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Commentary

The Impact of the Internet on the Healthcare Industry: A Close Look at the Doctor-Patient Relationship, the Electronic Medical Record, and the Medical Billing Process

Marc (Mourad) S. Ballas
Albert Einstein College of Medicine of Yeshiva University
Bronx, New York 10461
Joseph L. Mailman School of Public Health
Columbia University
New York, New York 10032

Abstract

The Internet and biotechnology drove an American economic boom. Could the Internet streamline the healthcare industry and reduce its rising costs? This paper will discuss possible scenarios for how the Internet could affect the doctor-patient relationship, medical records, and medical billing.

According to the Health Care Financing Administration's Office of the Actuary, national healthcare expenditures are expected to reach $2.2 trillion in 2008, representing 16.2% of the U.S. gross domestic product (GDP). Confirmed figures from 1998 have these expenditures constituting a 13.7% share of the GDP with an annual growth of 1.8% (http://www.hcfa.gov/stats/NHE-Proj/proj1998/tables/). This growth in health spending coincided with the longest and strongest period of economic growth the United States has seen. The "new economy," dominated by biotechnology and Internet companies, was the cornerstone of the economic boom. Biotechnology is promising designer drugs, mechanical prosthetics, and solutions to human ailments. Clearly, the biotechnology industry will make an impact on healthcare (Berenson, 1996). The Internet is promising to increase efficiency across all industries, thereby improving quality and increasing productivity (Blumenthal, 1997). In fact, some have theorized that the recent economic boom is due in part to the increased efficiency through the use of the Internet (Uchitelle, 2000). The unavoidable question is; how will the Internet impact the healthcare industry, and will it cut the growing cost of healthcare in the United States?

In November 1999, for the first time ever, the use of the Internet for health-related information sites superseded its use for sex-related activities (Kachnowsky, 2000). Moreover, some of the hottest "picks" on Wall Street in 1999 were "ehealthcare companies" like drugstore.com®, MedicaLogic®, DrKoop®, and Gomez.com®. Their products range from providing healthcare-related statistical information to fully electronic medical records. These companies and other not-for-profit ventures over the Internet are changing the delivery of medical care as we know it. These "new economy" stocks have not fared well in 2000, but the argument remains valid: How will the Internet change healthcare? To answer that question, we shall focus on the doctor-patient relationship, electronic medical records, and medical billing.

The Doctor-Patient Relationship

Economic theory states that one of the principles required for the success of the free market is equal access to and distribution of information (Parkin, 1999). Some economists theorize that the "failure" in the healthcare market is due to the asymmetrical distribution of health information (Folland et al., 1997). The relationship between the physician and the patient is out of balance, because the physician has better access to information and more experience than the patient.

In order for one to fully comprehend medical information, one would have to go through years of special training. One would have to complete college, medical school, and graduate medical education where one learns this information and the tools to update it. This process is both time-consuming and burdensome. Not only that, access is not equal, because of the highly competitive selection process that is a prerequisite for the aforementioned education (Folland et al., 1997). However, assuming that access to medical information is equal, the training of a physician throughout his/her education allows him/her to utilize this information properly; not so for the average patient. Medical training creates an asymmetry in the distribution of information even if the information is freely available.

This concept of asymmetrical information plays out when a patient requires an invasive procedure. The patient wonders if the procedure is really needed, whether to do it at a clinic or in a hospital, and whether the physician is properly trained in this procedure. The patient has no real decision power; the physician determines these aspects of treatment. Of course, the patient attempts to compensate for this through the utilization of other sources of information, such as friends and family who have gone through similar experiences. In addition, the patient could consult with another physician to

verify the accuracy of the information provided by the first physician. Nonetheless, the medical decision often comes down to the patient's trust of the physician's knowledge and recommendation. The physician has the role of decision-maker in the doctor-patient relationship. This dependence on the physician distorts the free market dynamic for one simple reason: the physician determines the services to be rendered and then determines the charge for them. Theoretically, a patient could leave one physician for another and thereby retain free market dynamics. However, for the consumer, that would mean having to build a new "relationship" from the ground up. This relationship takes time and effort to develop and nuture. This time factor has made patients value their relationship with their doctor and therefore dissuades them from changing physicians.

The Internet changes this dynamic. In the old way of doing things, a good doctor-patient relationship was the only way for a patient to bridge the medical information gap. The Internet is changing the status quo by providing interpreted medical information directly to the consumer. There was a story in *The New York Times* about Victoria Schlesinger, 31, the chief counsel for Telignet communications company in Vienna, Va., who was told by her physician that she might have lupus. Pressed for time, the doctor declined to elaborate until the lab results were back. Victoria went to her computer, typed lupus in a search engine, and found out all that she needed to know. Later, she went to her physician informed, and asked for her test result. She did not have the disease, but did not keep that physician (Kolata, 2000). According to economists, balance is returning to the doctor-patient relationship through the information provided by the Internet (Bader and Braude, 1998). The physician may no longer single-handedly control the patient's decision.

