

Review

E-health: transforming the physician/patient relationship

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Abstract

Healthcare delivery is being transformed by advances in e-health and by the empowered, computer-literate public. Ready to become partners in their own health and to take advantage of online processes, health portals, and physician web pages and e-mail, this new breed of consumer is slowly redefining the physician/patient relationship. Such changes can effect positive results like improved clinical decision-making, increased efficiency, and strengthened communication between physicians and patients. First, however, physicians and the organizations that support them must fully understand their role in the e-health revolution. Both must advance their awareness of the new consumers and their needs and define specific action items that will help them realize the benefits of e-health. Through a combination of timely research and advice, this article will aid them in fulfilling both tasks. © 2001 Elsevier Science Ireland Ltd. All rights reserved.

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1. Introduction

John Naisbitt, one of our great futurists, has said that the new source of power is not money in the hands of a few but information in the hands of many. A modern-day Gutenberg Press, the Internet is the engine powering this transformation. Just as literacy became both an instrument of freedom and a

necessity for those who could finally access books, computer literacy has become an imperative for those who wish to take part in this new information age.

The empowered, computer-literate public is exerting tremendous influence on healthcare delivery. Consumer interest in and demand for online administrative processes, information-rich Internet health portals, and access to physician web pages and e-mail has introduced a new dimension to maintaining wellness and treating disease. While doctors will hardly be rendered obsolete by these innova-

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tions, it is safe to say that the physician/patient relationship will be forever changed.

Armed with the right information, physicians can not only survive these changes, they can use e-health to improve the quality of their clinical decisions and foster true partnerships with their patients. First, however, they must have an accurate picture of e-health consumers and their needs and a clear understanding of what they and their support staff can do to help advance the transformation. At the same time, organizations must understand their role in supporting both the e-health revolution and the physician.

2. Power to the people: a snapshot of the new e-health consumer

Powered by regulatory changes like the Patient's Bill of Rights, by societal changes like increasing technoliteracy and self-reliance, and by the Internet's reinvention of the way information is accessed and managed, consumerism has become a thriving movement within the healthcare system. Healthcare organizations are moving away from a purely business to business orientation, devoting more time to business to consumer activities.

Who are these new e-health consumers organizations are targeting? In general, they are searching for three elements:

(1) *Convenience*: Today's consumers, many of whom are overworked, well-educated, and desperate to preserve their free time, expect the highest level of convenience from every industry they interface with, from banking to airlines. As Regina Herzlinger notes in 'Market-Driven Health Care', the healthcare industry has been slow to fulfill the increasing demand for convenience [1]. Consumers are tired of routinely wasting time and money enduring long waits for appointments, grap-

pling with inconvenient scheduling that robs them of work hours, and filling out duplicative forms.

(2) *Control*: Taking control of their own health, or at least playing a major role in it, is a high priority for e-health consumers. Numbered among the 100 million US adults who use the Internet, [2] the new e-health consumers search for online health information to supplement what they receive at the physician's office. The desire of many of these patients to become partners in their own health can be intimidating to physicians, but it can ultimately benefit both parties.

(3) *Choice*: Consumers demand a wide variety of choices for every service and product they require. Less intimidated by physicians and less wedded to traditional forms of health care, e-health consumers tend to be more willing to explore 'alternative' care like acupuncture and nutritional supplements: in 1999, more people visited alternative care providers than visited their physician [3]. They also demand information on the performance levels of hospitals, physicians, and medications before they make an appointment or fill a prescription. Through the Internet, they access comparative data and make their own choices based on quality.

3. Current trends: how e-health is transforming care

Before envisioning where e-health will take us in the future, it is useful to take stock of the present. With its capacity for inexpensively retrieving information when, where, and how it is needed, the Internet is already transforming physician/patient encounters. In fact, the word 'patient' is being slowly replaced, at least implicitly, by 'consumer.' As increasing numbers of healthcare consumers demand a more active role in their own care,

the two sides of the power scale are edging toward balance.

