



I

Introduction: Care at a Distance

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The past three decades have seen revolutionary changes in health care but only evolutionary changes in healthcare information systems. This must change if we are to realize the full potential of collaborative care and shared decision making. Providers, patients, their families, and even payers must leverage the power of information technology to improve clinical care as well as satisfaction with that care, and to reduce costs.

Managed care and disease management have reduced the costs of care and excessive use of services, but compromised the physician's role and the patient's trust. With increasingly narrow profit margins for episodic care, or with outright capitated reimbursement models, health managers have sought to cut costs while increasing the number of encounters for which each physician is responsible. As the volume of care increases, clinicians must make sacrifices to spend more time with each patient. In fact, whereas the average duration of an ambulatory visit with a physician in the United States was 26 minutes in 1993, the current goal among health maintenance organizations is a 7-minute encounter (as in Great Britain).¹ A 7-minute visit with an elderly patient barely allows enough time for the patient to undress and dress again. A 7-minute encounter is too short to allow the physician to establish rapport, take a medical history, conduct a physical examination, formulate a therapeutic or diagnostic plan, and exchange information about the patient's concerns and the physician's proposed actions.

Medication errors may also result. Tamblyn et al² showed that when visits were shorter than 13 minutes, physicians made more medication errors than they made with longer visits. No wonder clinicians neglect to ask about alcohol and drug use, safety in the home, safe sex practices, and the health of other household members. No wonder both patients and physicians are increasingly dissatisfied with this model of care.

Another problem is that our current encounter-based model of care is both physician-centered and facility-centered. A patient who has a health concern must schedule an appointment at a time convenient for the physician and at the physician's office, which may be some distance from the patient's home. If



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it turns out that the visit was unnecessary, both the patient's time and the physician's time will have been wasted. Alternatively, if the patient does not make a necessary visit because of the hassles of traveling for a 7-minute encounter, the patient's health could be compromised. This episodic approach not only leads to fragmented care but poorly supports both primary and longitudinal care.

In times past, clinicians could talk with their patients and take a complete history. They could build the trusting relationship so important to the art of healing. Sometimes physicians and nurses would even visit the patient's home and experience the patient as a person. This type of interaction is almost unthinkable in today's time-starved environment. But perhaps paradoxically, recent developments in broadband telecommunication and information technology may help us rebuild our eroding relationships with our patients.

Three advances in technology now allow us to interact with our patients when their health concerns first arise, or visit with our patients in their homes. Moreover, we can use this technology to engage patients in gathering and sharing information in ways that were inconceivable just a few years ago. First, with fast computers and reliable, inexpensive storage systems, we can now store nearly complete patient information, including images, sounds, and videos. Second, with collections of computer programs sometimes referred to as "electronic patient records," we can obtain, organize, display, and securely distribute this health information. Third, and perhaps most important, with the astounding growth of the Internet, we can anticipate radical changes in our society and culture, especially in the delivery of health care.

Fast affordable computing is penetrating our culture. Only 30 years ago, when I was in high school, the arrival of a single computer was a ribbon-cutting event. Today, an elementary school with no computer is considered disadvantaged. Only 20 years ago, when I finished my residency training, a disk drive that could store 200 million characters of text (about 70,000 typed pages) was the size of a washing machine and cost nearly \$20,000.³ Today a disk drive that holds several billion characters (one million typed pages) costs only \$200 and will fit in a laptop computer. Within a few years, it will be possible to store trillions of characters on "smart cards" that patients could carry in their wallets. All the health data that are now collected could be stored indefinitely in central (or distributed) repositories and shared when appropriate.

But having large amounts of data and information will not be a panacea for clinicians or patients, since physicians do not have time to look through huge quantities of disorganized documents every time they need an item of data. The way clinical information is organized is equally important, and during the past 20 years, sophisticated software has been developed to support the flow of work in health care. Whether the enterprise is a large medical center^{4,5} or a physician's office,^{6,7} computer programs can collect patient information as a by-product of good patient care. Weed's⁸ work on organizing clinical documents around the patient's problems not only led to the modern paper medical



record but also influenced the development of such computing systems. Today, the collection of programs that obtain patient information, display this information for the physician, and support the work flow is loosely referred to as the electronic patient record (a term that is misused by the nearly 400 companies that claim they can sell such a record and is misunderstood by most organizations that would like to buy one). Still, the ability to provide secure electronic access to patient information is a cornerstone to creative thinking about how we might reorganize the delivery of health care.

