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Health Information Arrays

A Powerful Prescription

For physicians, health plans and hospitals, new and emerging web technology offers higher quality, more cost-effective health care

A Krames White Paper

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Executive Summary

Up to 93 million Americans have searched online for health information. Americans are as likely to use the Internet for health information as they are to ask their personal physician.

Yet the health care industry has been slower than other sectors to harness the power of the Internet to create a more consumer-centric focus that would enable people to play a greater role in managing their well-being. Barriers have included concerns about information security and patient confidentiality, as well as the need to create business or economic models to pay for such services.

Nonetheless, the future of e-health lies in the concept of health information arrays: delivering the right information to the right person at the right time. The goal is to link the demand for online information with clinically relevant therapy to positively change people's behaviors — either in terms of improving their lifestyles, improving their management of chronic diseases, or better following prescribed actions before and after procedures or hospital stays.

Currently, many popular Web sites geared towards effecting behavior change fail to reach their potential. To do so, sophisticated health risk assessments must be used to tailor individualized feedback in programs that are based upon accepted theories of behavior change. Also, such programs work best, say experts, when they are offered within a trusted and valued context — through a physician or hospital, for instance.

Using such features, physicians, health plans and hospitals are beginning to plumb the potential of the health information array concept to reach extremely large numbers of people on an individual basis at relatively low cost. A growing number of programs are demonstrating their effectiveness in terms of improved clinical outcomes, enhanced patient satisfaction and cost control.

The National Library of Medicine and the American College of Physicians Foundation, for example, recently launched a program to encourage internists and other interested physicians to "prescribe" their patients pertinent, credible information provided through the NLM's MedlinePlus.

In addition, a growing number of major health plans are agreeing to reimburse physicians for online consultations with their patients for non-emergency matters. These virtual visits can be secure, meet federal confidentiality requirements and allow patients to formulate succinct, structured messages. To respond, physicians can refer to a database of customizable treatment templates and can attach prescriptions, specific consumer-oriented medical information or both. Patients can also schedule appointments, receive laboratory results and access approved self-care information.

An independent study concluded that one such program reduced office-based care costs and total cost of care. Another survey found that physicians, unburdened by less serious patient concerns, increased their number of daily visits and relative productivity values upon which compensation is based.

Meanwhile, the Internet is playing a growing role as health plans evolve from claims processors to institutions that can improve the affordability of health care and the health and lifestyles of members. A rising number of adults manage their health benefits and interact with their health plans online. And a number of insurers — including Kaiser Permanente and several Blue Cross and Blue Shield groups — offer their members Web-based tailored behavior change programs in such areas as nutrition, weight management, smoking cessation and stress management.

Finally, the technology holds great promise for hospitals, which are using Web-based programs to reduce costs, enhance quality of care and better educate and prepare patients and their families. For example, individually tailored programs for parents of infants in neonatal intensive care units (NICUs) have enhanced parents' knowledge and confidence and reduced costs both in terms of earlier discharges and fewer rehospitalizations. Parents across the socio-economic spectrum have embraced the program.

Information array therapy has the potential to become a powerful tool for consumers, physicians, hospitals and health insurers in an integrated process that enables better-informed people to become more involved in their health care and to stay healthier.

Introduction

The health care industry has been slower than other sectors — including banking, insurance and manufacturing — to take advantage of rapidly evolving information and communication technologies that allow a more consumer-centric focus. Yet the seeds have been planted for a revolution in health communications.

The slower progress of the industry is understandable in light of significant and in some cases unique barriers, such as concerns about information security and patient confidentiality, as well as the need for business or economic models to determine who should pay for such services. Charles Safran, M.D., a Harvard Medical School professor and CEO of an e-health firm, notes that addressing people's health is a much more complex and multidimensional undertaking than a simple ATM machine deposit or withdrawal. Yet, he says, "The results of poor communication, coordination and collaboration of care is not only a dollar cost to the system but it is a quality cost that may be a life cost to the patient. The imperative to bring about the kind of change that enables patients to become better participants in their health care is pretty clear."

Gary L. Kreps, Ph.D., chief of the Health Communications and Informatics Research Branch of the National Cancer Institute, takes a similar stand. "The future of health care is based on people having access to information that enables them to make good decisions with help from their experts, rather than having experts make the decisions for them," says Dr. Kreps.

The demand is unmistakable. According to Manhattan Research, a health care marketing and information services firm, online consumers in 2004 are just as likely to use the Internet for health information as they are their personal physician. The Internet, the firm concludes, is now a primary channel of health information for more than 80 million consumers.

"We are in the very early stages of a revolution of true connectivity between patients and other parts of the health care delivery system — including payers, pharmaceutical companies and ultimately providers," says Mark Bard, Manhattan's president.

The Pew Internet & American Life Project pegs the usage figures even higher. Its July 2003 Internet Health Resources report concluded that 80 percent of adult Internet users, or about 93 million Americans, have searched for at least one of 16 major health topics online. The most popular topics: Specific diseases (63 percent), medical procedures and treatments (47 percent) and diet and nutrition (44 percent). These people have conducted online searches either for their own health reasons or on behalf of someone else — a spouse, child, other loved one or a friend. As a result, Pew says looking for health or medical information is now one of the most popular activities online, after e-mail (93 percent) and researching a product or service before buying it (83 percent). Three-quarters of the people that Pew has dubbed "health seekers" say the Internet has improved the health information and services they receive.

Indeed, a survey of more than 380 thought leaders conducted by PriceWaterhouseCoopers predicted that, by 2010, more than 20 percent of all office visits could be replaced by their online equivalent.

