Paperless Healthcare

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What is the ***purpose*** of this paper?

The purpose of this paper is to try to turn a very complicated issue that involves quality of care, economic costs and benefits, and local and federal regulation into a simple question:

What's best for the American medical patient?

The exact goals of the paper are to clarify the nature of paperless healthcare, present the direct and indirect values of the system, grapple with sources of resistance to the transition, and suggest potential solutions to resistance by outlining best practices and standards for the broad implementation of the system. The most difficult and highly important portion of this paper does not involve discerning the benefits of paperless healthcare, but really understanding the essence of why certain health care providers *oppose* the transition. We move beyond the argument of cost and shift our focus to the elements of care that are in play when we *fundamentally change* the nature of the American health system.

Throughout the paper, the hope is to convince the reader that the style in which we construct our medical system should directly reflect the manner in which we live our lives. The interconnectivity, flexibility, and openness of the modern world should flow uninhibited into the institutions to which we trust our lives. At the same time, great efforts must be made to safeguard the privacy, safety, and dignity of each and every member of society. The cooperation of every level of the healthcare system is paramount for the success of the

transition, so effective management of facilities both large and small, third party intermediates, private insurance companies, and government-operated agencies is essential throughout this process. Leadership is, in fact, another key aspect of the challenge. This and other concerns are addressed in the paper.

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Nature of Paperless (Briefly)

Paperless healthcare is, on one level, the creation and maintenance of electronic medical records (EMRs; otherwise known as electronic health records, EHRs) for each aspect of a patient's health history. The highest order implementation of this system is an integrated health record – the lengthy, cross-disciplinary collection of data from every primary care, eye, dental, or specialist visit they have had in their lives. The integrated health record could then

be accessed by any health facility an individual goes to for treatment – allowing instant access to data. This obviously removes the requirement to provide each new health provider with a short health history before receiving treatment.

There are degrees of how paperless a facility can be. The most superficial use of digital technologies is implementing a computerized physician order entry (CPOE) system to send out for lab orders, prescriptions, and various other services electronically. The adoption to at least the simplest form of this technology is rather widespread – 84.4% among US hospitals in 2008 (Kumar & Aldrich, 2010). From there, the sophistication of the system grows to packaging and transmission of digital imaging throughout health facilities to recording physician's notes electronically on patient's file, to finally creating a patient record database that is mineable and a facility that can transmit and receive all aspects of the medical record electronically. Just around 0.3% of US hospitals fulfilled this last promise in 2008 (Kumar & Aldrich, 2010), though the number has steadily been increasing.

To reap the fullest benefit of the paperless transition, however, the most efficient implementation strategy would take the facility to this upper echelon of digitalization. At this point the ultimate effects of the system are greatest and so are the savings. At the same time, more savings inevitably imply more costs – the price tag on this level of integration is no trivial amount. Total cost estimates for creating widely integrated EMR systems in US hospitals over 10 years amounts to just around $28 billion per year and $16 billion per year afterwards to maintain the system (Kumar & Aldrich, 2010). Simply building the interconnectivity between systems alone is estimated to be $2.5 billion (Kumar & Aldrich, 2010). At the same time, the estimable cost savings are estimated to be around $1.3 billion a year for elimination of the

need for maintaining paper records alone, with total savings being placed between $81 billion and a staggering $300 billion per year (Kumar & Aldrich, 2010).

It should be mentioned that while only 30% of US practitioners utilize EMRs, more than 89% of health facilities in such countries as the UK, the Netherlands, and New Zealand already have such systems implemented (Kumar & Aldrich, 2010). Combining this with the fact that the US spends a significantly higher percentage of its GDP on health than these countries makes EMRs that much more ideal for wrangling out-of-control costs of healthcare.

As intimated above, one of the ultimate goals of the paperless system is to approach that point where patient data can be uploaded and analyzed on a large scale, creating a substantial wellspring of knowledge to be used in medical research. This information can be used to test everything from co-morbidity of various conditions to the most effective treatment of a rare disease. Just as the advent of the Internet has allowed for vast opportunities for categorizing and retrieving the world's information with a simple Google search, the value of all the world's medical records should be available to increase our knowledge about health and well being. In order to get to this point, however, the system must be able to both store and retrieve information efficiently and securely.

