



Putting telemedicine into practice

Improving health through remote services

Make it matter.

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An emerging requirement

The use of telemedicine in patient care is growing rapidly, with implications for hospitals, physicians, patients, and society as a whole. Once a novelty, telemedicine is becoming a more familiar experience—and even an expected option.

"Healthcare providers can no longer afford to ignore telemedicine or offer it only as a peripheral service," says Jon Linkous, CEO of the American Telemedicine Association (ATA). "Providers that don't integrate telemedicine into their delivery models are limiting patient access to the best on-demand care possible. They are also losing out to their competitors who are using the technology to improve care, reduce costs and expand their markets."¹

What exactly is telemedicine?

The ATA defines telemedicine as the use of electronic communications and information technologies to provide clinical services with participants in different locations. It places telemedicine within a broader category of "telehealth," which also encompasses non-clinical applications over distance, such as consumer outreach and continuing medical education.

Telemedicine is further defined as synchronous or asynchronous. Synchronous programs are those occurring in real-time, as in a live, two-way consult between a patient and/or their local provider and a specialist at a distant site. Whereas, asynchronous or "store and forward" distance applications, are delayed communications, such as those that transfer diagnostic images or video from one site to another for viewing in preparation for a consult. Both forms play an important role in delivering telemedicine services.

A tool, not a specialty

An important factor to consider is that telemedicine is not a separate medical specialty or end in itself, but rather a means to extend and enhance the practice of medicine. "Defining telemedicine can be difficult, but in the end, it's not about e-health, or m-health, or even telehealth; it's about health," says Harry Kim, Senior Director of worldwide healthcare strategy at HP. In fact, most reimbursement structures do not distinguish between health services provided onsite versus those provided over a distance, and they tend not to have separate billing codes for remotely delivered services.

Proof of promise

Telemedicine has tremendous potential and a demonstrated ability to expand access to medical services and deliver better care for less. Proven telemedicine applications widely adopted today include the use of live video conferencing, transmission or remote collaboration of still and video images from scopes and other diagnostic equipment, and remote monitoring.

Common examples include:

- Direct care between a patient in an underserved region and a healthcare professional in another location
- Remote consults with specialists to assist in diagnosis, provide a second opinion, or recommend and explain treatment options
- Monitoring and transmission of data—such as the transfer of X-ray, MRI, CT scans, and visible light images. Devices in the patient's home are also available to transfer information regarding blood pressure, glucose levels, electrocardiograms, or pacemaker testing to a monitoring station in a clinic, hospital, or physician's office for tracking and interpretation, thereby reducing the need for office visits and home nursing visits

Improved outcomes

While telemedicine has generally been envisioned as a supplement to traditional healthcare practices, new research finds that, in some instances, electronically delivered care can be more effective than conventional care. A recent study by the American College of Cardiology, for example, shows that patients who reported their blood pressure, heart rate, weight, steps taken per day, and tobacco use twice weekly using a web-based portal had better results than a control group that continued with repeated office visits. The Internet-based system also enabled ongoing communication that both patients and healthcare providers found more convenient.²

¹ As Telemedicine Pushes Costs Down, Its Adoption Rises, April 27, 2012, Best in UC.
http://bestinuc.com/telemedicine_pushing_costs_down/

² Study Indicates Telemedicine More Effective Than Office Visits, April 17, 2012, Best in UC.
http://bestinuc.com/study_indicates_telemedicine_more_effective_than_office_visits/

Greater access, less cost

In addition to improving outcomes and expanding access, telemedicine has the potential to reduce healthcare costs by as much as 90 percent, argues Dr. Vijay Govindarajan, Professor of International Business at the Tuck School of Business at Dartmouth University. After studying the positive impact of telemedicine in India using solutions built primarily on mobile phone short messaging service (SMS), digital cameras, and the Web, he concludes that telemedicine can play a similar role in addressing healthcare access and rising cost issues in the U.S. Medicare and Medicaid systems.³

A new dynamic

Perhaps the most promising aspect of telemedicine is reflected in its potential to change the patient-caregiver dynamic. Factors, such as the growing ubiquity of smart phones, capable of evermore powerful applications and imagery, and the entry of major manufacturers into the direct home health device market, indicate how powerfully telemedicine is transforming the way healthcare is delivered, and how it's empowering people to take greater initiative in maintaining and improving their own wellness. By giving consumers more convenient, affordable, and self-initiated choices, telemedicine brings new flexibility into the healthcare system.