Today, the Internet facilitates crucial components of healthcare delivery, including:

- Consumer education
- Disease management
- Clinical decision support
- Physician/consumer communication
- Administrative efficiencies

3.1. Consumer education

A report by Deloitte & Touche and VHA Inc. found that during physician office visits, over two-thirds of US patients do not receive literature about their condition or their child's condition, and only one-third receive literature about their medications [4]. To make up for this deficit, consumers are taking their education into their own hands.

In 1999, 74% of US Internet users searched for online health and medical information, and their numbers are swelling at a 43% annual growth rate, almost double the 22% annual growth rate of the Internet as a whole [5]. Disease-specific data is sought most often: 82% of respondents to a MEDSTAT survey reported searching for such online information. 63% searched for general and preventive health information [6].

Though its accuracy and validity is always a concern, online health information carries many benefits, especially those sites that adhere to the Health on the Net Code of Conduct and display the HONCode logo. Medical websites that offer interactive symptom checkers and address simple patient inquiries saves the time many physicians spend answering the same questions over and over. Patients are finding crucial information on disease prevention and risk factors, knowledge that can help save the eventual cost of treatment. What's more, maintaining wellness

and managing disease (Section 2.2) is becoming a continuous process, not an episodic one with the help of a doctor, consumers can locate websites that address their specific needs and keep going back to them when new questions arise.

Consumers recognize these benefits, and physicians are seeing the results in their offices. Internet information often sparks as many questions as it provides answers: 54% of patients with chronic disease who seek information online ask their physician about specific treatments that they have read about [7]. Of the 10 million searching for online pharmaceutical information in the US, 3.4 million have asked for a prescription from their physician, and 15% of these learned about the drug from the Internet [8]. As more healthcare consumers go online to self-educate, more will arrive for appointments with Internet-fueled questions, concerns, and reams of printouts. Meeting the growing expectations of these motivated consumers will be a significant challenge for physicians.

3.2. Disease management

Hand in hand with consumer education is web-enabled disease management, especially useful for patients with chronic disease. Since those who suffer from chronic illnesses make up 70% of medical costs and 80% of deaths in the United States, [9] improving the way their conditions are managed holds great potential for cost savings and reduced mortality rates.

Through the Internet, those with chronic disease are learning how to manage their conditions correctly. For instance, after seeking information from disease-specific web sites, one-third of chronic disease sufferers reported taking their medications more regularly. Access to care or advice has improved in certain instances as a result of the Internet many health portals have "Ask A Physician"

or “Ask A Nurse” features, and some offer web-based call centers. These options can effect considerable cost savings: Optum Online, United Healthcare’s web-based nurse line and call center, brought about savings of US \$4.50 for every dollar invested in the project [10].

For consumers who have conditions that preclude repeated trips to the physician’s office, the Internet also expands the possibilities for home health care. Web-based physician/patient interaction systems can save the time and money spent on repeated trips to the clinic and, for patients with compromised immune systems, reduces the health risks of sitting in a waiting room. One innovation is the Health Hero Network’s Health Buddy, a simple computer-like appliance that allows patients and physicians to use the Internet to monitor chronic conditions and address health issues before they become emergencies [11].

3.3. *Clinical decision support*

An area of particular concern for patients and physicians alike is the incidence of medical error and the high cost associated with them. According to various sources, particularly the much-discussed IOM report *To Err is Human*, medical errors are responsible for between 44 000 and 98 000 deaths in US hospitals per year [12]. More people die from medical mistakes than from accidents, AIDS, and breast cancer, a ratio that is both shameful and costly [13]. The US health care system wastes US \$2 billion annually on hospital-based adverse medication reactions alone, errors that are mostly preventable [14].

Providing patients with safe, efficient service at the point of care would improve consumer satisfaction and conserve expenses. Real time decision support is a possibility and an expectation in the Internet era. Web-

based or web-enabled clinical decision support systems can automate alerts and warnings, offer physicians instantaneous access to reference materials and standards of care, and help the physician perform compliance checking and maintain a complete, accurate patient medical record. None of these tools are futuristic. All of them are available and ready for physicians to use today.