Some recent related developments include:

- **The Decade of Health Information Technology**: In July 2004, Tommy G. Thompson, secretary of the U.S. Department of Health and Human Services, outlined a 10-year plan to create always-current, always-available electronic health records (EHRs) for all Americans. In 2002, according to HHS, only 13 percent of hospitals used EHRs, while somewhere between 14 percent and 28 percent of physicians' practices utilized such technology. In improving the quality and cost-effectiveness of care and reducing medical errors, the plan would also enhance consumer involvement. Secure personal health records could be maintained by patients and their physicians, insurers or others, giving patients what HHS says would be unprecedented access to and control of the record. That would mean not only better-informed consumers, but also direct consumer involvement in decision-making regarding their care.

Health Topics Searched On-Line

Health topic	Percentage of Internet users who have searched for information on it
Specific diseases	63%
Medical procedures and treatments	47%
Diet and nutrition	44%
Fitness	36 %
Prescription and over-the-counter drugs	34%
Alternative treatments or medicines	28%
Health insurance	25%
Depression, anxiety, stress or mental health issues	21%
A particular doctor or hospital	21%
Experimental treatments or medicines	18%
Environmental health hazards	17%
Immunizations or vaccinations	13%
Sexual health information	10%
Medicare or Medicaid	9%
Problems with drugs or alcohol	8%
How to quit smoking	6%

Source: Pew Internet & American Life Project, Internet Health Resources, July 16, 2003

♦ **The VA's MyHealtheVet**: On Veterans' Day 2003, the VA's Veterans Health Administration launched this Internet-based health portal designed to help veterans and their families better understand and take a more active role in managing their health. It initially included a library of 18 million pages of health information, a prescription checker, health calculators and self-assessment tools, and links to benefits and resources available from the VA. This fall vets will be able to refill prescriptions online, view their co-pay balances and appointments and enter information helpful to physicians, such as blood pressure and temperature. Next year veterans will be able to receive copies of their secure VA health information online.

♦ **Online support groups:** At Stanford University and the University of Wisconsin, the CHESS™ Comprehensive Health Enhancement Support System helps individuals cope with a health crisis or medical concern by using a computer-based system of integrated services. Other organizations and institutions are also sponsoring online health support groups.

♦ **The Mayo Clinic's Health Management Resources Customer e-Health Package:** Mayo provides this service to mid- to large-sized companies, including such Fortune 500 firms as Boeing and Intel, and member organizations such as teachers associations and unions. Now available to 4 million people, the online service bundles the clinic's formidable database of health information, interactive behavior change and condition management programs with the clinic's health risk assessment and reporting tools. The tools also allow the companies and organizations, which receive aggregate reports on the health and health risks of their employees or members, to measure and manage the health of their workforce or membership.

♦ **Online diabetes monitoring:** In 2003, Medem, a physician-patient communications network founded by leading medical societies and ConnectiCare, a Connecticut-based managed care company, launched a diabetes-

monitoring program. They teamed up with ProHealth Physicians, the largest primary care physician group in the state. The program allows diabetes patients to securely send their glucose readings to their doctors on a more frequent basis than regular office visits would allow, while compensating physicians for the time they spend providing care online.

"Despite the promise of e-health to connect consumers with their personal physician and health plan, the link between patient, provider and payer will remain spotty (at best) for most consumers in 2004," Manhattan Research concludes. "However, the data does show continued strength in the link between consumers and their health plans — driven in part by rapidly evolving online offerings from the health insurance industry (migrating customer service to online applications and portals)."

Regardless, for physicians, health plans and hospitals, the key to the future of Web-based e-health is the concept of health information arrays — using increasingly sophisticated software and powerful health information databases to deliver — and deliver only — the right information to the right person at the right time. The goal: to slake people's thirst for online information by giving them clinically relevant therapy, as outlined and/or directed by their physicians, hospitals or health plans, in order to positively change behaviors — either in terms of improving their lifestyles, getting a better handle on chronic disease management, or better following prescribed actions before and after a procedure or hospital stay.

"We have a health system that is fragmented and fractured and everybody says there aren't enough resources, yet the most underutilized resources we have are the patients themselves," says Dr. Safran, the founder and CEO of Clinician Support Technology Inc., a provider of Web-based health information programs in Newton, Mass. "We have patients sitting around when they could be more effective participants in their own care.

"Our goal should be to make patients better consumers of health services. When you do that you improve quality and produce care at lower costs."

Speaking of his firm's neonatal, cancer and stroke programs, Dr. Safran could be speaking of the entire field when he says: "The goal of these systems is to enable the just-in-time delivery of the right information that is going to change the health trajectory of a patient or, in the case of a parent looking at the material, his or her child. Each of us could go to the Web and see millions of pages when, in reality, each of us only wants to read one page" — the page of material that most directly addresses our current information needs and desires.

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>
> — David Anderson,
> Vice President,
> StayWell Health Management

Indeed, despite people's interest, the field currently suffers from too much online information.

"Consumers are not particularly good at navigating the Web unaided," says Dr. Kreps of the NCI, which funds a significant amount of relevant research. "There's such a wealth of information out there and there are so many different sources that it can be overwhelming and confusing. It's also hard for people to clearly determine how credible different sources of information are.

"And unfortunately, there are a lot of unscrupulous people out there selling remedies that are not evidence based and in fact might be quite dangerous, especially for people who are vulnerable because their disease isn't well treatable and they are desperate for a cure."

The concept of information prescriptions, says Dr. Kreps, is attractive for physicians who feel they are losing patients as they go online and get bad information and advice: "By

directing their patients towards particular sources of information, it allows them to provide a little bit of quality control."

What a lot of this lacks is structure. Today, a significant number of patients do not follow through with prescriptions or treatment regimes prescribed by their doctor — in part because such traditional medical settings lack structure. The same is true for prescribed information. "A physician talks to a person, the person walks out of the office and either doesn't understand it or isn't motivated enough to follow through," explains David Anderson, vice president of StayWell Health Management, a St. Paul, Minn., division of MediMedia USA that provides health management programs and behavior change interventions. "It doesn't mean that person doesn't want to change. It simply means they need something beyond what they got in that one encounter."

