California HealthCare Foundation

Right Here Right Now:
Ten Telehealth Pioneers Make It Work

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About the Foundation

The **California HealthCare Foundation** is an independent philanthropy committed to improving the way health care is delivered and financed in California. By promoting innovations in care and broader access to information, our goal is to ensure that all Californians can get the care they need, when they need it, at a price they can afford. For more information, visit **www.chcf.org**.

Contents

4 Foreword

6 The Electronic House Call

8 A Norman Rockwell Kind of Doctor, v2.0

11 "Connected Health" Sees the Whole Person

13 Winning Over Employers, Patients, and Providers

15 Telepresence Throughout Scotland

17 Second Opinions—
From Cleveland to 60 Countries

19 Medical Education Without Walls

21 Meet a Nighthawk

23 The Doctor Will See You Now

26 Expert Stroke Care, Anywhere

28 Endnotes

Foreword

This series of profiles complements Forrester Consulting's 2008 study for the California HealthCare Foundation, "Delivering Care Anytime, Anywhere: Telehealth Alters the Medical Ecosystem."

The profiled organizations come to online health care from a variety of perspectives. They provide care to people in many different settings: rural towns, urban centers, remote Scottish islands, Boston, Oahu, Singapore, Chile. They use an array of communications instruments, from ordinary telephones and televisions to broadband connections and 3G-driven iPhones. They share at least two things in common—they are innovators and they have a goal of improving people's health.

These are some of the interconnected factors that have converged to enable them to do what they do, in the ways they do it:

The world is getting flat. *New York Times* columnist and author Thomas Friedman popularized this metaphor to describe the leveling of the international competitive playing field thanks to the proliferation of new technologies. The concept is as true in health care as it is in business and socio-politics. It is happening because…

Broadband technology is getting cheaper and ubiquitous. In cities, suburbs, and increasingly in rural America, broadband has become the norm for connecting to the Internet. In the developing world wireless connections have leapfrogged over hard-wiring as the basic telecommunications infrastructure. As a consequence…

Telephones have emerged as useful health care delivery tools for providers and consumers alike. Phones are smarter and cheaper than ever. The camera in today's mobile phone is more technologically advanced than a prototype that cost $12,000 just a few years ago.

Reimbursement for online care is more available. No longer do telemedicine projects have to depend on foundation grants and government subsidies to seed a start-up or underwrite operations. Medicare, Medicaid, and private payers have begun to reimburse

providers for teleconsults as the positive return on investment (ROI) has become unmistakable. Market drivers make telemedicine an obvious solution in many clinical situations.

Providers are beginning to embrace remote care. Among early adopters of online health care have been radiologists, who increasingly provide remote coverage as "nighthawk" image readers for distant hospitals operating on a 24/7 basis. Forward-looking physicians are re-engineering care processes in recognition of the benefits that accrue when efficient, high-quality medical services are accessible to patients regardless of location.

Consumers are benefiting. More enrollees in health plans and consumers who self-pay are accessing online care in innovative ways. Some have financial incentives to do so. Some are choosing new care models that fit with their time-pressed, mobile, technology-rich lifestyles. Still other consumers, especially those without health insurance, find that emerging online services give them access to care despite the lack of a regular medical home. The recent addition of "Walk-In Telemedicine Health Care" to Wal-Mart retail clinics, for example, will serve this consumer-driven market.

Home can be the center of health care. Many online care innovators predict that the patient's home will be the new hub of a person's health and health care. As people take on more financial and clinical responsibility for health, the phrase "home health care" could take on new meaning.

Jane Sarasohn-Kahn
September 2008

1. The Electronic House Call

Jay Sanders, M.D., Global Telemedicine Group

Health services:
Telemedicine; remote physician visits.

Technologies used:
Television sets; personal computers.

Lessons learned:
Resistance to change by physicians can be overcome. The patient's home is central to health.

In 1993, Dr. Jay Sanders worked with the Medical College of Georgia and Georgia Tech to develop the first home telehealth application in the U.S. The team called it the "electronic house call." They used a standard television set as the interface between the physician and the distant patient at home. In the ensuing years, Sanders has consulted on telehealth projects with providers, medical schools, the World Health Organization, NASA, the United States Air Force, the Army, and the Navy. Following are three key insights he gleaned from these experiences.

In designing the electronic house call, Sanders used the patient's TV in their home and made the program fully interactive. "The reason we wanted to use the TV was we wanted it to be totally intuitive for the person," explains Sanders. "The patient didn't view this as something 'new,' but rather, 'just my TV.'" To access the program, the patient would change the channel, find the interactive health channel, and see the doctor or nurse at 30 frames per second. "We added some medical peripheral devices that were simple to use, and a graphic interface on the screen that showed, for example, a stethoscope. We'd ask the patient to touch the icon, and that would activate the electronic stethoscope." This was the first system of its kind, and American Telecare of Minneapolis developed the second. "That's what started this industry," says Sanders.

"We wanted it to be totally intuitive for the person."

Home Is Where the Health Is

"Over the past five years there's been a realization that the exam room is wherever the patient is," adds Sanders. "As we began to examine patients in their home, it was obvious: Why do we wait for the patient with congestive heart failure to come to the hospital? If we'd been able to pick this up a week earlier we could have prevented the acute admission to the hospital. It dawned on some of us that home is where the exam room has to be."

Sanders emphasizes that providing convenience and access is only part of the benefit to having patients remain in their own setting. For examinations, "the doctor's exam room is often the wrong *place*," he says. "Taking the person's blood pressure at home where

they live and at the office where they work is a better way to assess their BP throughout the day than my taking it in my office where a patient can have 'white coat syndrome' (a higher-than-usual reading caused by the stress of being in the doctor's office)."

