



# E-healthcare: an analysis of key themes in research

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## Abstract

**Purpose** – Healthcare is among the fastest-growing sectors in both developed and emerging economies. E-healthcare is contributing to the explosive growth within this industry by utilizing the internet and all its capabilities to support its stakeholders with information searches and communication processes. The purpose of this paper is to present the state-of-the-art and to identify key themes in research on e-healthcare.

**Design/methodology/approach** – A review of the literature in the marketing and management of e-healthcare was conducted to determine the major themes pertinent to e-healthcare research as well as the commonalities and differences within these themes.

**Findings** – Based on the literature review, the five major themes of e-healthcare research identified are: cost savings; virtual networking; electronic medical records; source credibility and privacy concerns; and physician-patient relationships.

**Originality/value** – Based on these major themes, managerial implications for e-healthcare are formulated. Suggestions are offered to facilitate healthcare service organizations' attempts to further implement and properly utilize e-healthcare in their facilities. These propositions will also help these stakeholders develop and streamline their e-healthcare processes already in use. E-healthcare systems enable firms to improve efficiency, to reduce costs, and to facilitate the coordination of care across multiple facilities.

**Keywords** Health services, Communication technologies, Customer relations, Privacy, Virtual organizations, Internet

**Paper type** Conceptual paper

## Introduction

The emerging field of e-healthcare has generated a lot of buzz lately. The promise of the delivery of health information via the internet to improve public health while simultaneously controlling health care costs is enticing to consumers, health care providers, insurance companies and employers. However, in a much broader sense, the term "e-healthcare" typifies significant attitudinal change for consumers, and a commitment by organizations to networked global thinking to improve healthcare locally, regionally, and worldwide by harnessing the latest information and communication technologies (ICT) (Bates *et al.*, 2006). Though there is a sizable body of literature in the information technology (IT) area that addresses e-healthcare issues, we find a relative paucity of published research on the management and marketing issues concerning e-healthcare. The purpose of this paper is to present the state-of-the-art and to identify key themes in research on the marketing and management of e-healthcare.

A significant number of studies have suggested that, the absence of adequate clinical information adversely affects both the cost and quality of healthcare and thus compromises patient safety. IT has been proposed as an essential tool in solving these problems and promoting better healthcare. IT applications in healthcare such as



electronic health records, e-prescribing, decision support systems, electronic management of chronic diseases, and bar coding of drugs and biological products have been shown to reduce healthcare costs and medical errors (Mannan *et al.*, 2006). For example, studies have shown that putting medical records in an electronic medium enhances computerized physician order entry which can significantly prevent serious medication errors. Electronic prescribing has been shown to reduce prescription errors and improve compliance with managed care formularies. Point-of-care decision support tools can also offer providers with alerts for contraindicated medications. The rate at which new technologies and treatments are evolving means that many clinical providers are dependent on the internet to gain current information on clinical practice guidelines. Consequently, the use of the internet has significant potential to enhance healthcare decision making, improve health management, and produce better patient outcomes (Bates *et al.*, 2006).

Internet has become a useful source for health information. In 2004, for instance, 4.5 percent of all internet searches worldwide were for health or health-related information. A large and growing number of Americans state that they would like to use the internet to find online-health information about disease, treatment, and prevention. The internet is often endorsed as an open, anonymous, and democratic medium for accessing information. Nonetheless, this poses some threat to information management because anyone with a computer and rudimentary skills can develop a healthcare web site. This has highlighted the concerns that make the internet a potentially powerful means of disseminating “good” as well as “bad” information that may allow inaccurate and misleading health information to become widespread (Bates *et al.*, 2006).

### What is e-healthcare?

The concept of e-healthcare emerged in the early years of the twenty-first century. It is the combined use of electronic information and communication technology in the health sector for clinical, educational, research, and administrative purposes, both at the local site and across wide geographic regions. Its use has enhanced networking, facilitated global thinking, and improved healthcare on local, regional, and national levels. The future of e-healthcare is based on empowering individual patients with current information about diagnosis and treatment for personal decision making about their health without ever visiting a healthcare facility (Rohm and Rohm Jr, 2002).