Storage and Access of the Medical Record

The most important part of an effective EMR system, beyond ease of use, is the ability of users to both upload and download important health information safely and rapidly. The exact designs of EMRs vary widely to the point that it would be difficult to generalize the build

and interface of standard EMR systems. However, the generic description of the system is that it is simply a database with a specialized database management software that can place and retrieve several different types of information in the database. These types of data would vary from numbers for vital signs and text for physician notes to all different image types for x-ray and MRI images. A system that cannot support a wide variety of data is a less-than-perfect design both for the purposes of the medical data miner and the investigating physician searching for the most accurate diagnosis of his or her patient.

When the physician or nurse is actually accessing or inputting the data, however, they are working through the graphic user interface (GUI) – the application they see and interact with on their computer terminal. There are also a great number of GUI types for the medical field that vary from extremely utilitarian to quite attractive and barely functional to shockingly fast. There are trade-offs between appearance, ease of use, and speed of processing, which are further determined by the particular hardware and database modeling underlying the terminal access point. Considering one of the greatest barriers to adoption, as discussed later, is the size of the learning curve on the new EMR technology, ease of use is typically very highly weighted in clinical settings, especially busier hospitals (Vishwanath, Rajan Singh, & Winklestein, 2010). Speed is also more of an important factor in busier hospitals than in smaller, private practices because time loss due to transactional delays compounds highly across the larger organization.

On the other end of the information use cycle are potential medical researchers who are attempting to mine the data for minute bits of data that might lead to a new revelation about some condition or another. Packaging the data for cross-patient analysis is thus another

important aspect of EMR design. It is easy to design a system wherein each record stands alone, but being able to separate a single record into many different data sets is necessary not only for the technical purposes in extracting only necessary information from a large volume of medical records automatically, but also for the more sensitive, practical implementation of a system in which individual patients are allowing the submission of very personal, very sensitive information to people that are beyond the scope of doctor-patient confidentiality. In a proposed scenario wherein patients publish their own medical records, there would have to be a quick and simple option to only release select sets of data to researchers.

Another important aspect of the data storage issue involves where it will ultimately be located as 'physical' data. One option for a healthcare facility is to store digital patient records on a secure hard-drive, private mainframe, and/or local server. This potentially localizes the data to one firm's ownership for practical purposes. In order to transfer the data for external use, as in exporting patient records for treatment elsewhere or abovementioned medical research, the health facility would need only transmit the data package electronically. This system might create lags due to limitations on upload and download rates from Internet connectivity on both ends of the connection.

Weighing whether or not that particular issue is really a bother, an additional encumbrance that arises in the local storage schema is the difficulty in accommodating large requests on the server or mainframe operated by the hospital or care facility. This would increase in-house maintenance costs and time for the firm while also slowing down access times for their staff and physicians. As an alternative, the data can be either stored solely on a remote server or periodically copied to a mirror database located on the remote server. This

form of online publishing, a type of *cloud computing*, puts the responsibility of securing, maintaining, and distributing data to an external specialist. The downside to this is loss of control over the data – once medical records are transitioned into a quasi-public good, it is difficult to wrest ownership back.

Although, if a health facility decides to store only *partial* patient records remotely for external access purposes while using local storage methods for care purposes, then part of the ill effects of both storage types can be minimized. The partiality of patient records would involve removing parts of the record that, quite simply, indicate identity. Since patient records must be complete when moving treatment from facility to facility, the cloud server would in this case only be used for mining and research purposes.*

Consider now a more unconventional storage method – external storage in a middleman business or agency – a health information bureau. Richardson et al. explored a parallel between medical records and credit in their 2010 analysis and commentary in the Journal of Consumer Affairs. More than a hundred years ago, credit was available almost exclusively at the single business level. Customers would go to a store and make purchases, some in cash and some on credit. Credit for new, unknown customers was usually more expensive and less available than it was for regular customers with a good track record of paying their debts. Of course, this meant that, in most cases, neither good nor bad credit would transfer to other stores. A person who ran up unpaid debts at one store could simply patron another to get temporarily better credit and so on and so forth, while good and honest

* Note that the use of personal medical records is not currently a common practice in American healthcare, especially in the automated, wide-scale fashion described in this paper. However, since this idea represents the pinnacle of paperless technology and this paper seeks to describe the most advanced, theoretical applications of the system, it is only fitting to assume the eventual evolution to such a commonality.

customers would be motivated to loyally shop at the stores they already were in good standing with.