Sanders is convinced that medical care must migrate away from episodic or periodic evaluations to continuous evaluation—the "same way our car's dashboard continually reminds us about the engine operation."

Patients are typically more likely than their doctors to embrace telehealth programs, according to Sanders. "While the technology has evolved from boxes that we had to build, to equipment that is now available in every Best Buy and Circuit City store, we haven't been able to effectively address the resistance to change in a lot of physicians' minds."

Sanders acknowledges that technology cannot substitute for all health care delivery. Nevertheless, he says, "Telehealth does help us deal with the access challenges that currently exist."

2. A Norman Rockwell Kind of Doctor, v2.0

Sal Volpe, M.D., Staten Island, NY

Health services:
Remote physician visits; electronic medical records access; continuing medical education; e-prescribing; and alerts.

Technologies used:
Personal digital assistants (PDAs); smartphones.

Lessons learned:
The mobile phone can be a powerful tool for physicians and consumers in health care.

"Once you're used to using a tool you will want to use it for the rest of your life."

Dr. Volpe is board certified in pediatrics, internal medicine, and geriatrics. He describes himself as a Norman Rockwell kind of doctor. "Patients in our practice feel like they're on the set of Cheers," Volpe says. "Everybody knows your name." His practice prides itself on treating patients like family, and part of what makes that possible is an array of technology that is essentially invisible to patients.

Volpe has been at the forefront of the wired physician practice since he first researched practice management systems for his office in the late 1980s. His only alternative in those days was a UNIX-based system—which he found to be "rock solid," he recalls. He later moved to Hewlett-Packard handheld PDAs with QWERTY keyboards, which he used initially for billing when he made hospital rounds in the early 1990s. "You didn't have to walk around with index cards to track your visits," he explains.

Volpe was an early adopter of e-prescribing on PDAs. As he followed the trends in information technology and health care, he recognized that cellular phones were becoming more sophisticated. "It was only a matter of time before you could get a Palm-based Centrino for $100 or less, and now for just a little more you can get phones running pretty good operating systems like Windows 6.1. The Nirvana these days is the iPhone, which is running a version of the Apple computer operating system on a handheld and is incredibly powerful."

Telehealth applications have been rapidly growing in number and variety since 2006. Thomson Research estimates that almost a third of physicians had adopted smartphones in practice in 2008. TDG, a market research firm, forecasts that 70 percent of active physicians will wield Internet-enabled smartphones by 2011.

After switching to a smartphone for e-prescribing, Volpe loaded in diagnostic software including Harrison's Practice. Today he owns a Windows-based Samsung handheld smart device. "Now I can look up anything I want," he says. "I've got Epocrates and other e-textbooks." He expects before long to be able to view his appointment schedule and phone messages received at the office. But his goal is to access a complete set of EHR functions.

"You'll be able to look into the continuity of care record and, if you want, to do (virtual patient) visits with the handheld." In fact, Volpe is working closely with the New York City Department of Health to help the agency deploy EHRs throughout the five metropolitan boroughs.

Saving Time and Improving Care

Bringing the phone into the exam room with a patient can actually enhance the value of the interaction, Volpe says. He sees patients every 12 to 16 minutes. If an issue arises during the patient exam that he wants to research, he can avoid the three-minute walk to his office and the additional three or so minutes to look up the research—which would eat up 50 percent of the exam time. "With my handheld and hypertext, I can link into the Skyscape Suite or Epocrates. If I look up asthma and recommend albuterol, I can then click on albuterol and read the pharmacy description of the medication. Then I can check and see if it interacts with the patient's beta blockers. You're leaping in fractions of a second from one reference section to another. You can do a lot for a patient in a short amount of time."

Doctors can, in fact, earn CME credit at the same time. For example, ReachMD offers credit via the Apple iPhone or the iTouch. As of late 2008, there were CME courses covering a broad range of conditions, such as bipolar depression, colorectal cancer, and functional bowel disorders.

Volpe believes the most important function of the handheld is enabling drug-drug interaction checks. "We should not trust our memories; there are way too many drugs prescribed," he warns. There is even, he adds, a version of Epocrates that incorporates herbal supplement interactions. If a patient is using St. Johns wort as a substitute for a selective serotonin reuptake inhibitor (SSRI), for example, it can affect platelet function. "If a person is bleeding and you ask them if they're taking any other medicines, they may correctly say no," Volpe continues. That's because the doctor didn't ask specifically if the patient was taking any supplements. Furthermore, the physician may not in fact know that St. Johns wort can work as an anti-platelet agent.

The problem of screen size on handhelds, which has been a barrier to physician acceptance, is being addressed with the newer phone designs and software, notes Volpe. "With Opera 8.65, or the Safari browser that runs on the iPhone, you can zoom in on sections of the screen. It's not as sexy as a 21-inch screen, but you can get a lot done on a handheld device." Such productivity improvements will attract more physicians to use the instruments, he predicts.

Younger physicians are naturally embracing handhelds for health care, Volpe notes. They have generally experienced game systems such as Nintendo and Playstation, and "they're very familiar with the idea of navigating a screen by hitting certain control buttons." Today's students at medical schools have been given PDAs in their third and fourth years, as have residents in training. Phones, however, aren't yet viable as telehealth tools for all doctors, Volpe notes. "As we get older, we get presbyopia. So it's hard to look at a small screen, even with bifocals."