Dr. Rita Charon, an internist at Columbia's College of Physicians and Surgeons, was quoted in the above article,

"It's a massive revolution. It altogether shifts what goes on when a patient comes in with pages of downloaded stuff and half the time the doctor looking at it has never seen it before. There's a whole new set of emotions present." (Kolata, 2000)

Of course, there is a plethora of information on the web, but there is also a need to authenticate it (Sonnenberg, 1997). However, this information is now available in a format that is not just physician-friendly but patient-friendly as well. Patients who use the web are becoming more educated about their medical decisions. They no longer come to the physician for medical information, but rather to seek medical advice to confirm their suspicions.

Moreover, patients are demanding certain procedures and treatments from their physicians. If their demands are not satisfied, they simply walk away and find another physician. Internet health sites have taught them about the different procedures, and it is up to the patient to demand them. Why is there suddenly action on the part of previously passive patients?

"With managed care you almost have to. It's up to you now, and if the doctor's not going to support (your decisions), you don't have to be involved with them." (Kolata, 2000)

With the proliferation of managed care, patients want to know that the decision they make is "the right decision," i.e. that it is not affected by any financial incentive. Therefore, they find it harder than ever to depend on the doctor-patient relationship.

On the other hand, a patient who values the relationship with his/her physician could now strengthen that relationship and increase communication through the use of e-mail and chat rooms. Instead of waiting for several weeks for an appointment, a patient could e-mail their physician with a question in the morning and check for an answer by midday. Additionally, patients could join one of the hundreds of chat rooms that host physicians from different specialties, ask them a question, and receive an instantaneous answer (Gorman, 2000). Chat-room conferences allow patients an opportunity to get an answer to a question as well as a second opinion for free.

It is possible to envision that the Internet will allow a patient even more involvement in his/her medical care. Instead of going to a primary care physician to manage his/her chronic condition, the patient could manage these problems from the comfort of his/her home. The patient will be trained to measure vitals (blood pressure for hypertension, blood sugar levels for diabetes, or peak outflow for asthma) and submit them to his/her physician through the physician's commercial website (Mitka, 1999). This may lead to two scenarios:

In the first scenario, the patient submits these numerical values into an Internet-based intelligent system that advises the patient about clinical action and reports the values and the clinical assessment to the physician for review. In the second scenario, the patient actually submits these values to his physician through the use of an Internet-based system as an e-mail attachment, without having a clinical encounter. In turn, the physician will provide the patient with an assessment and later a virtual follow-up. This latter scenario could be carried out presently and would serve to guarantee continuity of care without an encounter, thereby saving time. This is essential in a capitated market where the physician is paid for the management of patients regardless of the number of actual encounters.

Those scenarios create dilemmas that limit their use even though the technology to carry them out is currently

available. For example, in the second scenario, there are questions about the documentation of the encounter. In both cases, there are questions as to who is responsible for training the patient to perform the measurements properly. Who will verify the validity of the measurements? What if the physician does not review the automated decisions? What if all goes according to plan and "things go wrong" with the patient? Who is liable? Is it the patient? The software company that manufactured the decision support system? Or the physician? What about the health insurance plan that paid, or didn't pay, for this "virtual encounter?"

Another limitation to these scenarios is in their application. This methodology of treatment could only be applied in the management of chronic diseases such as asthma, diabetes, hypertension, etc., and only in non-emergent situations. In other words, these Internet-based intelligent decision-support systems are limited to the primary care field, which is a field that has been shunned by the majority of physicians until recently. Automated assistance in primary care may be beneficial in serving patients in fields where there aren't enough physicians.

Telemedicine is another utilization of the Internet. Business meetings, presentations, and conferences are already occurring over the Internet, with individuals located far away from each other. Medical consultations in fields such as pathology and radiology, where the patient is just an image, could be done over the Internet if the bandwidth is available.

However, even in other specialties in which the clinical encounter with the patient is essential, the Internet may be used. This is made possible by the digitalization of video-conferencing and by voice-picture devices, where images are crisp and sound is transmitted instantaneously. Devices that were once only imagined have finally become a practical reality with the availability of Internet bandwidth.

To go to an extreme, even surgeries could be done remotely. A number of surgeries, especially microsurgeries, are now done with the use of robots. Usually the surgeon is located in the operating room, but he/she is at the control panel looking through a camera and not beside the patient. Therefore, it does not matter where the surgeon is located as long as the connection is uninterrupted. Fiberoptic technology, with its fast rate of data transmission, could provide such a connection. We are not far from the day when a surgeon on land could perform a much needed operation for a navy operator at sea or an elderly woman on a cruise.

Whether it is through more information, the use of Internet-based clinical decision support systems, or telemedicine, the sacred doctor-patient relationship is changing into something that is no longer familiar to either the physician or the patient.

The Electronic Medical Record

The Internet is being utilized to increase the efficiency of medical record keeping in three different ways.

Electronic medical records used by healthcare provider organizations are not actually on the web due to privacy concerns. As a result, no one has true random access from any location. However, these e-records are set up on secure servers allowing access only to medical professionals with privileges. Nonetheless, these records could be accessed from home, office, or hospital. This is increasing the efficiency of a physician's time. It is now possible, through the use of such systems, to check lab values and radiology reports from a remote location. It is also possible to order medication and discharge patients through these systems, consequently accelerating patient care. Furthermore, the automation of patient record keeping and the resulting instantaneous access to old records allows for better continuity of care.