Behavior change occurs over a long period of time, Anderson notes. Along the way, people will encounter various obstacles and barriers. Unless they have the skills to overcome them, or unless someone periodically encourages them, provides the tools and strategies they need to overcome these barriers or both, they get bogged down or lapse.

That situation represents both the challenge and the opportunity for information therapy or information arrays — utilizing the power of the Internet to deliver the most appropriate, customized information to individual consumers when they most need it. "The state of the art now is pretty primitive," says Anderson. "By and large, people aren't using the Internet to manage their health. All surveys indicate that health information is the number one thing people go to on the Web. People certainly view it as a way of learning things and answering questions, yet the potential for managing health is huge but largely unrealized."

When people try to change behaviors, they need resources and tools that they either can't find or aren't motivated to seek and use. Among traditional behavioral change programs, the ones that succeed are structured to include significant follow-up. Common follow-up questions, notes Anderson, include: "What obstacles are you encountering? Are you still doing what we agreed you were going to do or have you stopped, and if so, why? Is there something I can help you with to get you started again? Is there anything else you can do? Or are you just not ready to do this?"

For example, StayWell's phone-based smoking cessation programs contact each person periodically over eight or nine months in 10- to 15-minute telephone conversations that provide structure, support and assistance as each person goes through the process of trying to quit smoking and start exercising. This proactive outreach — checking on people and keeping them motivated — is essential. "If it is a purely reactive process, so that the individual making the change has to drive the whole process, the relapse rate is pretty high," says Anderson. "The key, therefore, is to take what's known about successful behavior change and replicate that, or build an analogue, on the Internet."

Current Internet offerings

"The Internet is specifically designed to allow programs to provide the maximum amount of interaction with a computer," concluded a 2003 study published in the *Journal of Health Psychology*. "However, much of the health information that is currently in the Internet does not take advantage of this potential. Rather, 'brochureware' (placing print materials on the Internet with no changes) has become commonplace."

Admittedly, such material might be useful, says Kerry E. Evers, Ph.D., a psychologist and lead author of that study and a related one that appeared in the same issue. Dr. Evers is the director of health behavior change programs for Pro-Change Behavior Systems, a behavior change management company based in West Kingston, R.I.

Dr. Evers and her colleagues concluded that public Web sites geared toward health behavior change for disease prevention and management left a lot to be desired. The sites variously dealt with such preventive issues as alcohol, diet, exercise and smoking and disease management issues involving pediatric asthma, depression and diabetes. Of 37 free sites reviewed, all met at least four of the five commonly accepted minimum criteria for a program to have the potential for

producing behavior change. These were the "5A's" for effective health behavior change treatment on the Internet: advise, assess, assist, anticipatory guidance and arrange follow-up.

Strengths of the 37 programs included providing rationales for assessments, privacy and confidentiality protections, some form of feedback and some form of interactively. The researchers noted that many Internet concerns have been criticized for not allowing direct contact between site users and site personnel when questions or concerns arise. All of the sites allowed for some form of contact, ranging from 100 percent for e-mail contact for users with questions about content to 46 percent listing a contact telephone number.

Nonetheless, researchers concluded that most of the programs fell short of maximizing their potential for effecting behavior change. Few were based upon accepted theories of behavior change, such as the stages of change theory developed by James O. Prochaska, Ph.D., the founder of Pro-Change and a psychology professor who also directs the University of Rhode Island Cancer Prevention Research Center. (Other such theories include the social learning theory, the theory of planned behavior, the theory of reasoned action and the transtheoretical model.)

Dr. Prochaska believes changing involves moving through a series of steps:

- Precontemplation — Not intending to take action in the next six months.
- Contemplation — Intending to take action in the next six months.
- Preparation — Intending to take action in the next month.
- Action — Doing the healthy behavior for less than six months.
- Maintenance — Maintaining the healthy behavior for more than six months.

"Our research has consistently shown that people who try to accomplish changes they are not ready for set themselves up for failure," Dr. Prochaska and his co-authors explain in a book that outlines his stages of change theory, Changing for Good: A revolutionary six-stage program for overcoming bad habits and moving your life positively forward. "Similarly, if you spend too much time working on tasks you have already mastered — such as understanding your problem — you may delay acting on it indefinitely."

"There is growing consensus that individually tailored health communication represents one of the most promising modalities for health behavior change."

— Kerry E. Evers, Ph.D.,
Director, Health Behavior
Change Programs,
Pro-Change Behavior Systems

In addition, Dr. Evers and her colleagues concluded that only five of the programs offered individually tailored feedback, even though, the researchers said, "There is growing consensus that individually tailored health communication represents one of the most promising modalities for health behavior change … The Web is an excellent, low-cost modality for providing individually tailored communications, but most of the best sites do not utilize such individualized assistance."

In addition, few had empirically based tailoring — meaning the tailoring was based on the individual's responses to questions — and few had or were planning to evaluate their effectiveness.

About three-quarters of the programs offered some form of anticipatory guidance to prevent relapse, such as how to manage tempting situations and how to stay motivated. But less than a third systematically included relapse prevention components. Researchers also concluded that the programs were quite spotty in terms of arranging follow-up visits to help users progress over time. Only four of the 37 programs specified when participants should return to the program, while eight used regular e-mail reminders.

"Given the low cost of e-mails and elective scheduling, top sites could clearly improve in this area," the study concluded. " … Given that

about 50 percent of participants drop out of person-to-person health behavior change programs quickly and against clinical advice, top Web sites will need to put more efforts into preventing such drop-outs from computer-to-person programs."