Cornerstone of Patient-Centered Care

Consumers, too, are adopting self-care applications on phones. Blackberry devices have offered a long list of health tools since 2006, including Epocrates' drug reference software, Skyscape's medical textbooks, and Thomson Healthcare's medical software titles. The advent of Apple's iPhone has significantly expanded the marketplace for both physician- and consumer-facing health applications.

In the future, Volpe predicts, the handheld/phone will be the cornerstone of patient-centered care in the patient's home and mobile health applications

("mHealth" in shorthand). The two market drivers for this will be adequate reimbursement for these services and broad penetration of 3G phone standards. Advanced phones will enable two-way interactions between patients and doctors, each of whom will have a handheld device with camera. The doctor and patient can talk and video-conference, and the patient can zoom in with the camera on a skin rash or other visible symptom.

In the meantime, Volpe foresees an accelerating adoption of phones in clinical practice. "Once you're used to using a tool," he says, "you will want to use it for the rest of your life. I now have one device I use as an email checker, cell phone, drug reference tool, entertainment console, and for loading audio books."

In his spare time he uses his cell phone to catch up on what his kids have been reading. You could say he is a Norman Rockwell kind of doctor, v2.0.

3. "Connected Health" Sees the Whole Person

Joseph Kvedar, M.D., Center for Connected Health

Health services:
Remote physician visits; home-based care.

Technologies used:
Internet; telephone (wired and mobile); text messaging; cameras.

Lessons learned:
Remote clinician-patient consultations can result in optimal, and often improved, health outcomes. Connected health can expand access and improve efficiencies in care delivery.

"For some conditions and procedures, if we separated the doctor and the patient we could actually improve the quality of care."

Joseph Kvedar, M.D., wanted to know if telecommunications could enhance care for skin disease patients, so he initiated research to evaluate the potential of teledermatology. The study called for patients' skin problems to be photographed and stored in a database so that clinicians could access and examine them from another location. The technology for the study consisted of a one-megapixel camera that, 14 years ago, cost $12,000, Kvedar recalls. Compared to today's technology, he says, "it wasn't as good as a camera phone." Not only did the images prove to be a good substitute for an in-person dermatologic exam, Kvedar concluded, but there was another, unexpected outcome: A physician was easily able to review 37 cases in only three hours.

The researchers "discovered an efficiency here," Kvedar says. "And it dawned on me that, for some conditions and procedures, if we separated the doctor and the patient we could actually improve the quality of care as well." But when he made that argument to the physician community, "people kicked us out of the room," he quips. Nevertheless, "we believed that we could eliminate some of the bottlenecks inherent in our health care system as it is designed now, in which the clinician drives all health care transactions. We are proposing a fundamental change in concept: The patient doesn't have to come into the office for every blood pressure check."

Kvedar bases his concept of redesign on what he calls "connected health." It is focused on a three-part value proposition: expanding access, raising quality, and enhancing efficiency. Since 1994 Kvedar has tested and grown his ideas at the Center for Connected Health, a division of Partners HealthCare, the integrated system founded by Brigham and Women's Hospital and Massachusetts General Hospital. The Center (then known as Partners Telemedicine) established a program with the two hospitals to provide second opinions to patients and physicians anywhere in the world.

At the time, there was a growing capacity challenge in the health care industry, which pointed toward the usefulness of monitoring and messaging technologies to improve case management and extend the same provider workforce across more patients. In

particular, it was important to better manage chronic illnesses like hypertension and diabetes. Kvedar and his team saw a significant opportunity to apply the strategies being developed by the Center to this problem. By extending better care into the patient's home and conserving hospital resources for the most acute and complex cases, the Center could advance the three-part access-quality-efficiency value proposition.

Two Synergistic Principles

Kvedar says that better management of patient populations is dependent on using two synergistic principles:

1. Collecting physiologic information about a patient over time keeps everyone honest, empowering the patient and clinician to make better decisions; and
2. Coaching, augmented by clear, objective, measurable data, can create behavior change over time.

The Center has applied these connected-health principles in a broad range of clinical areas including hypertension, diabetes, heart failure, weight management, and medication adherence. Kvedar's team has learned a great deal about how patients respond to different clinical prompts, health information, and resources. For example, a recent study evaluated the role of a personal text message as a daily reminder to use sunscreen. The findings were remarkable. At baseline, participants were only 60-percent adherent to their sunscreen regimen; despite daily reminders, the adherence rate *never exceeded* 60 percent.

"This tells us that some people are just not responsive to reminders," concludes Kvedar. However, he adds, after a period of six weeks, those who received *no* reminders showed adherence of only about 20 percent. Those in the group who *were* reminded achieved a persistent 60-percent compliance rate. "This indicates that 40 percent of folks *are* very responsive to simple reminders," says Kvedar. "The study gives an early glimpse into how we will need to segment our consumer/patient populations…There is no point in giving someone a technology that he or she is going to completely ignore."

The Center has launched several programs in the Partners network, as well as one with a large Massachusetts firm to help employees manage hypertension. Numerous research programs are always under way. Kvedar and his colleagues are highly encouraged by the number of patients who sign up for programs, but concerned about those who do not. "The patients who are not enrolling for connected-health programs may be the ones who need it the most," he worries. "How do we attract people to a connected-health solution? We are pretty good for patients who can use a Web browser and have an Internet connection." To address the challenge of engaging more reluctant adopters, the Center is continuing to develop mobile phone modules.

Kvedar is hopeful about the role that connected-health strategies can play in managing chronic disease and promoting access, efficiency, and quality. He warns, however, that the path to success will likely not involve new reimbursement codes for distinct monitoring services. The important thing, he says, is re-engineering health care delivery in a way that takes the whole person into account—home life and technology preferences, personal values, and motivations.