While some definitions associate e-healthcare strictly with the internet, the term also relates to any electronic exchange of health-related data that has been collected or analyzed through an electronic medium for improving efficiency and effectiveness of healthcare delivery. Hence, it is broadly used to connote almost any information related to computer-aided medicine.

The main aims of e-healthcare are to embrace increased efficiency in healthcare, improved quality of care, increased commitment to evidence-based medicine, as well as empowerment of patients and consumers, not to mention the development of new and closer relationships between patients and healthcare professionals. Many healthcare providers and users have access to scanners, digital cameras, and videoconferencing facilities. Simply stated, e-healthcare networks can remove time and distance barriers to the flow of health information and can therefore help to ensure that collective knowledge is brought to bear effectively on health problems throughout the world.

E-healthcare comprises four major activities: e-business, consumer marketing, organizational management, and clinical customer service. Some of these can be accessed via the public internet, while others are restricted by passwords on intranets or local area networks. E-business in healthcare consists of online procurement processing between healthcare providers and suppliers, online electronic claims processing, as well as eligibility authorization from insurance companies. It also involves online consumer purchase of prescription drugs from pharmacies and health insurance from insurance providers. Research indicates that by the year 2000, electronic claims submission and materials management were the most widely implemented e-healthcare technologies in healthcare. For instance, one large practice association automated nearly half of their claims volume with an internet-based claims submission system and reduced their per-claim processing cost by almost 40 percent.

Consumer marketing in e-healthcare involves the use of web sites to display organizational information to attract new patients and provide wellness information and disease-specific information to existing patients. Organizational management in e-healthcare involves the display of employee information on a company intranet web site, delivering educational programs, listing job announcements, as well as announcing employee health benefit programs. It also includes administrative processes such as billing management and strategic planning. Clinical customer service encompasses patients' access to medical information via electronic health records allowing them to conduct risk assessments of their own health and also includes patient-physician interaction via e-mail.

E-mail communication can facilitate the process for patients with internet access to e-mail questions and receive responses from their physicians. This form of electronic interaction shows promise as a means of enhancing communication and facilitating interactions between patients and the healthcare delivery system (Harrison and Lee, 2006).

### Importance of e-healthcare

E-healthcare is about improving consumer access to healthcare and improving healthcare service quality. This involves making adequate information available for doctors, nurses, caregivers and patients. It is also about raising operational efficiency to create patient-friendly services.

The key stakeholders in the e-healthcare industry include employers, patients, providers, and health plans. Employers have a desire to analyze healthcare costs and utilization by their employees. Patients on the other hand want information about their own health. Providers too, want to save time and money by streamlining communications. Health planners want to strengthen relationships with members and providers while reducing their cost of doing business. For patients, who can also be viewed as consumers, e-healthcare lends itself as an opportunity to change their relationship with providers and insurance companies. These opportunities for improved communication include provider messaging, access to electronic medical records (EMR), and the ability to access information about alternative approaches to medical treatment. Patients have been noted to get only 10 minutes of face-to-face time on an average with their physician. However, through e-healthcare, these patients have access to thousands of healthcare internet sites from where they can gain unlimited health information. Also, evidence suggests that it can take up to a week to get a return phone call from a physician and up to almost a month to get a regular office appointment.

The potential for e-healthcare technologies to educate patients and promote improved self-management skills is without bounds.

Employers, particularly in the USA, have been saddled with rising healthcare costs that have adversely impacted their competitiveness within their respective industries. Since, healthcare costs are a large share of organizational costs, employers have sought new and innovative approaches to improve efficiency and quality in healthcare. As a result, employers are becoming engaged in activities which review the cost and quality in healthcare because they see this involvement as essential to economic viability. Some organizations consider the internet as a way of streamlining healthcare administrative costs and improving communication among the various healthcare organizations. Since, employers negotiate benefits packages, review geographic coverage, and maintain benefits administration staff, it is estimated that administration costs add up to \$10 billion a year to US healthcare costs. In addition, many of the company health promotion activities are offered through the organization's intranet site because they reduce healthcare costs and improve productivity. E-healthcare applications have enormous potential to support population-based approaches to healthcare delivery as well as in chronic disease management (Harrison and Lee, 2006; Mannan *et al.*, 2006).

