Electronic Medical Record - An Essential Part of the National Healthcare Network

Paulchris Okpala[1]

Abstract

Despite the rampant need for the sharing of information between hospitals, the interconnection among many hospitals in the United States is not yet excellent. The interconnection of the hospitals and units that offer health care services is significant in boosting the success of health care services in the U.S. Electronic medical record (EMR) is reliable in ensuring that hospitals share data concerning the patients. The system also ensures that the data is updated easily. The development on EMR is faced with many problems. This paper aims at investigating means through which these problems can be addressed. The paper also studies the benefits that arise from the use of EMR systems. The methodology used in the study involves the selection of a sample of 60 physicians. The sample was divided into two halves. One-half contained physicians who use EMR while the other half was for physician without EMR. The paper also conducts a literature review of past pieces of literature that have studied the benefits and challenges faced EMR. The paper summarizes by emphasizing the need for EMR to achieve the desired quality of health services. In addressing the challenges, the paper advocates for the enactment of uniform policies and subsidizing the cost of EMR.

Keywords: medical records, electronic records, EMR, electronic information

1   Electronic Medical Record – An Essential Part of the National Healthcare Network

Currently, many of the hospitals in the US are not interconnected properly through electronic medical records (EMR).   However, there is an urgent need to interconnect all the hospitals and healthcare units located in the US to ensure that a regional or national database is created an interlinked.   Once this database is created with hardware, software and networking infrastructure, then hospitals having super-specialty facilities can connect

[1]DHSc, MHA, MPA, RCP, CRT California State University, San Bernardino, California.

with those having basic faculties and provide highly-specialized healthcare.   The EMR systems can be utilized to transmit data across the network and ensure that enough details can be obtained of the patient and updated immediately.   However, currently, the use of EMR's in the healthcare system is not known properly as the same is seldom being implemented. A problem associated with the EMR usage is that although it is strongly meant to be patient centered for the exchange of information, they tend to drift away when used practically.   The hospital information systems including EMR's from various organizations need to be interoperable, ensuring that any dearth in the communication links needs to be removed.   Hence, a solution has to be developed to solve these problems.

Implementing EMR has a lot of problems at the hospital level.   Firstly, the costs of implementing EMR's are very high.   Hospitals have to spend huge amounts on buying software, hardware, networking, support and personnel costs.   Hospitals are also in doubt about which kind of a system to go in for – a comprehensive EMR system or a basic one.   A comprehensive system is costly, but has immense functions that can potentially improve healthcare.   On the other hand, a basic system is affordable but can lead to only minor improvements in quality.   The process of implementation is also very difficult for the organization.   Often the organization has to train many staff members and recruit support personnel to ensure seamless functioning of the EMR system.   At times, the EMR system may be slow and not function properly leading to problems at the work level.   Many of the staff members may actually not know how to use the EMR and would often want to revert back to the paper system.   Another problem lies with upgrading a new EMR system.   The organization may want to upgrade their EMR system to suit modern needs.   Often the costs of such up-gradation would be very high. Last and not least is the problem of integrating the EMR systems to form a regional or national system.   Having such a system would ensure benefits for the patient and others. A patient can visit any hospital within the network and have his or her medical records retrieved within a matter of seconds.   However, there are problems as it may be very difficult to interconnect two different types of EMR systems.   This paper looks at the manner in which these problems can be overcome.

There is also an urgent need to integrate the databases of several clinical research organizations so that information flows from hospitals to these organizations and vice-versa to help sharing information and further utilizing them.   EMR systems from various organizations can be pooled to form a database which can be accessed and help to transform clinical research information into practical bedside solutions.   One convenient way of doing so would be to have an EMR system that would be networked and integrated.   To ensure this integration, regulations and polices need to be developed. This paper would take a look at the benefits, problems and opportunities that would be available from integrating clinical research and hospital EMR systems.