Based on clinical trials with published results, HealthMedia® Inc., a behavior change provider based in Ann Arbor, Mich., contends that providing individuals with individually tailored information results in significantly better outcomes compared to offering non-tailored materials, such as generic brochures, Web sites or videos:

- 70 to 80 percent of participants recall receiving tailored materials, compared to 30 percent for non-tailored information.
- Recipients are more likely to read tailored materials completely (75 to 90 percent vs. 55 percent for non-tailored).
- A much higher percentage report finding tailored materials useful (60 to 69 percent vs. 16 percent for non-tailored).

"It's been shown over and over again that if you tailor the content of messages using psychosocial theories, you can produce better outcomes," says Jay M. Bernhardt, Ph.D., an Emory University professor of health communication who focuses on information technology. For example, in a skin cancer prevention study that Dr. Bernhardt conducted on college students, those who received personally tailored Web pages were more likely to have read the page and less likely to hold positive beliefs about tanning than those students who merely received a generic Web page.

Not all tailoring is created equal.

Obviously, one of the first keys to successful information array therapy is tailoring. Individually tailoring messages is not a new concept. It has been used successfully by real estate agents, physicians, teachers, brokers and salespersons, notes Matthew Kreuter, Ph.D., director of the Health Communication Research Laboratory at Saint Louis University and lead author of *Tailoring Health Messages*. All of these identify a client's needs through observation and inquiry, and then use that information to customize solutions.

Regardless of the medium, there are a number of different ways to customize material for individuals. We're all familiar with the common direct-mail approach of dropping a person's name into a letter with contents that are, otherwise, quite generic. Communications can also be geared to a particular sub-group, such as smoking cessation materials specifically for teens or African Americans or breast cancer information for middle-aged women. These are known as targeted communications, and they are based, according to Dr. Kreuter, upon an assumption: "That sufficient homogeneity exists among members of a demographically-defined group to justify using one common approach to communicate with all its members."

Unfortunately, people are as different as snowflakes. Dr. Kreuter contends such targeted communications cannot address important variables that affect particular individuals' health-related decisions and behaviors. A broad anti-smoking message to teenagers, for example, doesn't take into consideration such factors as whether or not a particular teen smokes, and if so for how long; whether the teen has tried to quit, and how many times; whether the teen's parents smoke; whether the teen knows anyone with lung or heart disease precipitated by smoking; teens' fears about weight gain; and teens' readiness at this particular time to try to quit.

Truly tailored communications — thanks to the power of current software programs and Web technologies — can take into account such factors to create personalized communications. The goal, says Dr. Kreuter, is to "reach one specific person, based on characteristics that are unique to that person, related to the outcome of interest, and have been derived from an individual assessment. New communication technologies have made it not only possible but practical to collect individual-level data from large populations and use that information to customize educational and behavior change materials to individuals' unique needs."

The process, says Dr. Kreuter, is similar to the way a tailor makes a custom-fitted suit. The tailor produces a suit that fits an individual only after taking measurements and asking questions about the customer's fabric, color and style preferences. Likewise, tailored health communications measure a person's needs, interests and concerns and utilize that information to customize messages and materials to fit that particular person.

Tailored materials address only those factors known to be important to an individual recipient. For example, says Dr. Kreuter, "Most smoking cessation materials address the benefits of quitting in some way or another. These benefits may

include improved health, reduced disease risk, saving money, gaining control over your life and improved physical appearance.

"But not every smoker will value each of these benefits. For some, the sole motive for quitting may be financial. For others, improved appearance. And even for those motivated by health benefits, there will be some who want to quit because they have been diagnosed with a smoking-related condition, others who want to prevent such illness and still others who want to quit to protect the health of non-smokers in their family. If it is indeed important to address the benefits of cessation in quitting materials, it makes sense to frame these benefits in the terms most salient to an individual smoker."

Assessment and reassessment

To provide such individually tailored messages, the key is conducting individual assessments, including periodic reassessments.

"One of the most common approaches is to do an assessment at the beginning and then to send out a series of what are called tailored communications over time, such as five communications to help with smoking cessation," says Dr. Prochaska. "From our perspective, we see only the first communication as tailored because otherwise, you have to assume one of two things — either people don't change, so you use the same baseline assessment for all communication, or everybody changes in the same way and at the same pace so you can use the same baseline for everybody."

Obviously, that is not the case. That's why, Dr. Prochaska says, it is necessary to re-tailor communications: "For us, it can only be considered tailored if you get a fresh, reliable, valid assessment to see how the person is progressing and gives feedback about that — where they are making the best effort and where they need to do more."

For example, the stress management program offered by Dr. Prochaska's Pro-Change company requires an individual to spend a few minutes completing an on-line questionnaire. Upon completion, the individual receives immediate feedback, including his or her current stage of change: Is the individual contemplating a change in behavior, for instance, or actually in the action phase? The feedback also includes pros and cons about the person's behaviors and attitudes, his or her level of confidence, and individually tailored strategies for change. For example, the program might suggest the person get some support from family and friends.

Suggestions might include:

"Ask someone to:

- ***Help you solve a problem that is causing you stress.***
- ***Just listen.***
- ***Give you some words of encouragement.***
- ***Take a walk with you"***

"You told us that you would do this to get support in the next week:

- ***Talk to my best friend"***

"What are some other ways you can get support from others?"

The program also includes links to sections of a Healthy Stress Management workbook and interactive activities. Pro-Change recommends that individuals revisit the site three times, with two- to three-month intervals between visits. Each time, the individual completes the assessment and gets fresh, newly tailored feedback based on his or her progress, or lack thereof.

While some online programs do not yet incorporate some of the elements we've cited, many are rapidly moving towards highly sophisticated health information array services. StayWell Solutions Online, for example, from Yardley, Pa.-based StayWell, offers an array of health content presented to encourage behavior change and health self-management. Capabilities include the ability to build a personal page centered on particular health interests and goals, including getting tailored daily health news; daily reminders, either sent to an individual's personalized Web page or via e-mail, concerning what the individual should be doing to reach a personal health goal, such as losing 10 pounds over the course of several months; health news archives; personalized health risk assessments; interactive tools; advice on managing health risks; and a health library that encompasses more than 400 common diseases, conditions and behaviors.