The stores were also motivated by self-interest to keep the credit of shoppers proprietary and immobile. Good customers could not get stolen away by competitors while bad customers would go to competitors and rack up debt. It was a perfectly non-cooperative and mostly beneficial situation for stores and it was both bad and good for customers (depending on how honest they were). Starting in the 1880s, though, credit bureaus started to appear – the precursors of TransUnion, Equifax and Experian (Richardson, Hall, & Madjd-Sadjadi, 2010). These organizations would collect data on people to create credit scores – the quantification of how safely one can bet on a particular person paying back their debts. Suddenly, people who abused credit were accountable for their trespasses not just at one store, but also in every part of their lives. As well, stores could no longer hold so tightly to their good customers. In short, the heightening of information sharing allowed for a more fair, equitable solution to the credit issues of the day.

This relates to medical records because most records today are essentially the property of the physicians that file and use them. A person could go from doctor to doctor, lying about previous history, and none of the facilities could know that the patient was being dishonest about their health. In another parallel, doctors actually benefit by having their patients' medical records poorly transferable and inaccessible (Richardson, Hall, & Madjd-Sadjadi, 2010). This was because they would be less likely to have their patients going to other offices for treatment because of the established relationships and files built at their current treatment center.

In order to alleviate this, a possible solution for the American healthcare system might come from that institution both necessary and reviled – the credit industry. Similar to our credit bureaus, there might arise *health information* bureaus (HIBs), as suggested by Richardson et al. The HIBs would act as a liaison between the caregiver, the patient, and potential 'buyers' of the medical record information. In fact, shifting money from the researchers to the HIBs to the health facilities might cover part of the cost of the electronic transition. In this scenario, a secure third party would be in charge of regulating and limiting the scope of patient records that could be given to researchers or other consumers of the information. By giving patient medical records to the HIBs, health facilities would be given access to the data available to the HIB from all over the country, perhaps the world. Lastly, these theoretical organizations could help push for a standard EMR system and data format. Insurance companies already have some semblance of influence on these systems, but since these bureaus would deal exclusively in these record batches, and likely on the large scale, then they would have more interest in pushing for uniform implementation strategies.

Organizations like the Medical Information Bureau (MIB) actually already compile and share this kind of information, in a limited sense, between health care providers, patients, and insurance companies. They typically become involved as a liaison between a patient who is seeking private insurance and the insurance company. The patient goes to a physician who then gives them a moderately thorough examination. The record produced by this visit is then sent to the MIB, who converts the patient's record into a series of codes signifying certain conditions. This information is finally passed on to the insurance company, who uses it for deciding whether or not to cover you based on your health history and pre-existing conditions.

They can also use risk factors you exhibit like smoking, skydiving, or high blood pressure to raise your premiums.

The proposed idea of health information bureaus is thus not quite as alien as it would have been if similar organizations did not already exist. The issue with the creation of such firms involves where they would come from and who would regulate them. The most natural scenario would have them developing at least initially as offshoots of either insurance companies or a federal government agency. The problem with that is that Americans love neither the federal government nor insurance companies. Alternatively, professional organizations such as the American Academy of Family Physicians or the American Medical Association might be interested in partnering with some non-profit or business start-up to provide this kind of service.

Additional Notes on the Paperless Environment

The paperless environment does not wholly revolve around the manner in which external elements or physicians store or retrieve information and how that information is owned or physically arranged on remote or local servers. Indeed, the most apparent aspects of the paperless healthcare facility involve quite a number of different fixtures that figure more directly into the care provided to the patient during their visit.

One example of such fixtures involves the issue of how to sign off on the various waivers and disclosure forms that are produced in a typical visit to the clinic. Fortunately, there is an industry standard, SAFE-BioPharma, which is used to verify and affix digital signatures to

digital forms (SAFE-BioPharma Association, 2011). The patient simply scrawls their name on a digital signature capture pad and the signature is recorded in the system to be verified. It is very lucky that such a very quick adaptation of an existing technology could be quickly incorporated to increase the power and security of the newly constructed electronic environment.

Another fixture that a patient would experience is the replacement of the familiar clipboard and waiting room with a computer terminal. Patients entering a primary care facility or into an office setting might be greeted with a computer into which they might type various important portions of their health history and reasons for visiting. This data would then not have to be transcribed by a receptionist, but could be instantly reviewed on-screen by the doctor, nurse, physician's assistant, or whoever might be in the process of prepping for the patient intake. This decreases the time the patient would have to spend waiting for his or her appointment, increases the time for care givers to review and set-up or plan potential tests or prognoses that might be relevant to the patient, and also reduce the burden on administrative staff in terms of busy work and filing.