From the commercial perspective, multiple Internet sites, such as medicalrecord.com® and medicalrecords.com®, promise to keep a patient's medical record in their database. If the patient provides them with his/her information, they vow to keep it confidential and allow the patient or his/her physician to access it in case of an emergency. In addition, it can always be modified. The company will provide a patient with a card that has the medical record number and a log-in code. This card is similar to medical alert tags worn by the elderly. The only difference is that these sites keep a more comprehensive medical record that is very similar to a hospital chart. In addition, these sites can be accessed from any computer linked to the Internet.

Somewhere in between the commercial interest and the healthcare provider organization is MedicaLogic Logician® software. This software is a combination of both systems. It allows physicians mobility and random access from anywhere in the world through its web-based interface. However, once access is accomplished, the site moves the transaction to a secure server for privacy. This medical records system allows physicians to enter medical information into virtual charts. This information is stored on a computer until online access occurs, and then it is sent to a database kept by the company for permanent storage. Transmission is conducted over a secure connection with encryption. Each physician can only access the charts they have stored. This system eliminates the need for paper charts, storage space, and the personnel to organize and maintain the charts. Moreover, this system offers the physician the ability to manage patients collectively. In other words, the physi-

cian can pull out all patients who take aspirin or all patients who have diabetes in order to study his/her management practices. It even provides anonymous data about the physicians who utilize the software, thereby allowing the physician to privately benchmark his medical practice against others.

All three systems need the cooperation of providers, but they also benefit the patient and provide better continuity of care.

The Medical Billing Process

In addition to affecting the doctor/patient relationship and the keeping of medical records, the Internet can change the medical billing process, with great financial rewards. Healtheon-WebMD, a $5.7 billion company in stock value as of February 2000, describes itself as,

"The first end to end Internet healthcare company connecting physicians and consumers to each other and to the entire healthcare community.... The result is a single, secure environment for all communications and transactions among physicians, consumers, and healthcare institutions."© (http://www.webmd.com)

The keyword is transactions. There are multiple steps to the medical billing process, whether in the inpatient or outpatient setting. These steps include enrollment verification, pre-approval, billing, reimbursement, and reconciliation. The latter steps could only occur if each previous step has been carried out correctly. However, each provider organization contracts with different insurers, who in turn each have multiple plans. Each provider uses a different billing system, and a large number just use paper processing. Each insurer has multiple information systems depending on the region and the plan. Patients are constantly switching plans as they switch jobs, and providers are constantly withdrawing and enrolling in different plans. It is chaotic and Healtheon-WebMD attempts to bring order.

With 400,000 doctors, 900 insurance companies, 46,000 pharmacies, and 4,500 hospitals registered on its online system (http://www.webmd.com), Healtheon-WebMD has the potential to deliver on its promise. That is why it is supported by some of the most innovative names in the U.S.: Rupert Murdoch's News Corporation, Microsoft, United Health, Janus Fund, CNN, SmithKline Beecham, and EDS/Lilly among others. Healtheon-WebMD talks of "transforming the nation's unruly, fragmented health system into a digitally disciplined online universe," in the words of Milt Freudenheim who wrote an article about the company for *The New York Times* (Freudenheim, 2000). To reach that end, the company has carried out more than 80 deals in 18 months. It carried out three acquisitions in the month of February alone. It bought: Medical Manager Corporation, a medical office management software maker; Care-Insite, a company that links physician and insurers online; and OnHealth Network, a web-based provider of healthcare information.

The concept is simple - there are over 30 billion healthcare transactions annually (Freudenheim, 2000). If one provides an easier platform to carry out the transactions and charges a 1-2% fee for the use of this platform, that is a winner. Basically, the provider of this platform would become the Visa® of healthcare. Healtheon-WebMD claims that 100,000 physicians are doing just that (Chin, 2000). They have to streamline the different platforms and systems out there and design a way for them to communicate with each other, which is not an easy task. Healtheon-WebMD has hired some of the best computer programmers to do the task, including those involved in the design of Netscape Navigator® and Microsoft Windows®. They are not the first organization attempting to streamline different medical systems. Managed care companies are attempting to do that within their own systems as they merge, but they are finding it very difficult. Some vertically integrated healthcare delivery organizations have attempted to integrate their systems and failed; others are still trying to carry out this difficult task. Of course, the harder the task, the greater the reward. That is what Healtheon-WebMD is counting on. Since the first draft of this article, Healtheon WebMD had spent a handsome sum of money in pursuit of its philosophy. Their market capitalization has been significantly reduced since their stock price has declined along with other losing dot-com companies. Nonetheless, only time will tell if this philosophy will materialize and create profit for the company and efficiency in healthcare billing.

Whether it is the doctor-patient relationship, electronic medical record, or medical billing, the Internet is changing healthcare as we know it. With its unique model of communication, its bandwidth for data transmission, and its random access capability, the Internet is introducing new ideas and methodologies into the healthcare system. Whether we are ready or not, the future is now.

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