As with similar products, StayWell's health risk assessment tailors itself with branching logic. If you are a white male over 50, for example, you will be asked some prostate questions. But if you are an African American female, you would most likely be asked questions pertaining to breast cancer and sickle cell anemia.

Recent Developments, Future Implications for Physicians, Health Plans and Hospitals

Of course, information array therapy geared toward helping people manage their health or change their behaviors does not occur in a vacuum. "If the context is a health care setting or work site, that does influence the way people view the program, for better or worse," says Dr. Kreuter of St. Louis University. "In some ways, there is an advantage to using these approaches within a trusted and valued context, such as a doctor or hospital."

Dr. Prochaska at the University of Rhode Island agrees: "The biggest challenge is that Internet programs, in and of themselves, are not proactive. So you have to have somebody making it more proactive, such as teachers in schools and physicians or other practitioners within health care systems."

Indeed, health information arrays offer opportunities for physicians, hospitals and health plans. In an ideal world, physicians know their patients best. And physicians, health plans and hospitals are all privy to ICD-9 diagnosis and treatment codes which, in and of themselves, can begin to form the basis of tailored communications.

Recent developments and future implications for physicians, health plans and hospitals include the following:

Physicians

The doctor-patient relationship is ripe for electronic communication. Half of Internet users would like to communicate with a doctor online, according to a 2002 Manhattan Research report. Of these, half say having this option would be a factor in choosing a doctor. More than half of all physicians, 55 percent, are now recommending Web sites to their patients, according to a 2003 report by the same research firm. Another study by the firm indicates that, of the factors that increase the trust of health sites, the recommendation of a physician ranks the highest. Today Manhattan Research estimates that 253,000 physicians, or about half the nation's physicians, have electronically integrated their practices. In a study of more than 1,200 randomly selected physicians completed in March 2004, the firm estimated that 48,000 more physicians now agree that the Internet is "essential" to their practice. The applications include searching online for patient education materials and occasionally communicating with their patients via e-mail.

According to Ashley Wendus, a senior analyst at Manhattan Research, other data collected by the firm indicates that doctors believe patients with access to online information are more knowledgeable about their health care and tend to be better patients. Among the emerging trends that turned up in the firm's March 2004 study:

- E-mail communication is becoming critical to physicians. While the vast majority of physicians have integrated e-mail communications with colleagues, a growing number are using it to communicate with pharmaceutical companies, health plans and hospitals.
- Future interest continues to exist for physician-patient online communication. Nearly one-fifth of all online physicians currently communicate with their patients via e-mail. In addition, more than one-third more say they would do so in the future, assuming certain conditions are met.

For physicians, barriers to online or e-mail communication between physicians and patients include concerns about security, the volume of messages, potential liability, lack of structure, and lack of either time or reimbursement for delivering services to patients online. "Some physicians say they prefer face-to-face communication or that they don't have the time to e-mail patients," says Wendus. "Those are two of the top three reasons given by physicians who don't e-mail patients, but our research indicates the No. 1 issue is reimbursement."

"Judging from our early experience in a practice that offers secure electronic communication, e-mail gives doctors and patients more time to think," Tom Delbanco, M.D., and Daniel Z. Sands, M.D., M.P.H., of Beth Israel Deaconess Medical Center and Harvard Medical School wrote in a 2004

perspective article published by *The New England Journal of Medicine*. "Doctors and patients move closer together, and trust grows strikingly. Interchange becomes more personal, and office visits seem more efficient and less emotionally charged.

"And with time 'offline' to reflect and learn, patients appear to be better able to grasp information that is central to their care."

Earlier this year the National Institutes of Health's National Library of Medicine, the world's largest medical library, and the American College of Physicians Foundation, an ACP affiliate that represents 115,000 internists, launched their Information R_x Project. The concept: to encourage physicians to give their patients information prescriptions for a credible, trustworthy site that doctors themselves use: the National Library of Medicine's MedlinePlus, *www.medlineplus.gov*. The program provides participating internists — or any interested physician — with a poster, bookmarks and a supply of prescription pads on which physicians can write in a disease or condition and advise patients how to look up the information on MedlinePlus.

ACP Foundation Executive Director Jean Krause says this requires a change in behavior on the part of physicians. "It has to be changed," she asserts. "Eighty-five percent of the information that is given to a patient at the time of the clinical encounter is forgotten or misunderstood by the time the patient leaves the office, and of the remaining information that is retained, 50 percent of patients don't really understand it."

She points out that if her doctor told her that, based on lab results, she has type 2 diabetes, "I'm not going to hear anything after that. By giving me an information prescription, I can look up the information, do the tutorial and I'll be able to discuss it when I return to the doctor's office. It allows the patient at his or her pace to read, understand and begin to process the information. It's a natural extension of the office visit."

Pilot tests with more than 500 physicians in Georgia and Iowa found that 97 percent of the participating internists made information referrals, with 59 percent using the prescription pads for information provided by MedlinePlus. Twenty percent also reported an increase in patients bringing Internet information to their office visits.

Also, internists who participated in the pilot programs said that MedlinePlus empowers patients (54 percent), explains difficult concepts and procedures (43 percent) and improves patient-physician communication (42 percent). In March 2004 the pilot program was modified in Virginia to partner with the state's librarians as an additional resource to help patients use MedlinePlus.

"The more patients know about their own disease, the better they do and the more motivated they are to take care of themselves because they know what the goal is," says Jacqueline W. Fincher, M.D., an internist in rural Thomson, Ga., and the ACP's state project coordinator. "When I hand my patients an information prescription, I tell them, 'This is as important or more important than any medicine I just wrote for you.'