These improvements in computers and their applications have been dwarfed by the effects of the World Wide Web. The Internet itself is not new; in 1973 we could send electronic mail between university computers around the country, exchange files including images, and even run computer programs remotely. What is new is the emergence of a common and intuitive interface that is accessible even to untrained users. In fact, the rate at which the World Wide Web has grown far exceeds the rate of growth of any other automated means of communication, including the telephone, the radio, and television.

As Internet traffic doubles every 5 months, with a yearly growth rate exceeding 118%, we are seeing the emergence of the “wired health consumer,” who has a computer at home and at work or school. We are seeing the telecommunications and entertainment industry responding to pressure to sell interactive video for use at home. What this means to health care is that our patients are already or will soon be online. In fact, of the 75 million free Internet searches of the MEDLINE database in 1997, 30% were conducted by the general public.⁹

How can more complex technology improve the healthcare environment I have described? Why would adding electronic tasks, such as answering e-mail from a patient, engaging in a virtual home visit via videoconferencing, updating an electronic patient record, or even typing a prescription instead of illegibly scribbling a script, help the time-hassled physician with only 7 minutes to see a patient? The reason is that with the more cooperative physician-patient relationship (and enhanced efficiency) the new technology allows, the patient can help with the routine collection and updating of health information.¹⁰ Informed and empowered, patients will communicate with their care team when a health concern arises. Perhaps the sight and sounds of the patient will trigger concerns that have the patient immediately come to the office or emergency room. Alternatively, computer-assisted histories will start a process of information exchange and shared decision making between the physician and patient that could lead to diagnostic and therapeutic interventions before (or even without) an actual visit. Computer-assisted histories ask questions without observer bias and always ask every question that they are programmed to ask. Our experience with computer-assisted histories is that patients enjoy a well-constructed interview. The report of the computer interview saves time by highlighting important issues and sharing a documentation burden with the patient. The fear that physicians so often express that their patients will tell them too much is neither well founded in experience nor appropriate. Imagine that when asked by a computer (as should be done by every primary care



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doctor), “Are you depressed?” or “Do you have thoughts about hurting yourself?” doctors complain that they didn’t want to know that information. Is there any excuse why we underdiagnose and treat depression other than we don’t have enough time in a 7-minute visit to explore all these issues? The World Wide Web now gives us a means to have patients take a complete history before every visit. Even patients with poor eyesight with limited reading ability can respond to spoken questions that are easily incorporated within a Web interview.

Frequently, issues of equity arise when we consider extending care through the use of advanced home-based technology. While these concerns are appropriate and real, work by Gustafson’s group¹¹ and others suggests that this kind of technology has its greatest benefit for those populations of patients with the poorest access to care. Traditionally, we have thought about telemedicine (care at a distance) as providing access to care for patients who are at great distances from hospitals such as in rural settings. But within our urban centers where the majority of people live, many of the frail elderly and disenfranchised citizens will have the greatest health benefits from the application described in the following chapters.

The four chapters in this section demonstrate the next stage of collaboration in health care where cooperation among customers (individuals, families, and communities), suppliers (pharmaceutical, device manufacturers, and medical supply companies), partners (national health systems, insurance companies, and payers), and colleagues (physicians, nurses, other care providers, and support personnel) lets health systems do business in different and better ways. Since effective health care requires communication, consultation, and collaboration among colleagues as well as with patients, their families, and community resources, shouldn’t healthcare information systems facilitate these basic tasks?

Clinicians need to embrace virtual patient visits as a way to revitalize our deteriorating relationship with our patients. We need to design this technology around the kind of care we seek to provide rather than responding piecemeal to administrative burdens. While adding more sophisticated technology to broken social systems almost never solves the human problem, sometimes high tech can also produce high touch. The following chapters show us how.

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