

KP HealthConnect as a Transformational Tool

By Allan Weiland, MD

A Vision of Better Health Care Enabled by Information Technology

Telemedicine applications are commonplace. Specialists use videoconferencing and telesensing methods to interview and even to examine patients who may be hundreds of miles away. Computer-aided surgery with Internet-based video is used to demonstrate surgical procedures to others. Powerful high-end systems provide expert advice based on sophisticated analysis of huge amounts of medical information. Patients are empowered in making decisions about their own care through new models of interaction with their physicians and ever-increasing access to biomedical information via digital medical libraries and the Internet. New communications and monitoring technologies support treatment of patients comfortably from their own homes.¹

We are early into the information age of health care, and Kaiser Permanente (KP) is investing large sums of money and effort to implement KP HealthConnect to lead American health care into this new age. Since the late 1950s and early 1960s, when Permanente pioneer Morris Collen, MD, developed his computerized medical record prototype, we have been trailblazers in the use of just about every type of clinical information technology to improve medical practice (see Debley article, page 32).²

Introduction

In this article, I call on work done by the Blue Sky Vision group for the KP Care Delivery Portfolio, the KP research community and many others, to paint a picture of how clinical practice could be transformed through the use of these technological tools over the next few years. Technology has the potential to change health care drastically by increasing access to patient and medical information, by increasing efficiency and timeliness of care, by simplifying complex tasks, by reducing medical errors, and by facilitating the tracking of outcomes and development of outcomes-based research.³

Imagine the health care system of the future. Every encounter is "paperless" from the

reception desk to the exam room, laboratory, and pharmacy. All data are electronic, and most data enter the system automatically. A larger system, or data warehouse, stores the data and generates reports about patients and populations (across conditions and over time) as well as longitudinal studies of diseases and treatment patterns. Communication is seamless, with orders and test results transmitted almost instantaneously across departments and with real-time sharing of information among clinicians, no matter their physical location. Clinical encounters aren't confined to the clinic—they meet patients' varying needs, including "virtual" visits with clinicians and home-based monitoring of chronic conditions.

As attributed to William Gibson, a science fiction author, "The future is already here, it's just not evenly distributed yet." Much of what I described above is happening right now in many KP regions and elsewhere.

Assumptions

In order to describe potential transformations achieved through KP HealthConnect, first we need to make some assumptions about the delivery of health care in the future. These are extensions of current trends, with no major discontinuities.

Assumption 1: Health care information continues to grow at an exponential rate and is widely accessible via the Internet.

This is a safe bet and recognizes current growth trends of health care information plus the increasing amount of knowledge spinning off from the Human Genome Project. Not only is the rate of knowledge creation increasing but also accessibility of knowledge to consumers, primarily through the Internet and World Wide Web. In several markets, at least 70% of KP members have computer access, and the number of "hits" on health-related Web sites is now well over 100 million annually.

The amount of medical knowledge available to clinicians is also increasing dramatically. On top of newsletters, updates from specialty societies, and online information, about 1500 medical articles are published each day.⁴ In this age of medical malpractice, physicians are expected to keep current on best practices, yet the amount of medical knowledge that we have gained in the last 20 years surpasses humankind's total prior understanding of medicine.³

Assumption 2: Point of care (home-based) testing and therapeutic interventions will grow rapidly.

Multiple home monitoring systems are currently available, all linked to information networks, including "smart houses" that monitor physiologic functions and "smart toilets" with diagnostic capabilities. Remote cardiac and uterine contraction monitoring have been available for years, and other types of monitoring are possible. NASA, for example, conducts remote physiologic testing on its astronauts in space, monitoring an enormous amount of information. Additional home-based interactive capabilities are being de-

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veloped all the time and will shift much of our office-based care to the home setting.

Assumption 3: Many specialized technologies will be “global,” bridging both time and space.

Electronic transfer of information now makes it possible to read imaging studies in other locations, regardless of where the image was generated. Robotics, miniaturization of cameras into swallowable or implantable sizes, and nanotechnology will all allow remote diagnostic and therapeutic care interactions. We will move information, not people. Individual experts can be housed anywhere and connected everywhere to support specific technologies. We are already using remote radiologic-imaging reading services in a number of regions.

Assumption 4: KP will have successfully implemented the entire suite of HealthConnect products across the whole program.

HealthConnect will unify existing and new technologies across all KP regions and will do more than just digitize current information. Although it includes a unified electronic medical record for each patient, which spans the spectrum of care and can be immediately accessible, HealthConnect is more than that. It will be supported by robust data warehousing, allowing aggregation of information by episode of care, diagnosis, treatment, complication, cost, frequency, and individual. The inpatient and outpatient clinical decision support and other functions enabled by HealthConnect will create synergies that move clinical care into a new realm.

Transformations

Assuming the above, one can imagine major transformations over the next few years in the nature of clinical interactions at KP: interactions between clinicians, members, and the organization as a whole, clinician-clinician interaction, and clinician-patient interaction.

Organization-Member Interaction

Member interactions with the organization will be much closer to seamless. Billing, sched-

uling, prescription refills, and benefit information will all be accessible online at www.kp.org. Each new member will be enrolled in a primary care panel and take a health risk assessment that allows us to tailor services to add value to their care. All members will be automatically enrolled in chronic disease registries, health education classes, and medication counseling sessions, as appropriate. In the not-to-distant future, members will have interactive audio-visual capabilities in their home, through which they can access a variety of KP services.