"And in terms of building a partnership between the patient and physician to help them do better, it's so important to know you're sending them to a credible Web site."

One attempt to overcome patient-physician e-mail communication barriers which incorporates reimbursements for physicians is WebVisit®, an online consultation developed by RelayHealth®, a provider of online health care communication services based in Emeryville, Calif. With secure servers, multiple firewalls and encryption, the system meets HIPAA privacy and security regulations. To prevent physicians from being overwhelmed by lengthy and disorganized e-mail communications from their patients, the Internet-based WebVisit guides patients through an interactive interview. Employing clinical guidelines and algorithms, it enables a patient to formulate a succinct, structured message to his or her doctor. To speed the response, the physician can reference the patient's online "Health Record" and, if the doctor chooses, refer to a database of 140 customizable treatment option templates to compose a response. As part of that response, the physician also can attach a prescription and/or specific medical information from a trusted third-party consumer health information publisher, such as Krames.

Nurses or other clinical team members can triage and prepare responses to WebVisit messages just as they would for doctors' office visits or telephone calls.

> "The more patients know about their own disease, the better they do and the more motivated they are to take care of themselves because they know what the goal is."
>
> — Jacqueline W. Fincher, M.D.
> Internist, Thomson, Ga.

In addition to the WebVisits, patients can renew prescriptions, schedule appointments, receive lab results, request referrals and access screened and approved self-care information. Meanwhile, physicians and other health care professionals can coordinate referrals, securely route messages to appropriate or covering providers, broadcast preventive reminders, and send appointment reminders and lab results. In order to meet HIPAA compliance requirements, the patient-physician communications can all be audited. That means every time anyone in the physician's office views a communication with a patient, the event is recorded.

While e-mail communications are not accepted by insurers as a chargeable patient service, RelayHealth's system is reimbursed by a number of insurers and employers. Its system utilizes built-in charging and the ability to collect fees online from patients. Patients are generally charged a $5 to $10 copayment — just as if they had made an actual visit to their doctor's office — which makes up a portion of the typical $25 reimbursement the sponsoring health plan or employer pays the physician for the service.

Researchers at the University of California at Berkeley and Stanford University who conducted an independent study of patients covered by Blue Shield of California concluded that WebVisits resulted in consistent, economically significant cost savings. Participants included 282 physicians, 3,688 patients and a matched control group. An analysis of claims data for a two-year period involving 5,727 patients revealed reductions in both office-based costs and total cost of care. The reduction in spending related to physician office visits was $1.92 per patient-month, and the reduction in total health care spending was $3.69 per patient-month. These reductions, the researchers said, greatly exceeded the cost of reimbursement for WebVisits, which averaged 31 cents per member-month.

Of the patients who used RelayHealth, 56 percent were female, with an average age of 38. Fifty percent of them were less likely than the control group not using RelayHealth to report having missed work due to illness, 45 percent were less likely to report having visited the doctor, and 36 percent were less likely to report having telephoned the doctor's office. Both a majority of doctors and patients found WebVisit easy to use, satisfying and preferable to an office visit for non-urgent health issues.

Meanwhile, 63 percent of the participating physicians were satisfied; those percentages rose to 87 percent of those under 45 and 100 percent for those who received 30 or more messages. In addition, 72 percent of the physicians found the service easy to use and planned to keep using the service, while 55 percent said it was easy to integrate into their daily routines.

Health plans

According to Manhattan Research, 21.9 million U.S. adults — a 94 percent increase in just the past year — are now managing their health benefits and interactions with their health plans online. Besides looking up network doctors and reading about coverage and benefits updates, consumers are researching treatment options and conducting routine customer service business, such as checking on claims or switching their primary care doctors. Consumers are also starting to take advantage of the extensive general health and drug information supplied by many health plan sites for their members.

It is all geared towards convenience, and helping members make better informed decisions about their health. A number of health insurers, such as Blue Cross and Blue Shield of Florida, are also offering their members Subimo's Web-based Hospital Advisor® program, which allows members to

compare various hospitals' success rates for particular procedures.

Some health insurance organizations are going even farther. In January 2004, Kaiser Permanente unveiled a Web site — for both members and the general public — that offers free, non-commercial access to more than 40,000 pages of physician-approved health-related information covering about 1,900 topics and 6,000 medical tests and procedures.

In addition, Kaiser Permanente, the nation's largest non-profit health plan, in July 2004 announced it was making available Web-based tailored behavior change programs provided by HealthMedia® for weight management, nutrition, smoking cessation and stress management. Kaiser Permanente offered the program to its 8.2 million members in nine states and the District of Columbia after a successful clinical trial of HealthMedia's weight management program.

"The results that we have achieved with behavior change programs over the past two years have shown high efficacy, improved health status, reduced utilization and overall plan satisfaction," said Kate Christiansen, M.D., medical director for Kaiser Permanente's Internet Services Group.

HealthMedia also provides a school-based teen health program for Kaiser Permanente. During the past year it and another client, GlaxoSmithKline, reported the results of what they said was the first clinical trial to prove that an individually tailored online smoking cessation support program increased the quitting rate of patients using nicotine patches.

"Sixty percent of Kaiser Permanente's eight million members are overweight," says Ted Dacko, HealthMedia's president and CEO. "How do you provide relevant, personalized interventions for that many people that are cost effective? There aren't enough counselors in the world, and if there were, the cost to an organization like Kaiser Permanente would involve way too much money.

"In terms of efficacy, reach and cost, this concept delivers efficacious, high-quality interventions at phenomenally low cost."

At the beginning of 2004, Highmark Blue Cross Blue Shield, which is based in Pittsburgh, also extended five HealthMedia behavior change programs — weight management, smoking cessation, nutrition, stress management and teen health — to its members. It did so after a highly successful year-and-a-half pilot program with the insurer's own employees.