One example is the Drug Risk Navigator software program, which allows physicians to access a database of information on over 40 000 medications [15]. The caregiver can perform drug queries and detect possible adverse reactions, maintain an electronic medical record of the patient’s medication and health history, and send relevant information to the patient’s pharmacist. Another type of online decision support is the online physician community; the largest and most active one, Physicians’ Online (www.pol.net), allows its 210 000 authenticated US physician members to search medical journal articles or discuss clinical decisions in online discussion groups [16].

3.4. *Physician/consumer communication*

Use of e-mail, both in the US and abroad, is experiencing explosive growth: between 1998 and 1999, it grew 83% in the US and over 100% in the rest of the world [17]. Most e-mail users in the US have at least two accounts and send out about six messages per day. The number of active e-mail accounts in the United States is reported by various sources as between 330 and 440 million, enough for every woman, man, and child to have one. According to Messaging Online, there will be one billion e-mail accounts across the globe by the year 2002 [18].

With fully 40% of the US population comfortable with e-mail communication, [19] it is not difficult to imagine how this new form of

relaying information will change the physician/consumer relationship. Used appropriately, e-mail can solve many of the problems associated with rushed telephone conversations. Patients may forget to ask a question or to write down what the physician told them in response to their queries; e-mail allows them to quickly relate follow-up questions and review the doctor's replies. As a flexible form of communication, e-mail can also be accessed and read whenever convenient, eliminating the need for busy consumers to wait by the telephone.

3.5. Administrative efficiencies

Before the advent of Internet technology, there was no way to escape the inefficiencies of a paper-based system: the piles of prescriptions, forms, and charts, the frustration associated with registering and filling in medical histories more than once, the high cost of such inefficiencies. Today, through web-enabled processes, organizations can:

(1) *Save time (and paper) through streamlined processes:* Referrals, prescriptions, test result notifications and appointment scheduling could all be automated for easier and more efficient processing. If forms are still necessary, they could be posted on a website, if they are easy to locate and download, consumers can print them and have them filled out before they arrive for their appointment. Automated process can also ensure that patient information need only be captured once.

(2) *Improve outcomes:* Automated processes can do more than relieve frustration and save time, they can also save lives. Online prescription systems are one example: a computerized pharmacy ordering system al-

lowed Boston's Brigham and Women's College to cut transcription errors by 84% [20].

(3) *Reduce cost:* Using the Internet to automate simple processes can bring about a 10 to 1, sometimes a 100 to 1, cost reduction. Two examples: the Brigham and Women's pharmacy system saved more than 2.5 million dollars per year in adverse drug reactions [21]. Central Washington Family Medicine's online patient eligibility service saves an estimated 600 to 800 hours in one year, a savings worth approximately US \$7 000 to \$10 000 [22].

4. Shaping the future: action items for physicians and organizations

Much has been written about the changes health care will undergo in the first decades of the 21st century. New knowledge of disease processes and health maintenance will change how healthcare professionals are practicing, and there will be a stronger focus on disease management, especially for chronic, high-risk conditions. At the same time, the consumer focus will create new paradigms as the process of care delivery takes a backseat to outcomes and products and services become increasingly tailored to individual needs.

These trends will unlock enormous opportunities for e-health. Projections are striking:

- The Computer Industry Almanac has reported that by the year 2002, 490 million people around the world will have Internet access, and one-third of these will be in the United States [23].
- By 2005, an estimated 88.5 million users will use the Internet to research health topics, shop for health products, and communicate with payors and providers [24].

- The online business to consumer health market in the US is predicted to skyrocket from US \$200 million in 1999 to US \$10 billion in the year 2004 [25].
- Eight percent of all retail health sales (US \$22 billion) will move to the Internet by the year 2004, and pharmaceutical sales will account for 45% (4.5 billion) of online health sales [26].