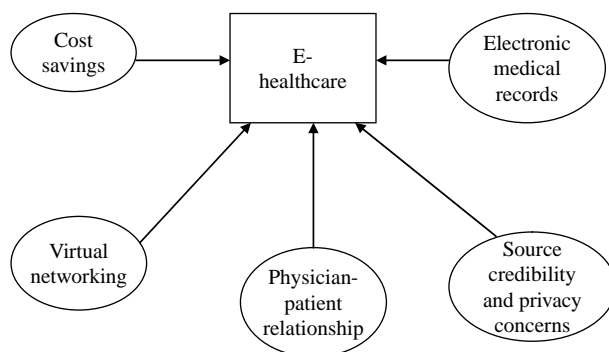
### Key themes from literature

This research adopts a key theme identification approach based on a review of the literature in the field of e-healthcare. The literature review for this research study involved the analysis of key scholarly peer-reviewed journal articles. Among the reviewed papers, commonalities and differences were apparent in terms of the authors' beliefs about the main goals of e-healthcare. However, one idea remained constant between all of the papers – e-healthcare is a total and comprehensive system that has great potential to revolutionize the healthcare industry and positively affect all of those involved, particularly the patients.

To properly analyze the state-of-the-art in research in this area, a qualitative meta-analysis approach was adopted. This allowed for a thorough understanding of the existing literature pertaining to e-healthcare. Also, this analysis served to further the understanding of e-healthcare and its implications as a tool for improving the current management practices in the healthcare industry. Through the meta-analysis, the following five key themes were identified: cost savings; virtual networking; EMR; source credibility and privacy concerns; and physician-patient relationship. The five major themes of e-healthcare research are shown in Figure 1.

#### *Cost savings*

Decreasing cost is the main goal of any strategy aimed at reforming the American healthcare system. Consequently, it is also one of the main benefits of e-healthcare. It has been noted that e-healthcare has the “potential to slice skyrocketing health care spending by 10 percent, saving the US economy \$140 billion a year” (Serafini, 2005, p. 36). One particular way in which e-healthcare employs cost savings is by increasing the overall efficiency within the healthcare market. In a more efficient system, cost savings are accompanied by other benefits such as better patient care and decreased administrative tasks. E-healthcare decreases cost through the avoidance of duplicate diagnostic or therapeutic procedures, which is enabled by the proper communication



**Figure 1.**  
The five major themes  
of e-healthcare research

between patients and providers (Eysenbach, 2001). The frivolous ordering of diagnostic tests by physicians is quite costly and unnecessary especially if the patient has already undergone these procedures. Particularly in the case of big hospitals that are not fully automated, the results of these diagnostic tests can be misplaced and therefore not available to the treating physician when necessary. This causes physicians to request the same tests again, which only serves to increase overall costs. This example is also useful in understanding how e-healthcare especially in terms of EMR can facilitate the communication process between various medical facilities. For example, if patient medical records were completely computerized, physicians from different facilities would not have to order the same tests nor would they have to waste precious time waiting for hard copies to arrive. In addition to saving cost, e-healthcare particularly electronic medical record saves time which allows physicians to concentrate on improved patient care.

E-healthcare can also deliver cost-effective access to healthcare information and services in special situations, such as in remote areas and in emergencies. Zinkhan and Balazs (2004) propose an automated system where a specialized wrist watch can monitor the wearer's vital organs, send electronic signals to emergency care, and administer a corrective drug, if necessary. E-healthcare can also reduce compliance-related costs by automatically reminding patients to make medicines or order refills.

Additionally, higher levels of patient involvement made possible by readily available internet-healthcare web sites also help the healthcare industry to save on costs. Patients who are more informed about their health are able to make better informed decisions concerning their healthcare matters which increase the overall effectiveness of their treatment plans. This point is reflected in the fact that healthcare consumers can utilize the internet to research ways in which they can avoid certain ailments, recognize symptoms that may lead to potentially major illnesses, and wellness practices that may be employed after the successful treatment of a disorder (Campbell, 2001). Actively involved and better educated patients are no doubt an essential part of the cost savings aspect of the healthcare industry which is fully exploited through e-healthcare and its initiatives.