Another thing the patient might notice would be the use, by physicians and nurses, of laptops or tablet computers for clinical purposes. Nurses would be utilizing laptops to increase the accuracy of such things as prescription medication delivery and other doctor-prescribed procedures. Doctors might be using portable computers to take notes, make prescriptions, or observe a patient's complete health history.

The paperless environment would mean that, for one, there would be no supply closets full of printer paper and also much fewer printers for processing massive numbers of

documents. The amount of waste material the hospital generated would decrease, along with certain persistent administrative costs. It is in these small, superficial ways that health facility workers would first notice a change in their cost structure and realize in part the benefit of the transition.

Value of Paperless Healthcare

The real value of the paperless environment, however, should not be cost reduction. It is true that fully implemented systems are projected to save billions of dollars in the health industry each year, but the prime motivation for adoption should really be the increase in healthcare quality for the average American medical patient. Of course, the two things are also interconnected: lower costs means more money available for improvements and updates in facilities and equipment and hiring sufficient physicians and staff. It must be stressed that the conversion of a facility requires a great amount of resources and time – both to redesign the workspace and retrain the workers. At the end of the transition process, the benefits of a properly instituted system by and large far outweigh the cost and effort needed to bring it into existence.

Instant access to a patient's *complete* medical record gives physicians the ability to formulate the fastest and most complete explanation for the ailments of any given patient. To illustrate with an example, consider the case of an elderly veteran who was being treated by a VA clinic in Washington, DC (Longman, 2005). The example here used of the Veterans Health Administration (VHA) is important because that institutions was really the first large medical

provider that adopted and really pioneered electronic medical records and paperless healthcare (Oliver, Public-sector health-care reforms that work? A case study of the US Veterans Health Administration, 2008). Beginning in the mid-1980s, the VHA had begun to make limited use of electronic medical records with their revolutionary VistA program (Oliver, The Veterans Health Administration: An American Success Story, 2007). By the late 1990s, the reputation of the VHA had rebounded after decades of poor regard and harsh criticism (Arnst, 2006). In fact, during the early 2000s, the level of healthcare provided by this government bureaucracy exceeded that of most private healthcare institutions on 13 out of 15 objective measurements (Arnst, 2006). Much of this improvement in quality of care is attributed to the extensive adoption of EMRs (Oliver, Public-sector health-care reforms that work? A case study of the US Veterans Health Administration, 2008).

The man in this example had been admitted to the VHA facility complaining of shortness of breath, and x-rays taken of his lungs were not conclusive of any single condition, though there was clearly a difference in one lung from the other. As a patient of the VA, however, one aspect of the diagnosis process was different: the man would step on a special scale each day that uploads data to the VHA server, for incorporation into the patient's record. Apparently, over the same course of time the man began complaining of shortness of breath, he had also been gaining weight regularly.

The doctor overseeing his case looked at these facts and, coupled with the information that the man had experienced al hip fracture rather recently, was able to make a rather educated diagnosis. The explanation for the x-ray irregularity, shortness of breath, and weight gain was a build-up of fluid in the lungs. The fluid was primarily building up in only one of his

lungs, however, because the patient was sleeping on one side because of the pain in the fractured part of his hip. Fluid in the lung is, of course, a frequent distress signal that a patient is in need of treatment for congestive heart failure. Being able to point this out was extremely fortunate for the patient because the other immediate possibility was lung cancer, which would have delayed the correct diagnosis and endangered his health.

The ease with which the doctor was able to make an accurate diagnosis was reflective of the efficiency with which digitally integrated medical records can serve to support physicians. On one hand, he had the weight recordings available to him, while on the other he could access the other important parts of his record and ***focus only on relevant information, ruling out other diseases***.