4. Winning Over Employers, Patients, and Providers

CIGNA and RelayHealth

Health services:
Remote physician visits.

Technologies used:
Internet access.

Lessons learned:
Consumers don't have to be "tech-savvy" to adopt virtual visits. Provider resistance can be overcome by proving ROI.

CIGNA WAS AN EARLY ADOPTER OF ONLINE VIRTUAL house calls as part of what it terms a "convenience care strategy." Explains Joe Mondy, assistant vice president of IT communications, "The member is going to receive an additional level of convenience. She doesn't have to wait in line for an appointment or leave work to see the doctor." CIGNA was among the first health plans in the country to reimburse physicians for remote consultations.

The online visits are powered by RelayHealth, a unit of McKesson, through a secure Web-based messaging service. To engage in online consultations with their physicians, plan members log on to a password-protected Web site and answer a series of questions about their illness and medical history. The doctor then responds online. If the physician thinks it advisable, an office follow-up visit is scheduled.

Before signing on with RelayHealth, CIGNA vetted the technology application with its own doctors to make certain only clinically appropriate cases were being treated online.

"Many enrollees with lower educational attainment have had just as good pick-up of the program."

"This isn't an email system into which you can write free-text," notes James O'Brien, CIGNA's director of product development. RelayHealth incorporates an algorithm that provides a kind of triage: If patients report symptoms that are inappropriate for the online consult (i.e., a higher than routine level of acuity or urgency), they are routed to their physician for a face-to-face appointment or, in emergencies, told to call 911.

Cost-effective Care

For employers, a positive return on investment is emerging, according to O'Brien. The $25 virtual visit is considerably cheaper than a typical office visit, and there are economies through increased productivity as well. He says the service "is more cost-effective and more cost-transparent" than conventional visits.

Patient acceptance is not automatic, cautions O'Brien. However, CIGNA found through consumer research that once an enrollee gets over the initial hump—unease in interacting with a physician online—there is a high percentage of repeat utilization. In fact, O'Brien reports, "people get comfortable quickly." To win over patients, CIGNA emphasizes the convenience of refilling prescriptions online. "Once tried, this channel for pursuing health care is very effective and clinically appropriate; furthermore, it meets the needs of today's busy workforce," he adds.

CIGNA hypothesized, when it piloted the service in California, that the earliest users would be highly educated and technologically sophisticated workforces, but over time it has found that "many enrollees with lower educational attainment have had just as good pick-up of the program," says Mondy.

The bulk of patient symptoms that prompt calls into the system are associated with low-acuity diagnoses, reports O'Brien. Primary care issues predominate, and pediatricians have been among the earliest adopters of the service. But specialists are also attracted by the ease of scheduling and e-prescribing.

A "Virtuous Cycle"

The lack of assured reimbursement, which has been a key barrier to the growth of virtual physician consults, has eased somewhat with the American Medical Association's adoption of a CPT-4 code to legitimize payment for remote interactions. CIGNA emphasizes to physicians that not only will they be reimbursed for an e-visit, but they will also benefit from the fact that the service reduces staff time on the telephone. The average cost to sign on to RelayHealth is approximately $100 a month for a physician practice. CIGNA reimburses $25 per e-visit. Therefore, if a physician handles at least four visits a month, the entire cost of the service is recovered. In addition to Web consultations, participating doctors enjoy a broad suite of efficiency-enhancing applications, including e-prescribing and refilling, e-delivery of lab test results, and appointment scheduling and referrals.

"The biggest learning we've had goes directly to the network effect issue," observes O'Brien. CIGNA expanded its four-state pilot (Arizona, California, Florida, and the Tri-State/New York region) nationwide in order to make the service more compelling to large-employer customers. As these subscribers recognize the value, more of their members will be given access to the service and therefore more physicians are expected to sign up. "This in turn will make the service more valuable to employers," says O'Brien. "It will create a 'virtuous cycle' for e-visits."

5. Telepresence Throughout Scotland

Cisco HealthPresence

Health services:
Extending clinician expertise to remote areas.

Technologies used:
The Internet; IP-enabled medical devices.

Lessons learned:
Networking technology can help scale health services to patient and clinical demand. Nodes of care should be located where the patients are: shopping malls, schools, workplaces.

MANY COUNTRIES ARE STRUGGLING WITH A GROWING imbalance between the demand for health care services and a physician workforce—particularly specialists—who are unevenly distributed geographically. The aging of the population exacerbates the problem.

Scotland faces an especially daunting challenge bringing high-quality, affordable health services to the one in five Scots who live in remote rural areas or on islands. In January 2008, the Scottish Centre for Telehealth and the National Health Service launched the world's first trial of Cisco HealthPresence, a telehealth delivery system. It was developed by the Cisco Internet Business Solutions Group (IBSG), the firm's global strategic consulting arm. The system combines video, audio, and medical information to create a virtual face-to-face experience for patients and caregivers who may be hundreds of miles apart.

The system "allows you to distribute the expertise," explains Nick Augustinos, global health care solutions director for Cisco IBSG. "You can expand the reach of specialists into remote communities." The program is based on the company's TelePresence platform, which was released in October 2006. The technology transmits life-size, high-definition images and audio. Augustinos says the result "is as immersive as an in-person meeting." Because the encounter "feels" live, he adds, it is particularly appropriate for health care delivery.

Because the encounter "feels" live, it is particularly appropriate for health care delivery.