E-healthcare has the ability to save money for all stakeholders involved in the healthcare industry. The first unit that experiences cost savings as a result of the introduction of e-healthcare and in particular of EMR is the hospital. Hospitals which

fully automate their administrative systems have the ability to save a substantial amount of money through the fact that more patient information will be readily available to various hospital staff in a timely fashion along with a reduction of medical errors that are experienced through the introduction of a comprehensive healthcare software system. American hospitals which have converted their systems to completely electronic have the potential to gain \$371 billion in net cumulative savings over the next 15 years (Anderson, 2007). A significant part of hospital cost savings would also come from a reduction in administrative costs. Conventional paper methods for patient charts not only use physical resources for their storage but also have a greater chance of being misplaced as opposed to fully electronic charts. These administrative costs in addition to others of similar type have been estimated to add almost \$10 billion a year to healthcare costs in the USA (Harrison and Lee, 2006). Based on this enormous amount, the incremental savings per hospital are significant.

Physicians, especially those in private practice, are another group of stakeholders who can reduce their costs through e-healthcare. The use of one aspect from this strategy – electronic health records – will aide physicians in deciding the appropriate tests and procedures that should be done on their patients as well as to reduce the number of medical errors made from simple things such as the wrong prescription orders which are possible if a patient's full medical history is not disclosed at the time of service. Physicians in private practice stand to save a substantial amount of money though their implementation of electronic software systems. The net cumulative savings for physician practice which could result from a total conversion to fully automated healthcare services in the USA could be \$142 billion (Anderson, 2007). For example, evidence suggests that, claim processing costs could be reduced by 40 percent in private physician practices which employed an internet claims clearing house to transmit their electronic claims (Harrison and Lee, 2006).

Patients are the next group of stakeholders within the healthcare industry who will benefit from some form of cost savings made possible through an e-healthcare plan. The enhanced healthcare education of these consumers gives them the ability to take better preventive measures which will save not only their money but also that of their health insurers and consequently their employers. Technology can empower patients. For example, Rohm and Rohm Jr (2002) propose an internet-based futuristic personal medical device (PMD) which works with support from local stores, and with voice and image capabilities to help patients with self-diagnosis. Furthermore, through a comprehensive country-wide e-healthcare strategy, the health of patients is improved not only at a regional level but also in terms of a broader national scope (Harrison and Lee, 2006). Healthier consumers translate into lower overall healthcare costs and more importantly a healthier population. Both these imperatives can be accomplished through e-healthcare. Patient treatment on sound medical evidence emphasizing the most efficient use of resources to reduce wastes will yield the biggest cost savings for patients along with private and public healthcare institutions (Campbell, 2001).

#### *Virtual networking*

Networking using the internet is not a new concept, but in terms of e-healthcare it is relatively innovative. E-healthcare can be very useful in enhancing communication between relevant stakeholders. Patients have always relied on support groups to help them overcome certain illnesses and have looked to these meetings for a sense of comfort.

Although support groups have always been around, the internet has had a major effect on the space, time, and geographic locations needed for these groups (Lueg *et al.*, 2003). These once face-to-face meetings are being replaced with virtual meetings that are becoming just as comforting to patients and also more informative based on the broader scope which they provide. Online chat groups, support groups and electronic communities, which developed based on certain affiliations, are becoming more popular and widespread (Natesan, 2005). These virtual communities offer patients a channel in which to communicate their emotions and offer or receive expertise. Patients are looking to these internet-health networks as a method of handling their physical crisis as well as being an avenue to other plausible treatment plans of which they are unaware. These virtual communities allow patients in any region at any time to access the support and information they need to make it through their doctor's appointment or simply through the day. "Virtual support group communities can be available to anyone at any time and at any place." (Lueg *et al.*, 2003, p. 58)

By accessing online support groups, patients get linked to other patients who have similar healthcare concerns, and are able to receive information from patients who may have experienced the same symptoms and are willing to offer some insight into what lay ahead in terms of their illness. This allows patients to gain a uniquely personal view of all that is involved with certain illnesses (Campbell, 2001). In addition to providing patients with the support they need to get through their illness, many virtual healthcare networks also provide them with access to other links and services that may be extremely helpful. These references include links to clinical trials being conducted, pioneer physicians in the field, and radical new treatments being offered. Studies suggest that, virtual groups play a proactive role in emerging research efforts pursued for specified disease treatment (Natesan, 2005).

