Effects of the Implementation of Electronic Medical Records in Small Internal Medicine Practices on Healthcare Objectives in the United States

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Abstract

Electronic Medical Records (EMR) are a collection of patient health data which is retained in a digitally shareable format with global accessibility. Correlations can be developed by studying the digital information in aggregate form, which allows for national and regional health trends to be better understood and projected. In addition, the universality of this data allows for seamless transfer of patient data between different health facilities. This only occurs with medical facilities that have EMR software operational. Because EMR failures that were identified nine years ago have still not been remediated, small medical practices still encounter tremendous failures implementing EMR. This prevents the completion of the larger patient data network, leaving the larger goals of EMR systems incomplete and diminishing their usability. A failed implementation of EMR software conducted this year yielded the same failures that prior research has identified; furthermore, smaller medical practices are particularly susceptible to these vulnerabilities.

Introduction

Big data is a term used for the proliferation of data available in the 21st century from the advent of electronic healthcare developments (Groves 2013). Pharmaceutical companies spearheaded these efforts a decade ago as they began the process of aggregating their research and development data into electronic databases. Today, there is a higher implementation of big data related technologies in hospitals and medical practices. This is due to the many benefits that are associated with their usage, which include the reduction of costs, the potential to save millions of lives, and the improvement of patient outcomes (Groves, 2013).

The rising adoption of Electronic Medical Records (EMR) is one of the main sources of big data in the healthcare field, as these records can be aggregated and studied for trends and correlations. Adoption of certified EMR technology picked up in pace and in market reach after the passing of the Health Information Technology for Economic and Clinical Health Act of 2009, abbreviated HITECH Act. This act provides incentives for those who can show they are meeting the objectives set forth by the federal government as "Meaningful Use" of the software.

Big data can only be as strong as the samples it draws from to assemble its information. At the present time, practices with either one or two physicians that are physician owned have lagging adoption rates when compared to the whole (Decker 2012). Eight tenths of medical practices in the United States only have one or two physicians (Hing 2007). Considering their position as the major group of medical practices across the country in terms of size, and the delays in implementation associated with the 30-40% failure rate (The Center for Health Policy and Research n.d.), big data is missing a crucial demographic of the larger physician population. An observational study was conducted this year at a two-physician medical practice in New York State which demonstrated that current EMR technology is not structured in a way that encourages smaller practices to participate. There are multiple obstacles in the way of adoption, mainly stemming from the sheer economic and time investment a proper implementation needs to find a vendor with a good EMR that compliments office workflow.

Situation and Environmental Factors

The medical facility, in which the observational study and rollout of EMR occurred, is located in Babylon, New York. The practice has two physicians, with one interested in implementing EMR for his patients for a three month trial period. Other services provided at the practice include various medical testing such as sonograms and cardiology services on-site. The volume of patients seen by the two main physicians generally stayed under 500 patients a week, but no less than 250 patients a week were seen.

Computing infrastructure at the practice prior to EMR implementation was flawed and dated. The practice has had no prior experience or implementation of modern EMR systems. Nine out of ten computers were utilizing Windows XP operating system on hardware unsuitable for upgrading to either Windows 7 or Windows 8, leaving systems susceptible to breach as Windows XP is no longer supported by Microsoft. Billing and appointments are handled by a computer program the office began utilizing in 1998, and as such, cannot be utilized for EMR services such as E-Prescribing, patient demographics, etc. Test results from other offices are either mailed or faxed into the office, and all office communications are handled manually, there are no automated services to inform patients of appointments or test results. Insurance verification also occurs over the phone or through insurance portals on the web.

Office staff had varying computing backgrounds. All are trained and are efficient in the old billing and appointment software; however, few are adept at fixing basic technical problems or other computer programs without technical assistance from outside providers. The old computing software used for billing and appointments perpetuated this mentality as most problems in it can only be solved via access to the root account; this account is primarily utilized by the software vendor over a remote connection.

During the EMR implementation process the practice hired one on-site IT staff member to conduct the operations of implementation such as technical upgrades, installation, training, and support services. This IT staff member worked under the direction of the physician. The time period for the implementation trial was July 1st, 2014 to September 30th, 2014.