Here Come the Pods

The trial, which will assess clinical efficacy as well as patient and caregiver satisfaction, is taking place at Aberdeen Royal Infirmary. There physicians are using the Cisco technology to monitor vital signs such as blood pressure, temperature, pulse rate, and pulse oximetry. They are also examining images from scopes that can be focused on a patient's ear or throat by an attendant working with

the patient in a HealthPresence "Pod." The Pods can be configured in a variety of ways—for example, as a fully self-contained structure that offers privacy, or as a panel that incorporates an array of medical devices and can be placed in an existing room. Pods can be located in a wide range of settings, including public spaces such as shopping malls or libraries.

Cisco is also developing new workflow processes and a business model that can scale. "We believe fundamentally that the health system does not scale fast enough or in a way that is fiscally viable," say Augustinos. "We have to be smarter in how we scale to meet demand. Financial considerations and technology allow us to challenge [conventional] health care delivery models as the world is becoming flat." The ultimate goal, says Augustinos, is to bring Cisco HealthPresence into the home. "Then," he says, "home will become an integral part of the continuum of care."

6. Second Opinions—From Cleveland to 60 Countries

eCleveland Clinic's MyConsult

Health services:
Second opinions from clinical experts; remote consulting direct-to-consumer for nutrition and other services.

Technologies used:
The Internet; telephone; electronic health records; Picture Archival Communications Systems (PACS).

Lessons learned:
Physicians can effectively cooperate when operating between community and consulting institutions. Patients and caregivers can feel comfortable providing personal health information concerning life-threatening illnesses over the Internet.

"We are the WD-40 of health care. We want to take the squeaks out of the system."

Since its founding in 1921, the Cleveland Clinic has been known for the expertise of its multispecialty group practice. In the mid-1990s, C. Martin Harris, M.D., chief information officer, began talking with his colleagues about ways to make that expertise more widely available through telecommunications. Harris outlined a series of HIT solutions he believed could provide a number of benefits: improve patient care, enhance operational efficiency, reach out to community physicians, create new knowledge, and provide people with many of the tools they need to manage their own health. The result was the creation of eCleveland Clinic, which was facilitated by an organization-wide transition from a paper-based to a digital medical record system.

Harris and his staff recognized that people were constantly faxing and emailing the Clinic for advice—in particular for second opinions concerning serious illness. Of approximately 6,000 possible diagnoses, notes Jonathan Schaffer, M.D., the questions received concerned only about 5 percent of them. Nearly all of those fell into what he categorizes as "the life-threatening, life-altering diagnosis set." To respond to this demand, the Clinic developed a second-opinion service, MyConsult. The program makes the clinicians' backup expertise available to citizens of 48 states (the exceptions are North Dakota and California) and more than 60 foreign countries. Schaffer, who also holds an M.B.A., serves as managing director.

How It Works

MyConsult has a dedicated clinical operations team led by nurses with many years of experience in the most relevant clinical areas. The nurses interface between Clinic physicians and the e-patients. The service is straightforward for patients or their providers to initiate. They register on the MyConsult Web site, complete the forms online, submit data based on the diagnostic checklist, and pay for the service (via their own credit card or their employer's benefit plan). The MyConsult staff nurse reviews the submission and assures that the patient's file is complete, then routes the case to the most appropriate consulting physician.

The consultant's opinion is published to a secure portion of the Web site that the patient can access. In 48 hours the nurse on the case contacts the patient to see if there are any additional questions to refer to the consulting physician. Once those have been resolved, a hard copy of the patient's report is sent to the patient and the responding physician(s). The consult is recorded in the Cleveland Clinic electronic medical record system and all digital images are stored in the Clinic's PACS.

The cost is reasonable, Schaffer notes, especially since the average airfare into Cleveland is $650, while an e-consult costs $565. "It's a no-brainer," he says. If an e-patient ultimately decides to visit the Clinic, he adds, there's a further payoff in that all the information about the case has already been registered in the Clinic's electronic medical record system.

Collegiality Pays Off

The MyConsult second opinions differ from the first opinions about two-thirds of the time, according to Schaffer. Sometimes it is the diagnosis that is deemed incorrect. In other cases the Clinic physician believes there are insufficient data to support a definitive diagnosis. In such instances the Clinic physician contacts the patient's community doctor to discuss the case. Almost invariably, says Schaffer, both physicians involved in these discussions have maintained a "very collegial" relationship. "We give them some specifics," he explains. "It's all based on data."

Collegiality is, in fact, a hallmark of the Cleveland Clinic, which may give the organization a competitive edge in providing second-opinion services. All of the 1,800 doctors in the multispecialty group practice are salaried. "We all have annual professional reviews and those determine our compensation for the year," explains Schaffer. "That's our key to success. If I call up somebody in infectious disease to discuss a patient with total joint problems, and if I phone someone in vascular medicine as well, the three of us work together seamlessly.

"We are the WD-40 of health care," he says. "We want to take the squeaks out of the system."

7. Medical Education Without Walls

Johns Hopkins Medicine Interactive

Health services:
Continuing medical education; remote consults and grand rounds.

Technologies used:
Videoconferencing; the Internet.

Lessons learned:
Don't assume broadband is available everywhere yet—but it can be found and used in the community-at-large, such as in cafés. Health care delivery and knowledge transfer is globalizing.

"I try to get people to stop thinking about their walls and start thinking about their community."

