The difficulties in building electronic medical record information technology ess...

Technology, Information Technology

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What management, organization, and technology factors are responsible for the difficulties in building electronic medical record systems?

From a technology perspective, one of the big hurdles is the number and variety of different providers of technology services that can be involved in the process of building EMR systems. These providers may build certain customised services that may not easily interface or communicate with other systems. Cohesion and the implementation of standards when developing EMR systems is a key concern. K. Laudon and J. Laudon (2011) reflects that it is unclear if systems implemented now will be compatible 5 years on, and indicates that without compatibility it " jeopardises the goal of a national system where all health care providers can share information" (K. Laudon and J. Laudon, 2011 p. 546). Cost of technology and the pace that it changes is another big concern. With the rapid rate at which technology changes, it is crucial to consider if smaller health providers have the expertise and resources to maintain and secure the online system, their client side servers and applications from new and constantly evolving viruses and attacks. These new kind of security challenges that are posed would require different, and quite likely more costly resources which they may not be prepared to spend on, train or hire. From an organization perspective there is evidence of resistance to changes in the current process. K. Laudon and J. Laudon (2011) establishes that the high cost of restructure will " represent a major increase on short term budgets and workloads" (K. Laudon and J. Laudon, 2011 p. 547), even with the presence of stimulus money. This makes it difficult for

smaller practices to justify the outlay and contributes to resistance at an organisational level. Furthermore, the payback period of implementing an EMR is quite high, and it will be a struggle to convince these companies of the longer term benefits of an online EMR system. The increased workload for staff will be met with resistance and will require careful and appropriate management. Management of the EMR system also poses some key issues that need to addressed. Firstly, by nature the data in an EMR system is online and must travel through the public domain (internet) to reach government systems and other health providers. There are privacy and security concerns that will provide a real challenge to the management of this data. How do we address the key security challenges of integrity, availability, authenticity, confidentiality and non repudiation? What level and mechanism of encryption is sufficient, and how will the sensitive data be transmitted and protected? K. Laudon and J. Laudon (2011) are critical of privacy, and indicate that even the " perception of poor privacy could affect success of the system and the quality of care provided" (K. Laudon and J. Laudon, 2011 p. 548). There is also the question of data distribution i. e. How and where is the patient data going to be stored? Will the government provide a cloud solution that all health providers can push data to, which can be queried by all health providers? K. Laudon and J. Laudon (2011) present an interesting working example of electronic medical record use in the Veterans Affairs (VA) system of doctors and hospitals. Laudon continues to explain that some 1400 VA facilities use this " record sharing software developed by the government that allows doctors and nurses to share patient histories" (K. Laudon and J. Laudon, 2011 p. 547), but does not

discuss the implementation or technical specifics of how this record sharing is achieved. If patient data remains distributed amongst the various clinics or hospitals that they visit, this raises the question of availability. If the patient data is to remain distributed, how can we ensure that another health provider can access all patient records from other providers at any time of day e. g. when they are closed? Small health service providers may not have the expertise or resources to ensure high availability and support 24/7 patient databases and services that are constantly online.

Question 2

What stages of system-building will be the most difficult for building electronic medical record systems?

Determining user requirements of the system for each health provider may provide many challenges and also be quite costly, as users may not be fully aware of what exactly the system is required to do. This will require the services of experienced and skilled business analysts to extract this information and put together the necessary work flows and requirements documentation for the application developers. Deciding what standards will be used, and how and where data translation will take place if necessary is another major difficulty when attempting to build an EMR system that can engage and understand each other on a national level. This leads to the next issue of determining the appropriate taxonomy used within medical institutions. EMR's by nature will contain a lot of text content, which raises the question of how the data will be organised and categorised. For EMR's to be used in an efficient manner it follows that some kind of indexing strategy