Implementation Preparation

Preparation occurred for this project in the month prior to July 1st, 2014. Approximately $10,000 was spent in computer hardware upgrades to ensure that all relevant office staff would be running Windows 7 computers with Intel Core i5 processors. In addition, three touch-screen Windows 8 laptops with Intel Core i5 processors would be available to the medical assistants and physician in order to chart the electronic medical records. The old computer system was still going to be used for the appointments and billing, as the focus of this project was to determine how well the office could meet the "Meaningful Use" requirements set forth by the federal government.

The decision for which EMR software was finalized with about two weeks remaining in the schedule for setting up user accounts, training, and acclimation to the system before the execution period would commence. The lead-in time to implementation was limited. The goal therefore was to select an EMR that would disrupt office time, money, and resources as little as possible.

Practice Fusion marketed itself as being capable of doing so; it is a free EMR offered through the internet. It functioned through the computer's web browser, storing information in the cloud to servers based outside of the practice. This EMR was selected because its company website touts it as number 1 for primary care based on 3rd party data (Farrell 2014). Including this information, the touted ability to start charting in minutes, and the free to use cost model, it was believed that this EMR would cause the least amount of disruption. This EMR featured electronic charting, lab and imaging integrations, E-Prescribing, integrated billing, as well as a secure patient portal.

Information on training videos was provided to office staff, and a couple of over-the-phone training sessions occurred with the physician and IT staff member during the implementation process. Practice Fusion system requirements were high; computers running the EMR need the latest Adobe Flash, a 2.5GHz Processor or higher, 1600 x 1200 display resolution or higher, 2GB of RAM, and 3 Mb/s or higher internet speed. Windows 7 and Windows 8 are supported, with Internet Explorer 10+, Firefox, or Chrome (Practice Fusion n.d.).

Problems during Implementation

The main focus of failure from the implementation period was a central underestimation of the drain on time, money, and resources an electronic medical record system takes to implement and execute successfully versus a paper charts system. Other obstacles that were encountered could often be correlated to this, such as lack of adaptation period, workflow disruption, slow program speed through a resource-heavy interface, negative office culture, lack of consistency using the software, and anemic support services. The drain of this system implementation sent reverberations throughout the entire office, primarily through the heavy disruption of workflow.

One of the main problems which the failure stemmed from was the idea that adaptation and implementation could occur over a short period of time. While the EMR

website expresses the idea that setup time is short before a physician can chart patients, there are many factors that comprise the successful transition of systems. Records must be transferred from the old system to the new system. E-Prescribing needs to be set up through a process in which the physician must become validated. Office staff needed to become comfortable utilizing the new software before returning to normal productivity levels. Because each software or web interface has its unique properties and qualities, workflow is automatically modified when using something different. When workflow becomes so routine and is upset via a change, decrease in productivity should be expected unless more manpower or exhaustive training is employed, which is a potential drain on time or money versus resources. The short term prognosis for any drastic change in an office setting is poor, especially in small practices in which these changes immediately affect every single worker, versus a larger hospital network that may implement their EMR solution unit by unit, with monetary resources to provide employee coverage while individuals attend training sessions.

The way in which workflow could be disrupted with less severe consequences would be to utilize an EMR with a high degree of customizability to suit the setting in which it is applied. This was one of the top physician complaints during the study. He found that the way in which he was expected to input a SOAP note was more time consuming than on a paper chart. Some of this was because the EMR was very thorough in asking for information that would be beneficial in the future. However, the way in which the physician had to input information was the problem. Options that the physician needed often had to be searched for or hidden away.

Free-text input was the easiest way to record information, however, no free-text information was counted for the purposes of meeting "Meaningful Use" requirements, because the free-form nature of the data prevents it from being aggregated to track health trends. By creating an EMR SOAP note interface that emulated the paper that the physician utilized in his everyday work prior to the implementation, with data boxes that were responsive and contained relevant information, the physician's time would be better utilized.

Another way to implement an EMR with more reliable results is to program and compile code that is lightweight, as speedy interfaces without slow-downs would increase satisfaction; a lot of the frustration inherent in computing and displayed in the observational study is the result of non-responsive situations such as slow-downs or crashes. This must be balanced with ensuring that the software is capable of fulfilling the needs of the physician and "Meaningful Use" requirements.