Located in Baltimore, Maryland, Johns Hopkins School of Medicine and Hospital are not part of a major integrated delivery system with scores of regional affiliates. Nevertheless their reach extends across the country and to places as distant as the Middle East, Asia, and Latin America. The organization has built a network of affiliations through Johns Hopkins Medicine International, a subsidiary dedicated to promoting knowledge exchange and clinical learning by linking Johns Hopkins clinicians with others worldwide. According to Director of Telehealth Alex Nason, telehealth activities going on every day in many global markets are hosted in clinicians' offices on the Baltimore campus.

JHM International offers two main types of global telehealth education: the GlobalAccess Lecture Series, in which Hopkins faculty deliver live lectures on a health topic; and Colleague Information Exchange, where physicians based overseas engage in real time with Hopkins clinicians to discuss patient cases, research, and treatment options.

These global telehealth relationships have grown organically, physician-by-physician, says Nason. Hopkins clinicians who want to reach out internationally often travel to an overseas provider site as a first step. They establish local relationships and then, after returning to Baltimore, rely on telehealth solutions to enhance and reinforce that collegial link. The Hopkins physician might make subsequent annual site visits to work with local physicians and engage in educational colloquies. The telehealth programs are "what happens in between the visits," Nason observes.

In addition to live remote patient consultations, international telehealth activities include transmitting grand rounds in various departments and telecasting lectures on a broad range of clinical topics. JHM International undertakes more than 250 video events a year at hospitals around the world. Live video-conferencing has taken many forms. In one example, a Hopkins oncologist established a virtual tumor board with an oncology program in the United Arab Emirates. Such liaisons enrich case discussions on behalf of patients.

The Bandwidth Barrier

One of the key barriers to service is inadequate bandwidth for high-speed audio and video applications in many parts of the world. Half of videoconferences require ISDN lines that many local environments lack. Limited by constraints on the receiving end, Hopkins's telehealth solutions often embody fairly simply technology. "If you look at the local environment," says Nason, "you can deliver services and not make a massive investment." In one scenario, an overseas provider who lacks the necessary bandwidth on campus might rent out a nearby Internet café with broadband access in order to host a Johns Hopkins education session.

"I try to get people to stop thinking about their walls and start thinking about their community," Nason says.

As a complement to its global medical education effort, JHM International manages hospitals in the United Arab Emirates and has affiliations in Chile, Istanbul, Lebanon, and Panama. It is now working with the health service of the Republic of Trinidad and Tobago to expand that country's infrastructure capacity for care delivery and medical education.

And, back home in Baltimore, the Johns Hopkins Hospital welcomes patients from more than 100 countries annually.

8. Meet a Nighthawk

Lawrence Sanders, M.D.

Health services:
Teleradiology coverage on a 24/7 basis.

Technologies used:
The Internet and broadband.

Lessons learned:
Round-the-clock teleradiology services can be cost-effective and can provide access in underserved areas. The only barrier to national coverage is licensure.

"Radiologists, like most physicians, want better lifestyles. We don't want to be awake at night."

Nighthawk Radiology Services started up in 2001 to fill the void for hospitals lacking 24/7 radiologist coverage. It provides off-site teleradiology, which includes both nighttime emergency department coverage and daytime subspecialty radiology coverage. The company employs American-trained radiologists who are all board-certified by the American Board of Radiology.

As of 2008, almost one in four U.S. hospitals employs the service, as do 700 radiology groups through a distributed network of image readers in the U.S., Australia, and Switzerland. Radiologists in the latter two time zones can work during daytime hours to provide nighttime coverage in the U.S.

Larry Sanders is a Nighthawk radiologist specializing in body MRI and cardiac MRI. After three years as what he calls "a traditional radiologist," Sanders left his practice in Hollywood, Florida, to join Coeur d'Alene, Idaho-based Nighthawk in 2006. He is now credentialed at 800 hospitals across the U.S. and is licensed in nearly all of the 50 states. To help with the licensure requirements for each state, Nighthawk has a large, dedicated internal staff that facilitates applications for the company's doctors. In addition to obtaining a license for every state from which a doctor receives images, he or she must go through the hospital credentialing process for each institution for which they will consult.

Five Evolutionary Stages

In the last 25 years, telehealth has changed the work of radiologists. In a 2008 article in the journal *Radiology*, William Bradley, M.D., Ph.D., described the early 1980s as the "wake up and drive to the hospital" era for off-site radiologists.[1] Each nighttime call from the emergency department resulted in at least two hours of lost sleep for the on-call radiologist.

By the mid-1980s, continued Bradley, radiologists entered the "wake up and read from home" phase. They could look at transmitted images on a video unit in their homes, but they were still roused from their beds. Stage 3 involved a "stay up at night and cover ED radiology cases internally" scenario. One radiologist

representing a group would remain on duty in a hospital overnight to read images referred there from a group of institutions. This was done via expensive T1 lines to the "mothership" institution where the radiologist was headquartered. This process was the model in the mid-1990s. Stage 4 on Bradley's timeline was the era of "outsource nighttime coverage to another U.S.-based group working at night." And this led logically to stage 5— "outsource nighttime U.S. coverage to a group working offshore (where it is daytime)."

This is the stage that has made Nighthawk's business model viable. And although the company began operations by targeting the niche of overnight radiology coverage, today its doctors study images around the clock.

Nighthawk has competition. According to the Radiological Society of North America, there are at least 41 teleradiology companies that provide nighttime coverage, daytime coverage, subspecialty coverage, or all of them. More than half of U.S. hospitals rely on an outsourced nighttime service.

Regaining Work-Life Balance

"I'm a much better radiologist than I was before, because of this model," Sanders says. "I spend less of my time commuting. There's flexibility built into the schedule I keep. I submit what days and times I want to work. I have a lot more opportunity now to structure time and schedule so I can keep up on my radiology training. When I worked six days a week at my previous job, I had no time to keep up and stay current and broad-based.