Closely related to the ability to make better diagnoses is the important benefit of mining data for best practices for future care scenarios. Physicians and clinical investigators are enabled by digital recordkeeping to search through records of patients with similar conditions who, perhaps, received slightly different treatments. The success of different treatments can then be assessed, creating a better level of care for any who may suffer that condition. As well, trends with how certain patients with certain conditions respond to certain treatments can not only help these patients to lead healthier lives, but also discover more about the effects of various conditions on subjects from different backgrounds or medical histories. In short, digitally conglomerated data provides the institution with an opportunity to learn and grow while treating successive tides of patients. This opportunity makes the hospital care better for patients, easier for caregivers, more cost-effective for management, and often raises the prestige of the hospital

The Agency for Healthcare Research and Quality reports that studies show between 44,000 to 98,000 die each year in America because of direct medical mistakes – not a small proportion of the **tota**l number of deaths (Longman, 2005). Inestimable numbers of people, on the other hand, are subject to mistaken or improper medical care. These errors are difficult to quantify typically because the effects are not immediate and fatal, but instead very subtly affect the recovery of patients from certain diseases, cause misdirection by superfluous symptoms, and set up long-term regressive disorders. The paperless system can eliminate some important sources of medical mistakes.

As previously intimated, prescription accuracy can be improved by digitalization, partially due to the simple effect of removing the sometimes subjective process of interpreting handwritten prescriptions. Prescriptions typed into the patient record are automatically checked against the patient's medications and health conditions to prevent allergic, synergistically harmful, or simply unpleasant side effects. As well, on the pharmacy end, the prescription can sometimes be filled robotically to ensure quality control. The medication, whether in an IV bag or a bottle, is then stamped with a bar code. This bar code along with a bar code on the nurse's identification card and the patient's wristband is scanned before administration of the medication is permitted. This ensures that the medication is given at the appropriate time to the correct person.

As a result, real time vital signs can be recorded that correlate, from the first administration to the final dose, the effect of the medication. This information can be used to assess the effectiveness of a medication. In general, connecting the real time vital signs of a patient to such things as meals, physical exertion, and bathroom activity can contribute to a

fuller picture of a patient's prognosis and whether the most appropriate course of treatment is being taken.

Though this has been touched upon, perhaps fleetingly throughout the paper, one of the ultimate, practical benefits of the paperless system is increased workflow efficiency. From a business perspective, the current level of interconnectivity, task automation, and throughput in non-digitalized hospitals would be almost completely deadly to survival in a competitive environment. Papered facilities have much higher redundancy rates, data lag times, superfluous overhead, and errors due to conflicting information than a well-run business should have. In no uncertain terms, the transition to paperless healthcare is an embracing of better management practices. When you can streamline processes for your workers and gather data on the efficiency of your workers, then you can not only supply an ideal of where your firm needs to be, but the route by which you can train your workers to get you there.

Sources of Resistance

Despite an overwhelming number of reasons for adopting a paperless system, there is nevertheless resistance to the transition at many different levels of healthcare enterprises. The easiest example of a physician resistant to implementing a comprehensive EMR package in his office involves more than one subtlety in the manner in which the physician provides care. On the one hand, the costs are, as has been mentioned, quite high for effective implementation of these plans. On the other, many small offices have little to no practical reason to go paperless.

Consider the simplified list of paperless benefits patient care – it reduces redundancies and errors in treatment, it allows a more holistic, *long-term* approach to a patient health, it provides faster access to patient documents. These advantages are either irrelevant in smaller, family practice settings *or are already part of the guiding principles of the healthcare facility*. A primary care physician sees fewer patients than specialists in large hospitals and maintains long-term relationships with his or her patients. Her focus is already to consider all aspects of the person's health when making any diagnosis or treatment plan, so a costly electronic system that does the same thing does not seem worth the money when the level of care, from her perspective, is already very good. In addition, the rapid access to medical records absolutely becomes much less important when the office is small, with relatively few patients. It is not an excessive burden to keep paper records of a few hundred patients, and it would certainly not seem to justify the conversion of all those records to electronic, especially using an unfamiliar system with few other perceived benefits.

The pace at a smaller doctor's office is also much slower than that of a major hospital with dozens of in- and out-patient centers, clinics, operating chambers, and diagnostic laboratories. A large hospital has thousands of physicians and staff working long or late hours on large numbers of new, unfamiliar patients. The hours at a doctor's office are typically short and only during the day. Errors due to rushed protocol are much less likely and intra-office redundancies are infrequent due to the ease with which paper records can be retrieved. In other words, the smaller the health facility, the more efficient it tends to be and the less it would require a paperless intervention.