KP will be considered a reliable source of information about care, and the existence of the technology itself will give members confidence in the care they receive. We will provide members with training on accessing and interacting with their medical records, libraries of medical knowledge, and clinical guidelines for all health conditions. Use of current information sources, such as the HealthWise handbook, will be much expanded and enhanced by interactive triaging of questions to the appropriate KP resource. We will use technology to enhance communication with members about how we can provide assistance in acute situations or with chronic illnesses, and what resources are available to optimize health. Interactions with KP will be supported with a robust technologically enhanced system that helps members more easily navigate the complexities of care.

Organization-Clinician Interaction

The interaction between KP and clinicians will be transformed to better support provision of care in the “information age.” The growing body of medical knowledge adds complexity, which can be simplified using technology. KP will provide tools that integrate the most up-to-date and relevant practice data, drug information, patient history, clinical guidelines, and screening recommendations into electronic reminders and prompts, enabling clinicians to provide informed and specific care. When a patient has a specific question about their health, clinicians will be able to draw from a database of aggregate experience to provide the evidence for a recommendation. For instance: “In your specific circumstance, with your genetic

makeup, this is the probability of a future problem, and these therapies are consistent with being effective for you.”

KP will create new models for organizing the daily work of all KP employees, as technology changes the way care is delivered. Support staff may be trained to manage information flow, more and more triage will occur electronically, and many needs will be met remotely. Instead of call centers, KP may have “information centers” or “electronic patient care centers” that can match the type of issue to the appropriate resource, no matter where in the system it happens to be.

Clinicians will also be supported by the further automation of many care processes. Laboratories can do “cascades” of diagnostic testing, using guidelines and algorithms established from our enormous data capture and analysis. Instead of ordering one test and waiting for the result, the lab could automatically do all subsequent tests based on the results of the first one, until the full complement of testing is done to get to the diagnosis on the first specimen. This specific and membership-wide data will also tie into care protocols that enhance clinician decision-making.

Clinician-Patient Interaction

The basis for creating value in the health care interaction between clinicians and patients is the transfer of knowledge, in a form that is customized to the needs of the patient. The majority of health care decisions are made by individuals, in their homes, with the advice of trusted others, not in our traditional doctor/office milieu. These technologies will enable us to use what tools we have available to bring the best evidence of effectiveness and cost-effectiveness to our patients in the “teachable moment,” when a problem arises and a decision needs to be made.

Interactions will be more flexible and continuous and less beholden to geographic barriers. As the availability and use of clinical information expands, clinicians will interact more robustly with members’ health care decision making that occurs on a 24/7 basis. Nonprocedural interactions will move beyond the exam room, since many types of lab testing and physiologic monitoring will be done

at home, and KP members will be communicating with clinicians online. Patients in nonmetropolitan areas will have greater ability to interact with their providers, and some surgeries will even be performed remotely.⁵

Clinical decisions will be more transparent to members, and navigation through the system can occur efficiently. The electronic health record will be an interactive tool to be accessed along with the member. It will provide in-the-moment information about continuity of care (particularly for chronic conditions) and will incorporate the best available evidence relevant to that member's needs. Further procedures and testing can be scheduled before the patient leaves the exam room, and results of previous tests can be called up and discussed. Medications can be prescribed and transmitted to the pharmacy online, mitigating medication errors and eliciting conversations about possible allergies or contraindications.

Clinician-Clinician Interactions

This area is likely to change dramatically over the next few years. The capability of having a small group of highly specialized consultants available to all KP clinicians, no matter what region, will be very helpful—particularly in the field of genetics and in other areas where there is likely to be a supply shortage. Today, in the Northwest Region we have electronic chart consults, so patients don't have to physically go to the consultant's office. In the future, we could have videoconferences to coordinate patient care, convened by the primary care clinician and involving multiple caregivers, potentially in distant geographic areas. Health care teams will be both physical (at the care site) and virtual (across the care system). No matter where in the system a member receives care, his/her "care team" will have simultaneous access to his/her medical information, and when the team needs to confer about his/her care, they will be looking at the same updated information.⁶

The wide availability of clinical information systems, linked seamlessly together, will have an enormous impact on the ability to provide high quality, culturally sensitive, cost-effective health care.

Our ability to rapidly assess new technologies and disseminate the results will be enhanced by common information platforms. Optimizing the use of these tools will take a concerted effort to create common definitions of terms, agreement about how information will be formatted and displayed, and rules about how we decide what constitutes good evidence. Work is going on in all of these areas but requires a mindset shift from locally autonomous decision making to "community standard." The KP community becomes all of us, leveraging the capabilities and values of our group practice model to lead the next revolution in health care.

Conclusion

The wide availability of clinical information systems, linked seamlessly together, will have an enormous impact on the ability to provide high quality, culturally sensitive, cost-effective health care. While the locus of much of the care will shift toward the home; there will be process improvements across the entire continuum of care.

Will KP be able to compete and differentiate itself in this world? We are uniquely qualified to succeed. Our clinicians, working in and supported by our systems, can be world-class information managers and knowledge-transferers. As a national group of Permanente staff, we can leverage our size and our approach to Permanente Medicine to provide value seamlessly. KP is committed to preventive care and chronic care management, both of which are greatly supported by HealthConnect. It will be very difficult for other, nonintegrated systems of health care to have the same types of information available at their fingertips.

These changes will be more evolutionary than revolutionary, because they all exist now. Our challenge will be to identify those technologies with the most potential, to incorporate them into practice, and to disseminate them quickly. What a challenge! What an opportunity! ❖

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Suggested Reading

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