Patients are not the only group of healthcare stakeholders that can effectively utilize virtual networking for purposes of enhanced medical diagnosis and treatment. Physicians also visit chat rooms to engage in discussions with their colleagues from other international locations to learn about new treatments and technologies in their field (Kerwin, 2002). These virtual communities based on physician needs take true advantage of the internet's global reach by connecting providers from all regions in the hopes of sharing their medical expertise to better serve their individual patients. The medical information physicians could exchange with their peers online is just as valuable if not more so than that between patients, as an effective physician virtual community can have great impact over a larger span of patients.

E-healthcare can also be used to improve the internal communications of a healthcare organization. A hospital can use intranet to communicate with its employees and extranet to communicate with its key partners such as a physician's office (Zinkhan and Balazs, 2004). Hospital web sites are also becoming an industry standard as patients (consumers) and health professionals use web resources for virtual networking and sharing of information, research, and communication. Industry predictions show future e-hospitals that would integrate all stakeholders in a seamless network allowing data to be shared. Randeree and Rao (2004) have proposed web assurance strategies implemented by hospitals in the design of their web sites for virtual networking.

*Electronic medical records*

One of the most significant components of the entire e-healthcare initiative is the introduction and utilization of EMR. These records are a more advanced electronic form of the usual hard-copy, paper patient charts that have been the standard in physicians' offices, and hospitals for too long. The advent of EMR through e-healthcare has enabled physicians to improve their quality of patient care and also reduce the number of medical errors which leads back to the major advantage of e-healthcare: cost savings. The federal government, employers, and private healthcare entities are all pushing providers to make fewer errors, offer higher quality patient care, be more accountable, and exhibit some form of cost containment which EMR serves as the best tool (Flower, 2004).

A nation-wide networked system of electronic patient records is a matter of great urgency even in the most advanced economies like the USA and the UK. In order to properly implement such a system, all of the stakeholders involved in the healthcare industry must play an integral role. With the full cooperation of these various groups, a standard EMR system will benefit the entire industry, especially patients. Allowing providers with access to vital patient information when it is most needed instead of when it is available is one of the major gains with the implementation of such a system. However, to make such benefits a reality, a meaningful coalition of government leaders, academicians, healthcare visionaries including nonprofit strategists, the pharmaceutical industry, payers, providers, hospitals, and patients is essential to ensure its success. This type of integration is particularly necessary since an EMR system would benefit all of those connected to it in some way. Such a system could go global too, in course of time.

Despite the numerous benefits associated with such a system, barriers to EMR are still present. One such barrier is physicians' resistance to convert their paper records into electronic copies. Although physicians currently in medical school are being trained to utilize information technologies in their services, this is not the general preference among those already in practice. This is because the more experienced physicians were all taught to physically write their notes for each patient consultation (Mannan *et al.*, 2006). This has slowed the rate of adoption by new physicians – especially for those in private settings as opposed to larger hospital locations. Another barrier that this group faces, which is gaining more prevalence with physicians in private practices, is the cost associated with the employment of EMR systems. The costs involved in properly implementing a comprehensive EMR system are a major deterrent for physicians, especially in practices with three or less providers. In 2005, the estimated cost for an integrated EMR system or practice management system was \$7,232 per provider (Hospitals & Health Networks, 2005). These costs seem considerable for these providers to bear, especially since their resistance to adopting these types of systems is high. However, while weighing the risks against the benefits, physicians frequently realize, after a thorough analysis, that EMR could maximize their efficiency which would yield greater benefits for their practice as well as for their patients.

Regardless of the setting in which EMR is established, the main goals of this e-healthcare component must be kept in mind. EMR is a system that must provide a true linkage between the different stakeholders – providers, hospitals, government agencies, pharmacies, and other similar groups, and facilitate the communication



process between the healthcare industry groups. Therefore, it is imperative that EMR be connected not only to a facility's internal departments but also externally to other medical providers and their facilities (Hospitals & Health Networks, 2005). Only through the proper internal systems and external connectivity can EMR be utilized to its full capacity within the healthcare industry.