Another big obstacle for implementation is the perceived benefit a physician attributes to an EMR system after it has been installed. There is a battery of different expectations that go along with the pre-implementation phase of an EMR – expectations of how administration costs will decrease, efficiency in patient processing will increase, basic clinical processes will become easier, documentation of patient encounters will become standard and easily accessible, economic challenges and reimbursement will be elevated, technical issues will be burdensome, patient safety and care will automatically go up, and communication and confidentiality will be easier but harder to secure (Vishwanath, Rajan Singh, & Winklestein, 2010). The complex web of expectations and concerns a physician has before taking on an EMR system makes it difficult to control the conscious or unconscious resistance to its implementation. Typically, the months directly after installation of EMR capability are filled with dissatisfaction with the results of the transition, largely because the manner in which the system is being used initially (Vishwanath, Rajan Singh, & Winklestein, 2010).

The primary use of EMRs does not differ with the more simple CPOEs mentioned above. They are initially used simply to make lab and pharmacy orders and enter in simple information about the patient and their conditions. Since the new EMR rarely does these very simple tasks any more efficiently than the CPOE systems they may have replaced, there is typically frustration with the early results of the system (Vishwanath, Rajan Singh, & Winklestein, 2010). The study by Rajan Singh et al. showed that satisfaction very slowly increased over time, but that expectations drastically affected the manner in which the system was received. The suggested reason for this dissatisfaction, as mentioned, may largely be due to the viewpoint of the care provider.

Earlier it was discussed that some primary care physicians benefit from poor information systems because they would act as a light barrier to diffusion of patients from doctor to doctor. Additionally, one of the highest order benefits of the paperless transition was the use of medical information for research and internal controls. For relatively small providers, the use of research mining on intra-office data has much less potential than the application in larger health facilities. Part of the incentive, lost on small players, is the internal control aspect of this data mining. The other incentive, discussed above, is the almost literal selling of medical records for external research purposes. This scenario, where a health provider would exchange medical records for compensation from proposed health information bureaus, would highlight for a smaller firm the more essential reasoning behind the national (and global) movement towards paperless healthcare – more information for establishing higher and higher standards of care.

The infrastructure does not exist, however, for this kind of relationship to exist. HIBs are purely academic constructs and have not as of yet been seriously proposed. A very large firm, for multiple reasons, needs EMR implementation simply to become a productive, efficient enterprise. For the smaller firms, this is simply not so. In addition to this is the substantial first-movers disadvantage that is incurred by investing early in rather infant industry. Smaller firms that pay for early adoption are subject to more rounds of updates and troubleshooting with less-tested software. Training and retraining with successive changes causes lower morale among employees who, in most cases, see little to no benefit to the EMR system over previous computer entry or paper methods. At the same time, few other facilities are suitably outfitted with paperless systems, which means that the early-adopter has to convert paper records to

electronic when taking patients and electronic records to paper when transferring patients. This last issue is less burdensome as a result of many EMR systems that allow for papered health facilities to look up the EMR of an intake and download the file for conversion and treatment purposes.

The training issue just mentioned is yet another discouragement for small firms, but one of the largest sources of resistance from larger firms apart from the substantial infrastructure investments necessary for interconnectivity and access. For a small office, training of on the order of a dozen people would take the better part of a weekend; for a larger hospital or hospital system, the training process would require waves of training rounds and months or years of continual training. Effective leadership and management come into play with such large, pervasive projects. In order for employees to really get on board with a new system, the leaders of the firm have to both personally believe in the change and *inspire others* to believe in the change. Without belief or conviction in the 'rightness' of the transition, the training process tends to take longer and be less effective; and this effect is more exaggerated the bigger the firm.

Another time and resource consuming activity is simply purchasing, designing, and installing the physical manifestation of the paperless, interoperable system. Questions such as what language the database will be written in, whether it will be relational or object-oriented, how many terminals and access points will need to be accounted for, how many requests will the server have to handle on the average and at peak, what kinds of security and privacy concerns will be addressed, and how much will it all cost? – will need to be answered by special committees or dedicated information technology specialists. However, the issue still remains

as to what system to implement, especially considering the wide variety of EMRs on the market and the possibility that at some point in the future your facility will be required to change over to a more standard format for insurance or mine-ability.

Government Involvement

When all other aspects of the transition are taken into consideration, all that inevitably remains is government regulation. The federal government has taken the position that certain hospitals should be given funding incentives to aid in the paperless transition. This funding is available primarily as a function of how much Medicare or Medicaid transfer payments you receive – the government measure of how poor their patients are and how much money the health providers do not have to invest in EMRs (U.S. Department of Health & Human Services, 2011). Qualifying physicians are given around $44,000 to pay for the transition, while qualifying health facilities are given a base amount of $2,000,000 (U.S. Department of Health & Human Services, 2011).