The company expected 900 to 1,200 employees to participate in the programs, but during the first year 1,749 of the 9,000 employees took part. Of those who participated:

- 71 percent of the 886 participants in the weight management program reported losing weight.
- 94 percent of the 433 employees in the nutrition program improved their eating habits.
- 83 percent of the 332 participants in the stress management program reported improved stress management skills.
- 30 percent of the 98 participants in the smoking cessation program quit smoking.

"The outcomes were fantastic," says Ann Marie Kuchera, R.D., the program development strategist in Highmark's Division of Preventive Health Services. "After we got the data back it was a no-brainer to extend the program to our members."

As with their members, Highmark already had offered its employees individual counseling as well as group-based, telephone-based and self-help programs for lifestyle changes. "But we had a hole regarding Web-based programming, and people have different learning styles," says Kuchera. "Not all of us like to be part of a group or want to meet face-to-face with a counselor, and not all of us are motivated to participate in self-help programs. These programs fill that niche."

In addition, because of where they lived or worked, not all of Highmark's employees or members could take advantage of some of these other programs. "We wanted to be able to reach members in rural western Pennsylvania," she explains. Members can now access the programs through My BlueLink, their own customized home page that offers Internet access to online services and health and wellness information, including news articles, healthy recipes and health tips.

"It's low cost but high reach and efficiency," adds Kuchera. "It's much less expensive than paying for a counselor and can also be less expensive than a group-based program, but because of the tailored approach the effectiveness is almost as high as if you were meeting with an individual counselor."

In addition, the Internet access means the members can participate on their own time

from the comfort of their homes. And, in keeping with the theories of behavior change that buttress such programs, Highmark's members can access the programs when they are indeed ready to change. "Whenever people are finally ready to take that step to change their lifestyle, the programs are there for them," says Kuchera. "They don't have to wait to schedule an appointment or meet with someone; they can get started as soon as they are ready."

Meanwhile, Blue Cross and Blue Shield of Rhode Island is currently piloting with its employees — with excellent initial results — a behavior change program it has dubbed HealthMates Personal Choices. It makes available 21 different individually tailored behavior change programs from back pain to stress management and weight control. Two different vendors developed the programs: HealthMedia and Rhode Island-based Pro-Change Behavior Systems.

So far, BCBSRI's employees have been very enthusiastic: 92 percent of them enrolled in at least one of the programs. The goals are two-fold: control costs by educating members on the proper use of the health care system, and enhance the health and quality of life of its members and Rhode Island residents. Since the program began last January, two coworkers of Meg Reggner, the company's director of public relations, have each lost more than 50 pounds. "We're in the middle of transitioning from a claims processor to a health and wellness partner [with members]," explains Reggner. "We want to get people healthier and want to control costs, and one of the best ways to address affordability is to engage them in their own health care."

Hospitals

Hospitals offer patients and residents of their surrounding communities a wide range of health and wellness programs, such as smoking cessation and stress reduction programs — many of which have been, or are ideal candidates for, health information arrays.

Typical of current Web offerings, HEALTHvision, which is owned in part by the VHA hospital alliance, provides about 400 hospitals with a suite of online capabilities for members of their communities. These include tools to track key personal health indicators; interactive, self-paced improvement programs; condition-specific health assessments with personalized treatment options; securely stored health records; a health information library; and a secure physician-patient e-mail system somewhat similar to RelayHealth's WebVisit.

> "This sort of timed information can help the patient have his or her anxiety level reasonably well controlled, and that will affect the success of the surgery and follow-up."
>
> — David Anderson, Vice President, StayWell Health Management.

Hospitals also are moving forward to harness the Web's potential for linking patients and their clinical care. For example, Abington Memorial Hospital, located in suburban Philadelphia, recently received a 2004 Innovator Award for its outpatient, Web-based monitoring program for patients using the anticoagulant warfarin. The program tracks patients' warfarin doses and blood test results and identifies patients tardy in getting their critical blood work drawn. A patient portal allows patients access to their own dosing and blood work results as well as warfarin educational materials, and reminds them when to get their blood drawn.

In addition to enhancing the ability of patients and hospital-related physicians to monitor and control chronic conditions and medications, the Web holds great promise for hospitals in another area: elective surgery. Advisories that have traditionally been printed or telephoned can effectively be delivered via the Internet. This includes reminders about scheduled pre-surgical lab workups, an explanation of the procedure and what to expect, information about what to do with medications, and cautions about not eating after a certain time. This can be accomplished via timed e-mails with links to particular Web

pages or, ideally, to a secure, personal Web page. "This sort of timed information can help the patient have his or her anxiety level reasonably well controlled, and that will affect the success of the surgery and follow-up," says David Anderson of StayWell Health Management.

Indeed, the timed e-mails can continue after discharge with helpful information and a questionnaire that, depending on how the patient responds, would elicit specific, individualized instruction and information or a phone call from the hospital's clinical or support staff.

Baby CareLink offers one prime example of how hospitals are already using Web-based information programs to enhance quality of care, better educate and prep patients (and their families) and reduce costs. The program, for premature and medically complex newborns, was developed and is offered by Clinician Support Technology Inc. of Newton, Mass. Originally funded by the National Library of Medicine, Baby CareLink is now being used in various locales, both urban and rural, including Chicago, Denver and Richmond, Va. It provides a secure Web page with individual password-protected access for both mothers and fathers of infants who are hospitalized in neonatal intensive care units (NICUs). Dr. Safran says it provides a nurturing environment where parents — even those not actually in the hospital — can actively participate in decisions surrounding their baby's care.