As the e-health market expands, the technology that supports it will continue to change at breakneck speed. Internet technology will continue to alleviate the burden of the decision-making process, and user interfaces will become smoother and more intuitive, using speech recognition, natural language processing, and visualization. With wireless technologies, which will be a major trend in the next three to four years, computing will become possible anywhere, and where information is physically located will not be important. One indicator of the consumer-centric future is the Bank of Health initiative, which represents a new concept of electronically capturing, storing, maintaining and sharing personal health information. Through a health “ATM” system that would work like banking ATMs, the consumer will have secure, private, and global access to a healthcare “checking account” containing information like blood types, medications, and personal and family medical histories (Ball, M.J., and Ramsaroop, P., ‘Banking on good Healthcare.’ *Healthcare Informatics*, June 2000).

Current usage statistics and growth projections shout the same message: the new e-health consumers are ready to explore the positive changes the Internet can bring to the physician/patient relationship. What can physicians and the organizations that support them do to shape the future; to keep pace with consumer expectations and leverage e-health benefits?

4.1. What physicians can do

90% of physicians who responded to a recent Harris Interactive poll said that personal computers have made or will make an enormous difference in the way they practice medicine over the next three to five years [27]. Physicians must not only ready themselves for these changes, they must help make these changes happen.

(1) *Recommend appropriate websites to patients:* With the proliferation of faulty medical information on the web, consumers can easily stumble on misleading or harmful advice. According to a MEDSTAT Group survey of consumers in Michigan, only 29% of Internet users have a high level of trust in the online health information they find, more than half (59%) reported only a “fair” amount of trust [28].

To allay these well-founded consumer fears, physicians should intervene and provide guidance, pointing consumers to reputable sites that display the HONCode logo. Their recommendations can have tremendous impact: a CyberDialogue report indicated that doctor recommendations are the most important factor in building consumer trust in online information. The same report, however, revealed that physicians are not taking an active enough role in website recommendation. While almost three-quarters of online health users agree that a doctor’s recommendation would make them more likely to trust a website, only 4% of patients are currently using these recommendations to guide their online health searches [29].

(2) *Create a website:* Last year, an estimated 87% of US physicians were Internet users [30]. For those who are becoming more and more comfortable with navigating the Internet, the next step is to create their own web presence. Although accessing physician web pages is a growing priority for con-

sumers, according to a Cyber Dialogue survey, 29% of patients would even switch doctors to do so, only 9% of online users are aware of a website run by their physician's office [31].

Creating a website can be relatively easy and inexpensive. Physicians can purchase Web-authoring software programs with step-by-step instructions, or they can opt to hire a consultant. Most Internet Service Providers (ISPs) offer a certain amount of free web space, and sites like Salu.net, DoctorNet, and Physicians' Online provides physicians/medical practices with web pages at marginal or no cost. With these services, physicians can create interactive sites that include staff information and resumes, online appointment scheduling, bulletin boards, patient education materials, detailed explanations of services, and online comment boxes. Once the site is up and running, registering with search engines will help build awareness and attract more visitors.

(3) *Exchange e-mail*: Using e-mail can increase physician/patient contact, reduce the frustration, and save time. While 48% of patients are interested in using e-mail to reach their physicians (or the physicians' offices), only 3% are doing so, and 89% are unaware of their physicians' e-mail address [32].

The solution to this can be as simple as putting an e-mail address on a business card. In a letter to the editor of JAMA, for example, one consumer related her experience with the 14 physicians she saw during a period of illness. Almost all of them gave her a business card, but only one had an e-mail address. When she did venture to send an e-mail to two of the physicians, both of them returned her message with a telephone call [33]. Clearly, e-mail will benefit no one if physicians are unwilling to be active participants.

Still, security issues are always a caveat of e-health technologies, and the fact that e-mail can be printed out, forwarded, or deleted makes it a delicate issue. Physicians must ensure that patients fully understand how the e-mail will be used, who (if anyone) besides the physician processes e-mail messages, and what third parties might be forwarded copies of the messages. Written evidence of informed consent is advisable [34].