The requirements for this 'qualification' are the fulfillment of a certain number of standard measures of 'meaningful use'. Meaningful use is the term created by legislation to signify a substantial and purposeful implementation of an electronic health system by an institution. Sample measures of meaningful use include recording a certain set of demographic information about each patient intake (preferred language, gender, race, ethnicity, and date of birth), recording smoking or non-smoking status of every person aged 13 years or older, tracking growth and body mass index (BMI) for children 2-20 years of age, and providing

patients with complete electronic medical records on request (U.S. Department of Health & Human Services, 2011). Around 20 of 24 measures for hospitals or 20 of 25 measures for health professionals have to be fulfilled in order to qualify.

These measures, however, are for stage 1 EMR/EHR implementation – relevant for the years 2011 and 2012. Over time, the standards will grow higher and more extensive – applying to larger aspects of the firm's activities in stage 2 (2013-2014) and stage 3 (2015 and beyond) (Office of the National Coordinator of Health Information Technology, 2011). These rules are subject to change in the coming years, especially as potential resistance grows or recedes. Stage 3 of meaningful use signifies universal adoption, which means that the Department of Health & Human Services (HHS) expects every health facility to possess not only working, but also highly functional and interconnected EMR systems by 2015. At that point in time, institutions that are not in compliance with the directives of HHS will begin to be fined through Medicare transfer payments (Office of the National Coordinator of Health Information Technology, 2011).

In the first year of noncompliance (2015), relevant institutions and health providers will have 2% of Medicare reimbursement payments withheld (U.S. Department of Health & Human Services, 2011). The amount withheld falls to 1.5% in following years, but for hospitals or health providers with large numbers of Medicare patients, this is a none-too-trivial sum to contend with. The important thing to consider, though, is that there are about four years until the fines start being incurred. As long as a given health provider begins to explore their options now, there is little to no reason why they should experience the financial discomfort of the repercussions.

Bringing It All Together

We live in a world where there is *information overload*. The age of the Internet has created around the clock data generation and consumption. Business leaders have to stay connected 24 hours a day to anticipate and plan for present and future trends, and major news networks operate day and night to bring the latest in breaking news. The upside of this trend for consumers is that access to full, up-to-date coverage of almost everything is available on-line at any hour of the day. Work cycles in nearly every field are collapsing to shorter and shorter duration as new products and new information are turned over more rapidly than ever before. It is in the shadows of this new information age that medical care throughout America fails to keep up.

The value of paperless healthcare has been expounded throughout this paper, though the real effects of such a transition are yet to be fully known. As of yet, there can only be estimations of what the face of national and world health might look like when the grand construction of interoperable health data records is complete and the openness of, say, world news sources is imitated in the health industry. The only thing that can be said with any veracity about the transition is that it is conceivably inevitable. More an exploration of what might come to pass rather than value judgment thereof, this paper has sought to explore what individual institutions stand to gain and lose when the future of healthcare arrives at their respective doorsteps.

One incredibly important aspect of the transition that was not discussed here in detail was the implementation of proper security and privacy measures in an electronic environment. One reason for that is that there are few universal standards that guide how systems should behave. There are regulations according to the Health Insurance and Portability Accountability Act (HIPAA) and other recent healthcare legislation that restrict the outright misuse of medical records, but best practices are still currently being developed for the higher order purposes of paperless healthcare that involve sharing and research of health data. It is important to consider not only the restrictions of current legislation, but also the public sentiment towards certainly a good portion of the proposals explored in this paper. The feasibility of any system that thrives on exploitation of personal information is impaired at birth, and the ultimate goal of paperless healthcare as expressed here is probably the most invasive and widespread incarnation of just such a system.

Ultimately, the final judgment on paperless healthcare, its reach and its limitations, will be passed not just by one authority or one institution, but by the preponderant valuation exacted by the American people. The essential duty to proponents of the system is to educate, inform, advocate, and demonstrate the benefits and ultimate goals of paperless healthcare in its highest form – approaching society with a rational and empirical analysis of just what exactly they might be getting into. Furthermore, additional research that delves more thoroughly into the inherent workflow benefits of the paperless system will be paramount to understanding, beyond conjecture, the actual value of its implementation. It is firmly believed that added research in this field will unveil yet increasing levels of unforeseen benefit from electronic medical records and the paperless environment.

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