Initially, a nurse manager provides whatever computer training is needed to ensure parents can navigate the program themselves. The parents can then monitor their babies from home, schedule visits and find medical information about their child's condition. They can monitor their babies at any time, and check frequent updates via "Daily Reports," "Doctor's Notes" and a "Baby Growth Chart." When they log on each morning, they find an updated daily clinical report, often a message from the night shift nurse and a new digital picture of their infant. Sometimes a physician or nurse will suggest a topic or information module for the parents to review, such as "giving your child a bath." Parents click on a link to that topic, which is part of a database containing some 700 newborn-related subject areas. It contains both clinical content and resources such as baby care and safety reference material.

After parents read such assigned materials, doctors and nurses review with them any questions they might have.

One area where Baby CareLink is offered is Chicago. In September 2001, the Illinois Department of Public Aid funded a pilot program involving Baby CareLink at Mount Sinai Hospital, a major teaching hospital that serves a large Medicaid population in Chicago's inner city.

During its first year, the program enrolled nearly 350 infants in Baby CareLink. Parent activity on the Web site was as follows:

- 75 percent of parents accessed the program at the hospital, while 25 percent did so from outside the hospital.
- The type of material accessed was:
  - Preparing for discharge: 39 percent
  - Welcome and home page information: 24 percent
  - Viewing digital photos of a baby: 17 percent
  - Other clinical information: 20 percent

Significantly, the length of stay in the NICU for all babies was reduced by 2.73 days compared to the same period in the previous year when BabyCare Link was not in use at Mount Sinai. Only three of 17 infants who were enrolled in the pilot program and had been born more than six months prior to the analysis had experienced a rehospitalization during that period — far less than the expected 40 percent rehospitalization rate for this population.

"By the end of two months, parents are more comfortable, confident and competent to take their small children home knowing that they are still connected to the NICU doctors and nurses," Dr. Safran explains.

Meanwhile, in a study of Baby CareLink involving 58 families at a Boston hospital, there was a 75 percent reduction in reports of quality-of-care problems. The number of families who felt there was a problem with their child's care fell from 13 percent to 3 percent.

Results of a Baby CareLink pilot project in Denver funded by Johnson & Johnson were even more dramatic. At four area hospitals, 75 percent of the parents used the program at least once. Parents who looked at an average of three or more Web pages per day took their babies home 15 days earlier than those who did not. That was true whether the parents were commercially insured or Medicaid patients.

> "The results suggest that families in crisis would embrace Internet-based tools and services regardless of their prior use of computers or the Internet, their socio-economic status, or their educational level, providing they can read English."
>
> — Charles Safran, M.D., Founder and CEO, Clinician Support Technology Inc.

With an average day in a NICU costing $3,000, according to Dr. Safran, that is a significant savings.

He doesn't claim the program is responsible for all of that 15-day stay reduction. "I believe three or four days of those days are eliminated because of programs like Baby CareLink," says Dr. Safran, who, using a football analogy, credits the results to paying attention to simple "blocking and tackling."

At a North Carolina hospital serving a mostly rural Medicaid population, more than 300 parents used Baby CareLink more than 11,000 times in a year. Common wisdom, says Dr. Safran, would suggest that Medicaid families do not have access to the Internet. But approximately 85 percent of those parents were accessing the program from home, at work, from the library or from some other public access point.

Meanwhile, at Cook County Hospital, 55 percent of parents' log-ins during the past two years came from within the hospital (using a computer in a family room or computers on wheels), while 45 percent accessed the program from outside the hospital.

"One concern we had was that this population wouldn't have access to computers, but that's not our experience," says Martha Gottlieb, head of maternal child health for the Cook County Bureau of Health Services. Regardless of how parents get to the Internet, Dr. Safran concluded in an article published in the *International Journal of Medical Informatics:* "The results suggest that families in crisis would embrace Internet-based tools and services regardless of their prior use of computers or the Internet, their socio-economic status, or their educational level, providing they can read English."

CST is also offering CancerCareLink, a similar program, for both children with lymphocytic leukemia and adults with a variety of cancers, including breast cancer, kidney cancer and melanoma. The programs are based on software CST has dubbed "collaborative healthware." The goal: to develop what it calls collaborative communities comprised of better-informed patients, physicians and nurses and informal caregivers, such as spouses, parents and adult children. Recently the Eclipsys Corporation, which provides software and service solutions to more than 1,500 health care facilities, formed an alliance with CST to offer the Baby and Cancer CareLink services, as well as a new stroke program, to its clients.

Conclusion

The U.S. Department of Health and Human Services, as we have indicated, has outlined a 10-year plan to create always-current, always-available electronic health records (EHRs) for all Americans. In the future, Dr. Safran, the head of CST, envisions everyone owning a card — similar to an ATM card — that would either contain constantly updated information or would enable the holder to access a database that contains this personal electronic health record.

Whether or not such cards become as ubiquitous as credit and debit cards is yet to be resolved. How much information that personal electronic health record will encompass — such as whether it extends to health risk data — remains in question. Clearly, however, such a health record, and a personalized health information array appropriate for a person with exactly that health record, will prove to be a valuable online tool to manage, maintain and improve health. It will benefit the individuals empowered by such information as well as those entities — whether it be physicians, hospitals, health insurers, employers or the government — with an interest in having patients exert more control and get more involved in decision-making regarding their health.

"It's only a tool in a broader integrated health management program that may involve telephonic or mail-based interventions and incentives — such as health care plans already have to encourage people to take steps to get them healthy," says David Anderson of StayWell Health Management. "But it's much more powerful than booklets and newsletters. We really haven't had such a powerful, highly personalized interactive tool that allows an individual to easily and quickly get at information he or she wants."

For example, information array therapy can easily be used to prompt an individual to get required preventive exams in a timely manner. Then, depending on the outcome of the exams, the individual can receive a series of timed information updates that can either help him or her maintain a good health status or take measures to improve.

Anderson's bottom line: "Information array therapy will become (or has great potential to become) an increasingly powerful tool to be used by both individual consumers and entities supporting them to really provide an integrated managed process to keep people healthy."

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