4.2. What organizations can do

A recent survey of 27 health plans by First Consulting Group and Cisco Systems, 'Health Plans on the Road to E-Health,' pinpointed five major stages of e-health integration in today's practice settings: (1) publish, (2) interact, (3) transaction, (4) integrate, and (5) transform. Each stage represents a new level of seamlessness and customer interactivity. Market "laggers," 12% of the respondents, are stuck in stage 1, publishing static information on company websites. Market leaders, 20% of the respondents, are moving toward stage 3, deploying such self-service transactions as online enrollment and claims processing. The majority of the respondents, 68%, are still in stage 2, which means they offer only the simplest forms of consumer interactivity, like formulary and provider searches. Stages 4 and 5 are the brass rings to reach for in the new century: organizations will integrate numerous automated transactions and transform the enterprise by offering seamless, end-to-end web-based interactions with consumers [35].

Reaching the transformational stage will be an increasingly important component of care delivery. In the near future, as much as 20% of a health plan's business will be proactive, empowered, technologically proficient consumers, but only an estimated 24% of hospitals are prepared to deal with empow-

ered consumers [36]. What can healthcare organizations do to challenge this unsettling statistic?

(1) *Put people first*: Leading informatician Reed Gardner has said that since medical informatics is a social science, the success of a project is 80% dependent on social and political interactive skills and less than 20% on the implementation of hardware and software [37]. Indeed, the most crucial guiding principles for success are not technical in nature (top management support, careful selection processes, emphasis on implementation, user buy-in, project team, personnel, control costs, lack of herd mentality, determination, common sense). Simply put, if an organization lacks people skills and management skills, projects will be unsuccessful.

(2) *Focus on service and interactivity*: These are two major consumer demands, but healthcare organizations are just beginning to address them. In addition to evidence offered by the FCG/Cisco survey, Computer Sciences Corp. recently reported that most hospital websites offered little or no consumer interactivity or services. 57% were purely informational, 36% had some interactive features, and almost none had transactional features (6%) or service delivery features (1%) [38].

With a Internet-enabled system that offers high levels of service and interactivity, consumers, physicians, and supporting staff all win. Envision a future in which registries “pull in” patients who should be seen, web-enabled registration processes eliminate the need to re-register at seven different places, and consumers have fast online access to payers and formulary information. Picture reduced traffic in waiting rooms due to patient self-education, online consultations for simple medical issues, and web-based home monitoring solutions. With the time these new efficiencies save, the 21st century vision of achieving open access to care and same-

day visits with providers may not be such a distant goal.

(3) *Offer appropriate training for physicians and support staff*: Technology is a tool and an enabler, not a solution, and user comfort and facility with new tools is the foundation upon which their success rests. That said, healthcare organizations must reacquaint themselves with the importance of training, which is too often cut or reduced as part of cost management strategies. According to the American Society of Training and Development, health care is the industry that spends the least on training, both per employee and as a percentage of payrolls [39].

Organizations must recognize that short-term cost savings on training are not worth the benefits they forfeit. Training ensures that the most possible value is squeezed from the investment, in terms of physician decision support and time conservation, cost savings, employee retention, and consumer satisfaction. For example, training investments helped one Chicago health system reduce employee turnover from 25% to 15.5% annually and increase the percentage of outpatients willing to return from 83% to 91% [40].

(4) *Ensure that technology matches business goals*: Aligning technology with business goals and objectives is probably the most important aspect of the entire process. As James Cordata has said, “well-run enterprises align their business and technology strategies and then develop processes to ensure both work together for good results.” [41] In the consumer-driven Internet world, overall goals for both business and technology would include security, reliability, simplicity, and manageability.

Larry Weed, the father of the problem-oriented medical record, once stated that “since modern information tools can do things that the unaided human mind cannot do,” these tools would show us “a picture of medicine

we have not seen before.” [42] Indeed, new tools will allow both physicians and consumers to operate differently and think differently. They will achieve a new level of knowledge and connectivity, and the inefficiencies that bar them from fast access to crucial clinical answers will largely disappear.

Reaching these goals will require significant investment in technology, training, and dedicated staff. The products, better and faster care that treats the consumer as an active partner, will be well worth the time and money. If both physicians and the organizations that support them can learn how to engage the new breed of consumer and use e-health, they truly will transform healthcare delivery, not only for healthcare consumers in our country, but for patient care around the world.

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