#### *Source credibility and privacy concerns*

The issue of source credibility as it relates to e-healthcare is imperative to the proper utilization of information from an internet-health source. Privacy concerns also impede consumer usage of e-healthcare. Since, the internet is generally an unregulated open system where anyone can post or download any material, many patients are not able, willing, or motivated to assess the value of the information provided by a web site, particularly in the area of healthcare, based on the sources providing them. The healthcare press is replete with news on high-profile lapses in online medical information security, increased incidence of spamming, hacking, and "phishing," and figures suggesting that a large proportion of online healthcare information is fraudulent. Consumer concerns include a range of possibilities from healthcare insurance fraud to leaking of personal health information, resulting in excessive spam as well as medical identity theft (Mukherjee and Nath, 2007). There are cases where patients have compromised their health by relying on improper information derived from the internet. Therefore, internet sites which post unverifiable information actually make patients more vulnerable. Such information could be unreliable, filled with medical errors, difficult to understand or totally irrelevant to their particular ailment (Dolan *et al.*, 2004). A study conducted by the American Medical Association found that comprehensive coverage of healthcare issues on the internet is "poor and inconsistent and that high reading levels are required to comprehend medical information on the web" (Natesan, 2005, p. 250). Based on this evidence, it is clear that consumers in search of healthcare information on the web need to be more discerning when assessing the value of the information on which they are relying. This is especially important in an environment where many more consumers are taking control over their own healthcare matters, and the internet is becoming the first source they consult in matters affecting their health.

On a positive note, more consumers are aware of the fact that not all information posted on the internet can be completely trusted. Busy doctors as well as patients, who are distrustful of online health information, are more likely to believe internet medical advice when the source is a university or medical association as opposed to a pharmaceutical company or medical health insurer (Natesan, 2005). However, although consumers are skeptical of internet information provided by unknown sources, most e-health consumers do not even bother to check the sponsor of the web site. While consumers say they are concerned about the source of their e-healthcare information, in most situations they fail to exhibit their concern in their actual online behavior. A research study conducted in 2002 found that online health consumers rarely checked the source for the medical information they were seeking (Lueg *et al.*, 2003). This evidence clearly illustrates the need for educating consumers in terms of their healthcare information search behavior.

Consumers need to take a much more active role in educating themselves about the healthcare information they search for and in many cases rely on, as well as their

personal information they provide on the internet. However, the process of educating consumers on evaluating web site credibility and privacy policies faces many obstacles. One such barrier is the fact that not all consumers searching the internet for health information have adequate levels of processing ability. Online health consumers vary in their ability to effectively utilize the information they receive as well as to properly evaluate the sources from which the information was acquired. Another hindrance to properly educating information seeking patients is the socio-economic level of the web-enabled consumers. A consumer's socio-economic status to a large extent dictates how much of the health information obtained on the web they will actually put into practice immediately. For example, a patient who hails from a higher socio-economic level is more likely to compare and in some cases contest the information he/she receives from the internet with the primary care physician. However, a patient who belongs to a lower socio-economic level may not have the medical health insurance necessary to even see a physician and much less have the ability to challenge his medical knowledge.

Despite potential intervention from federal agencies, e-healthcare sites are currently not mandated to validate any of the information posted on their sites. The Federal Trade Commission (FTC, 1998) report to congress regarding online privacy revealed that only 14 of the 88 percent e-healthcare web sites that collected personal medical information actually disclosed their information management practices. Based on the vast size of the internet and overwhelming amount of information available on the web, any effort that attempts to regulate this communication medium is likely to be futile and will partly violate one of the basic principles of the internet which is to provide unadulterated, uncensored information to its users. Since, most consumers and now federal agencies are aware of these potential policing problems, private groups have begun the daunting task of approving healthcare web sites based on their own source credibility requirements and privacy standards. Utilization Review Accreditation Commission (URAC), a leading non-profit group that accredits health maintenance organizations (HMOs), has initiated a similar program for health information web sites, by granting eligible web sites a seal of approval for meeting strict content and privacy standards (Natesan, 2005). The web sites obtaining these seals of approval must be credible and provide accurate health information that is in accordance with consumers' privacy rights.