must be employed. In " Indexing Electronic Medical Records Using a Taxonomy", Kuranz and Gilles (2012) suggests that machine aided indexing software is the answer. Before indexing can be applied though, a taxonomy must be agreed upon. They go on to explain that " subject matter experts who are familiar with health services and medical terminology" should be involved in " suggesting and reviewing terms" (Kuranz, Gilles 2012 p. 31). There are thousands of clinics and hospitals spread across the country, and to come to an agreement on taxonomy, even starting such an exercise is daunting task indeed! Kuranz and Gilles also acknowledge that " descriptions in medical codebooks are not always neat and clear" and that " due to the needs and expectations of the medical community, the medical taxonomy will need to be very specific" (Kuranz, Gilles 2012 p. 31). These complexities will make this stage of system development quite difficult. Developing the client side applications and tools themselves in a consistent fashion will be another big challenge for the application developers, as each provider may want a differently configured system, or tailored to specific needs of that particular clinic. As mentioned previously, K. Laudon and J. Laudon (2011) has voiced uncertainty about whether systems implemented now will be compatible in the future. This leads to the next difficult question of determining how and where the patient EMR data will be distributed. There is the choice of central government/private cloud servers, or allowing distribution across the various clinics/hospitals. Both options present a unique set of challenges in the various facets of privacy, security, access/retrieval and taxonomy. Coming to the implementation stage of the EMR system will also provide numerous challenges, as many clinics may not

have the infrastructure or access to high speed services to link in with the EMR system, or even reach other nearby providers. Another difficulty is the question of high availability, how and when will backup and emergency servers be made available and how to handle data corruption or loss, and finally deciding what security measures and methods will be used and where will they be implemented.

Question 3

What are the business and social benefits of digitizing medical records (to individual physicians, hospitals, insurers, patients)?

There are many social and business benefits of digitizing medical records. To physicians, it reduces the amount of manual paper based searching and form filling. This means that they can focus on their core task, which is to spend time diagnosing and prescribing cures, ailments and treatments for patients. Increased speed means that physicians may be able to operate more efficiently and service more patients than previously. K. Laudon and J. Laudon (2011) supports this idea with the comment that " physicians would be able to immediately and directly access needed information from the EMR without having to pore through paper files" (K. Laudon and J. Laudon, 2011 p. 546). Digitized medical records also means full access to patient backgrounds, which makes physicians able to provide more accurate diagnosis with reference to patient history. Hospitals have plenty to gain, as mentioned previously the reduced search cost means that hospital staff can operate with greater efficiency. Administrative roles for record keeping and form filling would no longer have a significance, and hospitals can focus their

resources on and training and recruiting professional medical staff. This means significant cost savings that could not be achieved when managing paper based medical records. The other added benefit is digital medical records allow for better control of patient data. This reduced the risk of errors being introduced, and also fraudulent behaviour e. g. modification of test results for insurance purposes. There is an opportunity to contribute to and increase cohesion and synergy, as different hospitals and insurers may also be able to understand and work with other more closely. Ambiguous medical terms, codes and meanings could be replaced with common categories and a consistent taxonomy. Kuranz and Gilles (2012) recognises this beneficial aspect of EMR, describing it as a " proven valuable source of information for diagnostic research, coding enhancement for billing and insurance purposes and understanding of an overall patient encounter" (Kuranz, Gilles 2012 p. 30). At a broader level, the data in EMR systems can be aggregated and analysed to better understand the medical system as a whole, assisting governments, regulators and insurers to respond and modify policies appropriately as the environment changes over time. Insurers have a lot to gain, as access to full patient history would give them a wealth of information about their customers that they may not have had previously. This allows them to tailor insurance products to the right individuals, and also cater for exclusions in a proper manner. More information here ultimately allows for better control and management, and mitigate the risk of fraudulent behaviour. With proper management, this can ultimately lead to insurance companies operating with better margins and better premiums for members. Given all of the above, patients will find a greater level of service

and satisfaction when visiting physicians/hospitals with EMR systems. There would be reduced wait times, shorter queues, with prompt and accurate advice with respect to their full medical history. K. Laudon and J. Laudon points to the success of the VA Vista system, where patients describe the process as being " effortless", adding that " instant processing of claims and benefits are among the benefits of EMR systems" (K. Laudon and J. Laudon, 2011 p. 547). There is a lower risk of a physician missing a critical piece of information leading to a misdiagnosis, or providing an incorrect or less than optimal prescription.

Question 4

As is Process

To be Process