The methodology of the study proposed is to select about 50 to 60 physicians located in the country.   This would include 30 physicians using EMRs and 30 who do not have EMRs. A structured interview should be organized and 30 questions in the form of a questionnaire tool needs to be organized.   These would include questions regarding the overall use and effectiveness of EMR or the need to have an EMR system, questions regarding quality standards and the manner in which medical records are transmitted, etc. By analyzing the data, the effectiveness of EMR and the opportunity of its use can be identified.

EMR is the basic essence of any national healthcare network and can tremendously help

to improve healthcare. Such a system can help improve the effectiveness, reduce the cost, provide immense opportunities (which can be used based on innovativeness) and improve the accessibility of healthcare. However, there are many deterrents existing with the use of EMR. Such problems need to be removed to ensure a functional and efficient system.

2   Literature Review

One of the highly sought out features for physicians using EMR is the ability to seek library evidenced-based articles. The study by [1] was conducted on 137 primary care physicians to determine how attractive this feature was. Physicians were given standard EMRs with abilities to place literature request. The study was conducted for duration of 10 months. Physicians were given a questionnaire with 25 items. About 35 percent of the physicians reacted to the questionnaire and found that the literature request feature was highly relevant to clinical practice. However, it was found that although this feature was acknowledged, many of the physicians did not use it during clinical practice. Hence, during the implementation phase, efforts should be made to demonstrate the importance of such features in the EMRs and encourage the physicians to use mandatorily use them as it would improve the quality of care [1].

Another study was conducted to determine the cognitive components that were utilized during EMR usage. Hence, possibilities of errors could be obtained and hence, clinical practice can be improved. This study was conducted on 25 physicians serving in the primary care settings in Israel. It was found that the manners in which EMRs were organized and the legibility of information recorded in the EMRs helped to make the physicians tasks easier and thus reduce errors. There was increased efficiency, but also possibilities of errors, as sometimes physicians chose wrong drugs in the Computerized Physician Order Entry (CPOE). Hence, the EMR should be designed in such a way that increased communication with the patients through verbal and non-verbal means can be ensured. Questions can be asked and doubts can be cleared. The EMR should not only facilitate mere entry of information and presentation of reviews to the physicians but also ensure that communication between the patient and the physician is optimized [2].

[3] tried to determine adoption of EMR in the primary care settings. More than 30 participants serving in family practices were included in the study and data was collected through semi-structured interviews. It was found that there were certain barriers to adoption of EMR including knowledge of the use of computers, training fulfillments, solving problems related with EMR-use with in-house personnel. There was certain variety of issues that affected the EMR adoption including knowledge level with EMR use. These factors play a vital role in the implementation of the EMR in a clinical setting. Training, computer literary, solving problems related to EMR usage at the workplace, promotion of continuum, etc, play a vital in the adoption of EMR [3].

[4] provided a report that presented information regarding the EMR usage by physicians. The study utilized information from the 2006 National Ambulatory Medical Care Survey. About 29 % of the physicians used EMRs fully or partially, which increased by 60 % from the last five years, and by 22 % in the last one year. Some of the features that physicians wanted and considered for usage included placement of orders, prescriptions, reporting test results, entering notes recorded in the clinical settings, etc. In the year 2005 about 9.3 % of the physicians used EMRs which increased to 12.4 % in the 2006. This

study goes on to say that although the number of physicians using EMRs increased, the rise was not all that significant, as many practices did not use comprehensive systems or EMR systems totally [4].

[5] conducted a study to determine the use of EMR in drug trials. The information obtained from EMR was used to build a database. The information that was present in the database was further studied to determine if the same can provide results regarding therapeutic effectiveness. Besides, newer methods of validating information present in the EMR for drug trials were also determined in the study. [5] feels that EMR usage can be of immense opportunity in drug trials. A well-designed database can provide appropriate information that can be analyzed for various clinical trials studies. If the analysis done is inappropriate, wrong information would flow leading to negative effects in therapeutics and use of a wrong health policy. The study tried to determine if the database provided information is valid and the results obtained through analysis could be considered as valid. [5] considered two negative effects of information provided by EMRs. First, the data presented by the EMR database was just observational information that was not experimental or interventional in nature. Could such information be considered as part of outcomes in a drug trial? Second, [5] had an even bigger question to be answered. Could information provided by the EMR be sufficiently reliable to provide details regarding treatment outcomes? [5]

