-11]. EHR facilitates communication, integration of information and patient care coordination action among many healthcare personnel such as doctors, nurses, pharmacists, laboratory scientists, just to mention a few [3, 6,11]. Also, the use of a digital-based reminder system for the patient as well as the clinician will increase compliance with preventive service protocols [3, 6, 10].

Clinical Research Application of EHR in Healthcare System
Another important area where biomedical informatics has played a significant role in healthcare system is in the aspect of clinical research using the surveillance and query facilities in the digital-stored records. The query system may be used to identify patient who meet appropriate criteria for prospective clinical trials [6]. Surveillance facility supports the execution of clinical trials by tracking patients via their visits and by way of following the phases of clinical trials as defined in the research protocol [6]. Besides, data required for a clinical trial research could be derived directly from the EHR, thereby making research data collection a by-product of regular medical records keeping [6]. Thus, it assists in the elimination of the manual task data extraction from the paper medical records.

Administrative Application of EHR in Healthcare System
Administratively, EHR can be used to schedule hospital admissions, in-patient, and out-patient procedures, and visits, therefore, improves the efficiency of healthcare systems and also offer better, more timely service to patients [1, 3, 6-8]. In addition, recorded patients information in the healthcare system provides speedy and accurate patient's insurance eligibility validation, consequently add value for both provider and patient by improving access to healthcare services, more timely payments, and reduced paperwork. In the past, administrators had to rely on data from billing systems to understand practice patterns and resource utilization. But now with the use of EHR, the medical query system provides valuable information about the associations among types of diseases, diseases severity and use of resources. Hence, query system is an important tool for an administrator who wishes to make informed decisions in the increasing healthcare costs [3, 6].

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Application of EHR in Healthcare Financing
The application of EHR in health care financing is an important area to discuss especially during this period of federal health care reform with the goals of maintaining some balance among access, costs, and quality of care. Based on cost-accounting applications in other industries, health care cost-accounting systems, adapted from cost-accounting applications in other industries, have been adopted widely [6].

Application of EHR in Reporting in Healthcare System
EHR has also been very useful in reporting and population health management. Many healthcare institutions, both private and public presently have many reporting requirements at the local, state, and national levels for patient safety and quality, as well as for public health [3, 6-8]. Additionally, the internal quality improvement efforts of various Healthcare systems involve routine reporting of vital health quality indicators. Many of these reports contain data manually extracted from the patient charts which is often labor-intensive and time-consuming process.

Moreover, manually extracted data and information have been shown to involve a number of major errors [3, 6]. EHR establishes standardized terminology and data formats for public and private sector reporting requirements [7, 8]. Therefore, having clinical data and information represented in a standardized format and in an electronic-readable form will decrease the burden of data collection substantially at different levels of reporting. Furthermore, this will not only reduce the costs of data collection and organization, but also increases the data reporting accuracy and completeness [3].

DISCUSSION

EHR provides clinical functions which are health information and data, result management, order entry and support, and decision support. The kind of health information and data that can be derived from the EHR includes clinical narratives, physician and nursing diagnoses, demographics, laboratory test results, a medication list, and allergies. It also provides results management function which manages all kinds of results such as laboratory results, pathology results, and radiology procedure digitally. Besides, EHR provides order entry as well as support function by incorporating the use of computerized provider order entry, especially in ordering medications. Clinical decision support role is another great function that is offered by EHR which employs decision-support capabilities such as computer assisted diagnosing, alerts, and reminders.

Furthermore, EHR enables those involved in patient care to communicate effectively with one another and with the patient. Administratively, EHR simplifies and facilitates such processes as appointment scheduling, verification of insurance. EHR also employs decision-support tools to identify eligible patients for chronic disease management programs and clinical trial research. In reporting, EHR plays vital roles in establishing standardized terminology and data formats for private and public sector reporting requirements.

CONCLUSION

Clearly, it has been shown that EHR plays germane roles in the healthcare system and its application encompasses many aspects of the healthcare system. The main drivers for the increasing role of EHR in healthcare system include the need to improve efficiency in healthcare service delivery, patient safety, increase access to health care services, and more importantly, the need to reduce the costs of medical expenditures. EHR has been very useful in various ways in healthcare system ranging from clinical care application to administrative function, to clinical research function, to financial application, and reporting in the healthcare system.

Conflict of Interest
No conflict of interest associated with this work.

Contribution of Author
This work was done by the author named in this paper and all liabilities pertaining to claims relating to the content of this article will be borne by the author. The author conceived and designed the study and prepared the manuscript for publication.

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