"Radiologists, like most physicians, want better lifestyles," he adds. "We don't want to be awake at night. All of us want to spend more time with our families."

Two factors will expand the opportunity for outsourced radiology: readily available technology and a limited labor supply. The technology to enable radiologists to work from home is fairly ubiquitous; most American homes have reasonably priced access to broadband cable and/or telecommunications lines. At the same time, the demand is large. Hospital emergency departments—even in remote areas—must have 24-hour coverage, and the number of specialty-trained radiologists is limited. More radiology companies are expected to move into this space to serve a marketplace where professionals will be in short supply—and where those who are in the current supply are eager for a better work-life balance.

9. The Doctor Will See You Now

Roy Schoenberg, M.D., American Well

Health services:
Virtual physician-patient consultations.

Technologies used:
The Internet and Web browser; a Web camera if available and desired; a telephone if the Internet is not accessible; software accessed from American Well online.

Lessons learned:
The traditional barriers to physician acceptance of telemedicine—medical liability and the cost and availability of technology—can be overcome.

"We have the scars from the PHR industry, so we know that you need to deliver actions, not just a remote hard drive to put some stuff in."

Drs. Roy and Ido Schoenberg started a comprehensive, Web-based "personal health management" company called CareKey in 2001, when personal health records (PHRs) were in their infancy. Five years later, they founded American Well, again pioneering in a largely unexplored market niche—this one focused on physician visits online.

American Well bills itself as the Online Healthcare Marketplace™. It offers a platform from which consumers can launch a visit to a physician remotely, pay for the visit with a credit card (if self-paying) or through a health plan, and interact with a doctor of their choice by voice, Web camera, or telephone.

"It is as simple as watching a YouTube video," American Well advertises.

The first commercial application of American Well was in Hawaii, under the auspices of the Hawaii Medical Service Association (HMSA) of Blue Cross/Blue Shield of Hawaii. The state's population is scattered across eight islands. While Oahu has significant population density (1,650 people per square mile), the state's average overall density is just 187 people per square mile—among the lowest in the nation. HMSA will deploy American Well to serve enrollees in the sponsoring plan as well as all Hawaiians without health coverage.

A Disruptive Force

When American Well's Online Health Marketplace began operation in June 2008, it stirred a flurry of media attention. Stories appeared in major news outlets including *The Wall Street Journal*, MSNBC, *USA Today*, and a host of technology and health industry media. Observers within and outside of the health care field saw the concept as a disruptive force.

With its founders' roots in the development of personal health records, American Well sees the patient visit as an information-rich encounter; diagnostic and clinical information must be recorded to enable good follow-up and care management. Thus, the company is collaborating with Microsoft's HealthVault to integrate patient

data generated through Online Health Marketplace visits into HealthVault's PHR repository. Patients can access this confidential information at a later date and provide it to their physician during a subsequent in-person visit—or the American Well physician can access the data from within the platform.

"When you are interacting with the physician inside the American Well system," Schoenberg explains, "your PHR information is presenting along with you." Schoenberg recalls from his work with CareKey, which did not include the capability to do a transaction between the patient record and the physician's, "We have the scars from the PHR industry, so we know that you need to deliver actions, not just a remote hard drive to put some stuff in."

Assembling a Physician Network

An early question for American Well was how to build a physician network that consumers could access. The company considered enrolling patients within a certain geographical area and pre-enrolling physicians in that market. Then questions arose about how to assure that participating physicians are sufficiently trained and comfortable with technology.

The company has been working with health plans to solve these issues. In the case of HMSA, all physicians who are in the plan's network are eligible to participate on the American Well platform. Enrollees can therefore access physicians in existing provider networks. As Schoenberg explains, "This brings it back in parallel with the online consumer tools of Health 2.0. You can browse a book in a Barnes and Noble store, and then you can buy the same book on Amazon. This was one of our 'aha!' moments."

Automatic inclusion of all plan physicians also lowered the barrier to physician adoption. "We have allowed physicians to step in at their own pace, to do as much consulting online as they like," says Schoenberg. "If they do one transaction, their fee for the visit appears in their bank account. The insurance and claim management system is seamlessly, transparently built into American Well." Physicians can try out the system; if they like using it, they can do more. This option could be attractive for physicians at different points in their careers, says Schoenberg.

The problem of medical liability is also mitigated by a creative plan developed with AIG, the global insurance company. The cost of malpractice insurance is folded into the reimbursement for each online visit.

Future Directions

To understand how online care will impact health plans, American Well has been working with the actuarial company Milliman, which has a long history of developing clinical care guidelines for health plans. Milliman has been studying the domains in health care that lend themselves to online care. A patient with acute chest pain, for example, should immediately go to an emergency room—whereas a person with peptic discomfort, headache, or a chronic condition may be a good candidate for online care. Milliman assisted American Well in sorting out the applicability of online care, as well as quantifying its fiscal impact on a health plan's bottom line.

Schoenberg says the future growth of the company could move in several directions. Initially, online physician visits were expected to be best suited to the relatively technology-savvy patient, perhaps a busy professional parent with young children. Paradoxically, Schoenberg says he has learned from conversations with companies and policymakers that the American Well model could positively impact,

among others, enrollees in Medicare and Medicaid plans as well. Since the Medicaid population is a significant user of crowded emergency departments, the American Well platform could, for example, provide a lower-cost and more accessible health care gateway for these enrollees.