A similar alternative to web site stamps of approvals are web sites in which consumers can check the trustworthiness of health information they have found on the internet. For example, Kaiser Permanente has established free web sites which consumers can use to judge the reliability of medical information they find from various sites (Natesan, 2005). Such sites, run by major HMOs, provide a valuable benefit to patients in that the accuracy of the information they may potentially put into action has the chance to be verified for its content which relates back to the sponsor of the site and its content credibility.

Consumer privacy concern regarding the collection and use of personal medical information is particularly pronounced in the realm of e-healthcare. Rohm and Milne (2004) present some interesting evidence of the widespread nature of the problem. In the 1993 Harris-Equifax survey, eight out of ten respondent consumers believed they had no control over how their personal medical information was distributed and used by healthcare organizations. This is corroborated by another study of the California

Healthcare Foundation which found that 75 percent of the respondents were concerned about healthcare organizations sharing their medical information with third parties (Rohm and Milne, 2004). Rohm and Milne (2004, p. 1000) further report that e-healthcare web sites frequently fall short of “the minimum fair information practices of providing adequate notice and consumer control over personal information.” Rohm and Milne (2004) conceptualize consumer privacy concerns in the healthcare industry in the context of two dimensions: information sensitivity and trust in the organization collecting personal medical information. Information sensitivity depends on the type of information being collected, used or exchanged by healthcare organizations. Relatively more sensitive medical information that could be misused by employers for personnel purposes or by fraudulent agencies for identity theft include personal or individual-level data, personal medical information or history, and confidential medical information on fertility, abortions, mental illness, sexually transmitted diseases, HIV status, substance abuse, genetic predisposition to disease, etc. (Rohm and Milne, 2004). Mukherjee and Nath (2007) address the challenges in building online trust among consumers. Promoting shared values, improving communication and controlling opportunistic behavior can promote trust in e-healthcare.

#### *Physician-patient relationship*

Historically, the patient-physician relationship has been one in which physicians have always approached and treated their patients in a paternal fashion. However, since the advent of the internet, patients have been able to acquire some of the control as it relates to their healthcare concerns. “As the internet has evolved, it has become a resource that challenges the traditional role of the family physician as the gatekeeper for health care information” (Bodkin and Miaoulis, 2007, p. 27). Through the mass availability of information from healthcare web sites, patients are now able to compare their physician’s diagnoses and procedures against those prescribed on the internet. Patients are also able to contest and even recommend certain treatment options directly to their physicians. This new patient power has changed the very nature of their interaction with their physicians such that patients are seen as being an integral part of the healthcare team. Now, the trend, as it relates to physician-patient relationships, is based on shared decision making between the two parties.

This new degree of equality between the patient and the physician has affected how each partner views the other. Physicians no longer can look down upon their patients as being medically illiterate since they are the ones, in some cases, bombarding their physicians with reports and studies which suggest alternate treatment options. Some physicians believe that this surplus of information from their patients will make them even busier as patients bring the information they have found online for discussion during their consultation (Kerwin, 2002). Based on their new found knowledge, patients no longer have to view their doctors as the ultimate authority in terms of their physical health.

The internet particularly as it relates to e-healthcare has allowed patients to propose new and innovative solutions to their healthcare needs that perhaps even their physicians were unaware of or hesitant to recommend. Differences in physicians’ experience, geographic location, and training can foster biases in favor of treatments that the physicians are most comfortable with instead of treatments that are the most appropriate. Therefore, e-healthcare provides patients with the information to verify

the course of treatment their physicians have prescribed to confirm that the plan is actually the best one based on medical evidence.

However, with all these advancements in the proactive role of patients in healthcare matters, a physician's opinion and expertise must still be respected. Despite the fact that medical practice is taking on a more patient-centered orientation as healthcare consumers become more informed about their medical choices via internet-health web sites, physicians still have the final say in deciding whether they will approve the treatment options presented to them by their patients. Obviously, patients always have the option to seek advice from another healthcare professional but it is still ultimately the decision of the physician that determines the course of treatment. Physicians could guide patients to ensure that healthcare consumers who seek information from the internet really understand the ramifications of the advice being conveyed to them (Kerwin, 2002). It is the job of the physician to accurately explain all of the implications involved with a certain diagnosis and treatment plan so that patients can make the most informed decision for themselves in the end. Therefore, physicians as well as patients must learn to consider the health information available to consumers over the internet as complementary to their medical expertise instead of as substitute. Based on this school of thought, the quality of patient care will be elevated because physicians must now stay abreast of new medical occurrences in their field. Therefore, the new roles that have now been created by e-healthcare for patients and physicians are much more balanced.