[5] considers that effectively a randomized controlled trial (RCT) can provide the highest level of evidence in various study protocols, as they are able to balance out both measured and unmeasured variables. On the other hand, from an observational study, the quality of information obtained would be lower than a RCT as some of the variables may not be appropriately measured and there is the effect of bias. However, a study conducted on various observational studies, have noticed that there may be instances in which the quality of the observation study would be equivalent if not better than an RCT. The authorities also consider that besides, relying on data from RCTs, observational studies also need to be considered. As the observational study did not have tough inclusion and exclusion criteria, results different from a RCT would be obtained. [5] used the data from the UK General Practice Research Database (GPRD) that would reproduce the design of RCTs. The study results depended upon the quality of the information and whether observational studies could reproduce the RCT results. To improve the validity of the study, the Prior event rate ratio was adjusted [5].

Information from the Clinical Practice Research Datalink (CPRD) was utilized which contained several types of information including that of primary care, prescriptions, consultations, referrals and hospitalization. There were some interesting inclusion and exclusion criteria mentioned and the basic aim was to reproduce what was done in certain randomized clinical trials. These criteria are similar to six RCTs that were compared from other studies. Besides, standard bio-statistical methods along with prior rate ratio (PERR) adjustment were also used. More than 17 outcomes in all were compared, and it was found that there were no significant differences in nine of these outcomes. In about eight comparisons, there were significant differences which were usually unmeasured confounding factors. The study found that observational studies are affected with unmeasured confounding factors. The PERR analysis helped to reduce the effect of the confounding factors. The study effectively demonstrated that EMRs could be utilized to study the effectiveness of therapeutics and treatment. This would enable the EMRs to have been utilized in the clinical research field also [5]. For the development of EMRs, evaluation of the current pattern of usage by the physicians is necessary. The

evaluation should include quantitative as well as qualitative parameters. [6] developed a task orientation questionnaire tool that helped to evaluate the clinician's perspective of EMR. The questionnaire tool included 24 general clinical tasks and could be used across various specialties. The tasks that were present in the questionnaire tool were found to be relevant and understandable by the physicians. Some of the physicians found certain tasks that were not appropriately supported by the EMR tough to address, although the results obtained were precise and there were very little missing responses. Thus, such tool could be used to self-evaluate the usage of EMR and ensure that the results obtained are valid, reliable and interpretable [6].

It can be seen that physicians consider that EMRs play an important role in delivering treatment based on evidence-based finding and thus helps improve the effectiveness and quality of care. Besides, information is more legible and it is easier to place orders, prescriptions and report test results. Errors bound to occur due to human cognition can effectively be prevented through computers. However, there were certain limitations with EMR usage. Often during implementation, training, computer literary, ability to solve problems, etc, played a vital role. Hence, the topic of EMR implementation is very complex presenting several benefits for the physicians provided that certain issues are taken into consideration and effectively addressed.

3   Discussion

Several studies have demonstrated that EMRs are of huge all-round benefits in healthcare organizations, with respect to dissemination, entry and storage of medical information. However, it is not easy to achieve high standards in usage which would reflect over improvements in the quality of care. One startling finding has been the EMRs are specifically of use and hence when used, compared to the paper records can provide obvious advantages to the user in improvements over the quality of care than with the paper records. Hence, the users need to consider that even a small benefit which can be easily achieved should ideally be considered as a stepping stone to success. However, implementing the EMR's is a huge task often which may be a mountain to climb. Hence, certain protocols, active decision-making, problem-solving strategies need to be utilized during the implementation phase of the EMR [7].