"What we will find is that there are some unpredicted areas in health care where online care will play a role," Schoenberg says. Specifically, he believes the platform could serve as a bridge toward universal health access. "What we are humbly doing through technology is opening up the notion of getting health care for the nominal cost of one transaction," he explains. "A person without health insurance can go on to the system through the public site of a health plan that offers online care, and with an ATM card, can get in front of a credentialed, live physician." With online care technology, Schoenberg says, "we have opened up access to the health system to those who have none."

10. Expert Stroke Care, Anywhere

REACH Call, Inc.

Health services:
Telemedicine for stroke.

Technologies used:
Personal computer; Internet connection; software intelligence built into an ASP model.

Lessons learned:
Providing specialty health care services to even the remotest area is possible via generic, off-the-shelf hardware and an Internet connection.

"Dr. Hess drove into a Taco Bell, opened up the wi-fi connection, and treated a stroke victim who'd been admitted to a small rural hospital in East Georgia."

Stroke ranks third as a cause of death in the United States, after heart disease and cancer. Americans suffer some 780,000 new and recurrent strokes each year, and more than 150,000 die.

The American Heart Association/American Stroke Association (AHA/ASA) created the "Get With the Guidelines" program, which publishes performance indicators for health care providers. A key indicator for preventing deaths is the administration of tissue plasminogen activator (tPA) to patients diagnosed with an ischemic stroke within three hours of the onset of symptoms. However, only a fraction of Americans for whom it is appropriate receive tPA within that timeframe. (Close to 90 percent of strokes are ischemic—characterized by a clogged vessel.)

David Hess, M.D., of the Medical College of Georgia (MCG) in Augusta, is only too familiar with this situation. The state has one of the highest rates of stroke in the country—46th out of 50.[2] Professor and chairman of neurology at MCG, he and his colleagues had long observed that in too many instances rural hospitals in Georgia are unable to provide stroke care quickly enough in their EDs because there is no neurologist on staff. Many of these stroke patients are transferred to MCG for treatment—often too late to benefit from tPA.

Telemedicine off the Shelf

To respond to this critical problem, MCG launched what it calls its "REACH" system in 2003. This 100-percent Web-based protocol uses generic, off-the-shelf hardware to enable a neurologist and a community- or rural hospital-based physician to engage in an online consultation. All that is required of the nonspecialist is a personal computer, a mouse, and an Internet connection. The software-based intelligence is built into the Web server through which the clinicians connect. The REACH tagline, appropriately, is "Stroke Care Anywhere™."

In 2006, the system became commercially available through REACH Call, Inc. By August 2008, the program had facilitated more than 900 stroke telemedicine consults—saving an estimated

200 lives. Operational in seven states, REACH has demonstrated onset-of-treatment times that are among the fastest nationwide. Hess and his team have published this research in peer-reviewed journals such as *Stroke* and *Lancet Neurology*.

The REACH approach addresses several of the hurdles that have hampered adoption of telemedicine applications. First, the cost of hardware acquisition and maintenance is low because the turnkey service is driven by the PCs that health providers already own. As an application services provider (ASP), REACH Call has made the investment in hardware, data storage, and the Web-based tools and algorithms that power the system. Users pay on a monthly basis; the fee is fixed regardless of the number of cases they submit.

When a health system signs up for the service, it designates a "hub" institution to provide neurology consulting services to "spoke" hospitals. Each spoke hospital has installed a REACH cart in its emergency department equipped with a laptop, monitor, keyboard, mouse, and camera. The cart is battery-powered and wireless-enabled. It can be located anywhere in the ED, but is mobile. Physicians at spoke hospitals connect through the cart's laptop via a wireless communications link to a neurologist at the hub institution when they need to initiate a consult.

The system works well at the 10-bed Jenkins County Hospital in rural Georgia, according to Sandeep Agate, CEO of REACH Call. "The patient in rural Georgia has access to the same level of care" as a patient at the 400-bed academic medical center in Augusta, says Agate.

No More Nowhere

Reimbursement for telemedicine is a work in progress. Medicare has reimbursed two-way radio and video consultations since May 2006, provided there is complete clinical documentation. "Because we're a Web application," notes Agate, "we produce documentation on-demand in real time immediately after the encounter is over." The consultation can be coded as a 99244 CPT code or higher, the same as a conventional emergency department consult. "It is the same coding as if the patient were physically present," he emphasizes.

Once Medicare reimburses for a clinical service there is typically a domino effect, with commercial payers quickly following suit. In a growing number of states Medicaid programs now cover telemedical consults. However, Agate warns, "we still have a long way to go with respect to telemedicine reimbursement."

The short supply of neurologists is driving the demand for REACH Call's services, observes Agate. The need in rural areas is especially acute. He relates an incident that happened to Dr. Hess in one such area.

"If you've ever been on the road to nowhere," Agate says, "it's on Route 25 in rural Georgia, miles from everywhere. One evening, Dr. Hess, who had his laptop in his car, drove into a Taco Bell, opened up the wi-fi connection, and treated a stroke victim who had been admitted to a small rural hospital in East Georgia. After the consultation, he continued his trip. When he reached his destination, he logged on to the system to check on how the patient was doing."

While the stroke module has been REACH Call's flagship product, the company also offers a general telemedicine consultation module and plans to add treatment modules for cardiology, acute psychiatric episodes, and other acute conditions.

Recently the health service in Singapore called on REACH Call. Stroke is the third leading cause of death there, too.

The world is flat.

Endnotes

1. Off-site Teleradiology: The Pros, *Radiology*, Volume 248, Number 2, August 2008, pages 337-341.
2. Heart Disease and Stroke Statistics 2008 Update, American Heart Association.