### **Future of e-healthcare**

It is anticipated that as information and communication technologies continue to improve, the e-healthcare industry will revolutionize healthcare in the USA and the rest of the world. In general, healthcare providers will increasingly utilize automated systems to verify eligibility from payers as well as process claims. Patients will have access to electronic medical records as well as condition-specific clinical data from providers. Employers on their part will sponsor disease management and wellness programs for their employees.

E-healthcare is envisaged to become a major factor in the infrastructure of modern healthcare. Despite this expectation, the open architecture of the internet requires that organizational policies and procedures be put in place to guarantee the privacy and integrity of e-healthcare systems. These policies ought to focus on data security as well as the other ethical issues pertaining to e-healthcare. The emerging field of biometric technology provides the capability to enhance data security through the identification of an individual's biological traits. Biometric security technology will be in common use in the future to protect patient information.

Nonetheless, the full potential of e-healthcare will only be realized through greater investments in telecommunications equipment and supporting IT. For example, the use of clinical biometric technology through a personal wearable device would allow patients to be monitored at home via a tele-healthcare system. Future initiatives in e-healthcare will empower consumers to use health IT to enhance their knowledge of disease processes and improve their health outcomes (Harrison and Lee, 2006).

Practice staffs acknowledge the benefits of information and communications technologies in the workplace in terms of improvements in efficiency, communication, accessibility and accuracy of data within primary care. Those already using computers

believe they have transferable skills and therefore are able to adapt to new and evolving clinical systems. Interestingly, opposing views have been expressed in the media. Adequately training healthcare staffs to adapt legacy systems to e-healthcare, new communication equipment, and high-end computers are perceived barriers for small service providers with limited budgets. Limited computer and internet usage skills and lack of experience of applying them in the health sector are other barriers for implementation of e-healthcare.

### **Managerial implications**

E-healthcare potentials have vital managerial implications as the healthcare industry faces a more competitive environment. Low returns, combined with increasing healthcare inflation, pose a distinct challenge to healthcare organizations. Many hospitals are experiencing low return on assets, which when combined with high levels of debt make further investment in expensive IT difficult. Healthcare executives who wish to improve efficiency and profitability are challenged to implement meaningful programs that can positively affect their organization's financial status. Further, complicating this challenge is the resistance to change exhibited by senior healthcare providers and their staffs. Healthcare executives must consider not only what elements of e-healthcare to implement, but how best to introduce the change given the culture within their organization.

The implementation of e-healthcare programs can provide an opportunity to improve efficiency and reduce costs in health services. Healthcare decision makers need access to better-integrated patient information systems to facilitate organizational healthcare strategy, to improve patient satisfaction and to enhance patient outcomes. The key to this is the proper management of the impact of technology by healthcare organizations. Paulson and Snyder (2005) discuss strategies and explore operational issues needed to create a successful healthcare information system. Additionally, the coordination of care across multiple facilities within an integrated health system may enhance efficiency (Harrison and Lee, 2006).

There are few areas of concern as well. The protection of critical technical infrastructure and patient information is crucial to the success of any e-healthcare strategy. Based on a sample of 100 premier hospital web sites, Randeree and Rao (2004) demonstrate little progress made so far in their goal of making the web site a fully functional unit of the hospital. Current sites are limited in scope and have become more selective in their provision of information in light of new HIPAA regulations. Healthcare managers will need to be proactive to possible federal/state regulations on e-healthcare. Further, to control the potential for privacy to be compromised, advertorials to be inadvertently interpreted by consumers as unbiased information, and online fraud to lead to medical identity theft, healthcare managers will need to work closely with their professional associations to formulate standards for the practice of e-healthcare. These standards will not only allow consumers to feel more confident when using e-health programs, but may help reduce the resistance of current healthcare providers that are skeptical of the technology. Finally, healthcare providers will need to commit money for ongoing training for e-healthcare professionals at all levels. While this expense may be viewed as onerous by healthcare managers, in the long-term it will reduce costs and enhance the service quality of healthcare delivery.

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