A huge concern in the use of the EMR is the barriers which the users feel as difficult to overcome, resulting in often abandoning the entire plan and setup of the EMR system. This can be a huge negative experience to the organization. It is important to note that EMRs have a large suite of applications and great potential of improving healthcare. Such are the capabilities of EMRs that the physician may not even imagine what the advantages would be. Besides, EMRs would ensure certain standards whilst transmitting prescriptions, orders, lab test results, reminders, etc, which can provide huge improvements in the quality of care. More than 50 % of the physicians feel strongly that EMRs are of huge benefits in practice [7]. Physician may consider using EMRs for several processes related in healthcare including:-

- Placing orders online – Physicians can order blood tests, other laboratory investigations, prescriptions, X-rays, etc, online. Laboratory test results and critical test results can be reported, often prompting the physician or other healthcare providers about these results and ensuring that an acknowledgment is received for the

same.   Previous studies have clearly suggested that these can improve legibility, and reduce the number of errors during transmission.

- As a messaging system – The healthcare providers can chat with each other and message each other about patient information.   This can act as an extra safety boosting mechanisms as strong interactions, solving doubts and rectifying problems can be enabled.   Another advanced system is enabling a messaging system between the healthcare professionals and outside individuals.   For example, the physician can message an expert in a particular field and clarify doubts on the same.
- Reporting and analysis – the information recorded in the EMR can be used for analysis and recording.   For example data recorded from several healthcare organizations in a particular organization can be utilized for studying particular characteristics of the population and ensuring that doubts and queries can be resolved.
- Provision of certain functions to the patient – the patient should ideally know what treatment is going on and the options he/she has in healthcare.   This can be improved using EMR systems.   Several EMR systems provide the patient with certain usage. They can access their information online, ask doubts and queries from their healthcare providers, seek information from the internet, message or email their healthcare providers, order drugs or see test results online, etc.   This permits a greater customization in healthcare.   The patient can be provided with total control, thus ensuring that the quality of healthcare would improve.
- Billing and insurance – EMR systems have several advantages for billing, placing claims and corresponding with the insurance companies.   The coding standards can be improved using the EMR systems.

However, EMR systems may have a few limitations, which need to be closely looked into. These limitations may de-motivate or frustrate the organization towards using the EMR system in practice.   Many organizations have had problems using EMR.   Some of the common barriers associated with EMR usage include:-

- High costs of implementing an EMR system - Often a single physician practitioner may not like to utilize the EMR system as it would be costly.
- There may be the need to spend more time with the patient when the EMR system is being utilized as the physician would find it difficult to insert data
- There may be problems in getting used to the appearance, layout, finding areas of interest, navigation, etc, in the EMR
- Poor technical support can really hamper the use of the EMR
- If there are barriers in accessing other systems that the EMR should communicate with, it could be really frustrating for the physician.   Information needs to be exchanged between the clinical sections and the laboratory, radiology, pharmacy, referrals, etc.

Often the healthcare providers may consider using a parallel paper system for inter-departmental communications.   However, having the same may lead to a lot of information getting mixed up and missed out.

- An organization that implements an EMR without motivating the staff to use and enjoy the same would in no way working towards the cause of ensuring 100% usage of the EMR and subsequent improvements in the quality standards.   Hence, an organization would have to incentivize the staff members and ensure that the staff is encouraged to use the EMRs.

- Attitude of the physician towards using EMRs – Many physicians were able to understand how to use EMRs.   Some physicians who found it difficult took it up as a challenge and further learnt how to use the same.   On the other hand, there were several physicians who did not understand how to use an EMR and did not consider learning the same.   Besides, there were several physicians who actually did not recognize any advantage in using the EMR's and hence did not consider adopting the same towards practice.

Each implementation of an EMR should be taken as a challenge.   EMR system has huge benefits in terms of quality and economics. The biggest challenges lie with small-scale practitioners who may find acquiring an EMR as costly and may have certain difficult times in getting things rectified on the system.   However, solutions need to be developed by using a customized policy that suits an organization.   At the end of each solution should be a potential benefit that each healthcare worker should find attractive and work towards.   Although there are certain limitations in the usage of EMR for clinical research purposes, there seem to be certain advantages although information from observational studies may be significantly different from the RCTs.