Because of the disruption the EMR was causing to the office workflow, the culture immediately turned against its usage. Instead of seeing the benefits, the general commentary was that the EMR was only serving to increase the amount of time that it took for a patient to get into a room to see the doctor. Familiarity with the system had trouble developing because the perceived destruction and havoc that the system was causing by the initial slowdown in productivity left a negative impression on office staff on all levels. The rapid adaptation generally caused a shock to the system. As a result, the benefits and potential of using EMR became cloudy and uncertain.

Consistency while utilizing the EMR software was not present. Differing computers (even with the exact same specifications from the factory) ran the program in unique ways, which was exacerbated by the resource-heavy nature of its operation. Reaching the records from the server had varying speeds of connection; the software sometimes loaded information very slowly, which was time taken away from the physician seeing his patients. This lack of consistently created problems as the physician had this EMR system delaying his schedule of patients beyond acceptable amounts.

Support services for the EMR system felt anemic at best, this feeling was spurred by the lack of training options with the new system. It was recommended based off of information on the website that the practice should have someone certified with expertise in the software come in and provide training services. The practice was not in a position to facilitate this in the timeline, so support and training direct from the vendor over the phone during the trial was utilized instead. If there were technical issues with the EMR, the first assumption on the part of their technical support team was to assume it was because of a problem on the practice's end, which was not always the case. However, this presumption alone left a negative impact; the practice was not assured that technical problems would be readily and quickly solved.

The largest problem derailed the project and caused a termination of EMR usage one month prior to the trial period's end. The processing of the physician's E-Prescribing application was delayed. Validation and E-Prescribing capabilities became active about halfway through the implementation period. For the purposes of meeting the "Meaningful Use" requirements, 40% of all prescriptions during an attestation period must be e-prescribed. Due to the delays in acquiring E-Prescribing rights and the anticipated training needed subsequently, it was decided by the physician to discontinue utilizing EMR software. The physician wanted the trial period to evolve into a system that would be eligible for meeting the "Meaningful Use" standards, which the trial was no longer eligible for. Further EMR implementation was delayed until a slow roll-out could be performed with an EMR company and software that can better accommodate the training and operational needs of the medical practice.

These lessons and the information gathered will assist the medical practice in future endeavors, as multiple revisions are planned for future EMR implementation. EMR vendors will be consulted in thorough detail; having prior knowledge of how they work is invaluable knowledge which will aid in a future EMR vendor decision; one with extensive customizability is a top priority. Furthermore, more time resources will be allocated for effective transition of data, then slowly implementing in each department of the office one by one, so to not overdo the transitional burden. Training will be provided to all employees so that usage is less strenuous on employees. On call support with a focus on good service and responsiveness is a requirement of great importance as it is a resource office employees have relied on with their previous vendors besides the on-site IT staff member. Additional employees will be considered for hire during the transition period, and potentially for the long term, as the current office staff, while competent, is very lean for the ever expanding office.

Discussions

UMass Medical School furnished a paper with data from 2005 including the main reasons there are failures of EMR implementations. They included lack of implementation planning, inadequate research and expectations of technology, incomplete training of staff, mismanagement of workflow and staffing changes as a result of technology (change management), and reluctance of providers to take on additional burden (The Center for Health Policy and Research n.d.).

All of these reasons are culpable in the failure of the attempted implementation that was performed this year. This is alarming as that the paper was written 9 years prior to this implementation. While we now have legislation that provides incentives and penalties to encourage EMR adoption, the pitfalls associated with it are still present. In nearly a decade of technological advancement, none of these issues have been eliminated.

There are larger-reaching implications associated with this information. What progress, if any, has occurred in eliminating pitfalls associated with EMR implementation? Is the government doing enough to get small medical practices on board with EMR systems? Are financial incentives and resources provided by the government enough? Why hasn't a company developed a system that combines ease-of-use, a fast implementation cycle, compliance with “Meaningful Use” objectives, and failure-proofing in the nine years since significant EMR problems have been identified? How will big data in the short term be able to compensate for the lack of data from small medical practices? These questions and others will be the focus of future research plans.

Future Research

Further surveys are in the planning stages to conduct a correlational study on EMR in small practices. The objective is to strengthen the correlation between EMR failures nearly a decade ago versus today, determine a reading of present failure rates, and also develop research on the amount of trials it takes small practices before they successfully implement EMR. Specialty practices can be surveyed to compare and contrast their results with internal medicine or family practices.

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