4   Conclusion

Although there may be some problems with using EMR, Physicians usually consider using an EMR that is uniform in various practice settings.   Physician working in academic organizations prefer to achieve the highest quality of care.   Hence they would greatly consider using an EMR in their practice.   Physicians who work in academic organizations are competent with the use of computers and hence are confident whilst using EMR [8].

It is also important that the organization develops certain guidelines, policies and Standard Operative Procedures (SOP's) in using the EMR.   A uniform EMR system placed across several hospitals and departments within the organization would help useful data exchanges.   All physicians who are provided with EMRs for the first time should be given incentives in some way, which include financial and non-financial benefits.   The idea of using EMRs is to improve the quality of care, and hence efforts should be made to demonstrate to the physician how the EMRs could help reduce errors, improve the transmission of critical results, etc.   Besides, EMRs should also strongly concentrate on improving patient satisfaction in healthcare.   Medicare and Medicaid could increase the use of the EMRs by mandating certain standards in storing and accessing information [7].

Another important consideration that can be made by the government and the policymakers should be to subsidize the cost of buying the EMR.   A larger number of hospitals can purchase these EMRs which in turn can further reduce the rates.   The government needs to consider the nascent stage of EMR application and promote the development of the same.   In a way, the legislation can also ensure certain standards and security levels to be achieved across the regional and national networks [7].

All policies that are developed at the hospital regarding their EMRs also need to consider encouraging certain amount of experimentation.   Users should be allowed to insert ideas and brainstorm on developing stronger solutions to practical problems.   Studies have demonstrated that users should be involved before actually acquiring and setting-up the EMR system in the hospital.

References

[1]   Jerome, R. N. (2008). Exploring clinician adoption of a novel evidence request feature in an electronic medical record system. *Journal of Medical Library Association*, *96*(1):34-41.
       http://www.ncbi.nlm.nih.gov/pubmed/18219379?ordinalpos=1&itool=EntrezSystem 2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_R VDocSum
[2]   Shachak, A. (2009). Primary care physicians' use of an electronic medical record system: a cognitive task analysis. *Journal of General Internal Medicine*, *24*(3):341-8.
       http://www.ncbi.nlm.nih.gov/pubmed/19130148?ordinalpos=2&itool=EntrezSystem 2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_R VDocSum
[3]   Terry, A. L. (2009). Adoption of electronic medical records in family practice: the providers' perspective. *Journal of Family Medicne*, *41*(7):513-5.
       http://www.ncbi.nlm.nih.gov/pubmed/19582637?ordinalpos=1&itool=EntrezSystem 2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_R VDocSum
[4]   Hing, E. S. (2007). Electronic medical record use by office-based physicians and their practices: United States, 2006. *Advance Data* ;(393):1-7.
       http://www.ncbi.nlm.nih.gov/pubmed/18019786?ordinalpos=7&itool=EntrezSystem 2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_R VDocSum
[5]   Tannen, R.L. (2009). Use of primary care electronic medical record database in drug efficacy research on cardiovascular outcomes: comparison of database and randomized controlled trial findings. BMJ. 38:b81
[6]   Laerum, H. (2004). Task-oriented evaluation of electronic medical records systems: development and validation of a questionnaire for physicians. *BMC Medicine Information Decision Making*, 4:1.
       http://www.ncbi.nlm.nih.gov/pubmed/15018620?ordinalpos=15&itool=EntrezSyste m2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_ RVDocSum
[7]   Miller, R.H. (2004). Physicians Use of Electronic Medical Records: Barriers and Solutions. *Health Affairs, 23*(2): 116-126.
       http://content.healthaffairs.org/cgi/content/full/23/2/116
[8]   Penrod, L.E. (2001). Attitudes of academic-based and community-based physicians regarding EMR use during outpatient encounters. Proceedings AMIA Symposium. 528–532. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2243431/