With this, also comes the opportunity to further the practice of personalized medicine and better healthcare for each individual. Dr. Eric Topol, a cardiologist and Chief Academic Officer of Scripps Health, describes such a transformation in his book *"The Creative Destruction of Medicine: How the Digital Revolution Will Create Better Health Care."* Topol presents a vision of the new digital age in medicine that "will help transform the practice of medicine from a one-size-fits-all diagnosis to a movement to personalized medicine." Topol touches on the growing trend towards more personalized approaches using devices and technology to map an individual's unique health fingerprint, from monitoring devices to genetic tests, and how the data can be used to provide better, more targeted care.⁴

Telemedicine in practice

More than 10 million Americans benefit directly from telemedicine today.¹ Studies by agencies in the U.S. Department of Health and Human Services, private vendors, and assessments by the ATA of its memberships, place the number of existing telemedicine networks in the United States at roughly 200, with close to 2,000 medical institutions participating across the country.⁵

To date, clinical departments have taken the lead in applying telemedicine technologies. Radiology leads the way, with most hospitals in the country using telemedicine to assure 24/7 access to professional radiology services. According to reports and studies, almost 50 different medical subspecialties use telemedicine, with dermatology, ophthalmology, cardiology, and pathology being among the specialties growing most rapidly.

Telemedicine has also been applied to fill gaps where sharp imbalances have risen between medical needs and the availability of expertise; most notably, in the areas of:

- Tele-stroke—Lack of quick action and/or misdiagnosis of the type of stroke a patient has suffered can literally kill. Faced with a dramatic increase in the incidence of ischemic stroke in the U.S. as the baby boomer generation reaches retirement years, coupled with a scarcity of onsite neurologists, many hospitals have turned to videoconferencing telemedicine solutions to enable 24/7 consults with offsite neurologists for rapid expert diagnosis and treatment recommendations.
- Tele-behavior—The gap between the demand for mental health and behavioral services, and the limited availability of practitioners is also being addressed via teleconferencing. One such example is how pediatricians are reaching out to behavioral specialists using videoconferencing to help with diagnosis of the rising number of cases of autism and Asberger syndrome, which can be tricky to diagnose. Likewise, the U.S. military is using telemedicine to support and provide treatment for veterans suffering with post-traumatic stress disorder (PTSD). In addition to reducing the need to travel for services, videoconferencing, with its ability to cost-effectively and conveniently enable a multiple series of sessions, is proving valuable in rendering the proper PTSD diagnosis, since initially most resist presenting symptoms.

³ *Telemedicine Can Cut Health Care Costs by 90%*, April 23, 2012, Harvard Business Review blog.
http://blogs.hbr.org/cs/2012/04/how_telemedicine_saves_lives_a.html

⁴ *San Diego's Topol Named Nation's Top Physician Executive*, April 21, 2012, UT San Diego News.
<http://www.utsandiego.com/news/2012/apr/21/eric-topol-named-one-nations-50-best-doctors/>

⁵ *Telemedicine Defined*, American Telemedicine Association.
<http://www.americantelemed.org/i4a/pages/index.cfm?pageid=3333>

Telemedicine is increasingly being integrated into practices to reduce the need for nurse and/or office visits and to alert caregivers to worsening conditions to prevent unnecessary complications and trips to the emergency room. Cardiac pacemaker testing and maternal fetal monitoring are common applications that use basic phone and/or web technology to enable transmission of device or vital sign data, as well as provide the opportunity for patient check-ins to report issues and ask questions.

In addition to fairly standard telemedicine solutions, which are tailored for use by multiple practices, some large bed hospitals and others work with solution providers to develop custom telemedicine solutions to meet specific objectives and requirements. Telemedicine solutions designed for on-ship clinics, for example, enable remote diagnosis, treatment, and triage of travelers or crew who need care. The solutions provide immediate access to medical experts and can save the rather large cost of sending a helicopter to bring a patient off the ship.

Drivers of double-digit growth

While the practice of telemedicine is already well established, its use is projected to grow dramatically over the next few years. According to a technical market research report from BCC Research LLC, the global telemedicine market is expected to nearly triple—from \$11.6 billion in 2011 to \$27.3 billion in 2016, for a compound annual growth rate (CAGR) of 18.6% over five years.⁶

A number of factors are driving accelerated growth, including the need to:

- Expand access to medical care for underserved populations and regions
- Reduce healthcare costs, which continue to rise per capita, and as a percentage of GDP⁷
- Enable limited resources to meet the needs of a growing and older patient population with longer life spans

Government programs and reimbursement

Access to Meaningful Use Funds under the American Recovery and Reinvestment Act of 2009 has been instrumental in securing federal grants for initiatives that have advanced the adoption of telemedicine. Telemedicine market growth has also been driven by the implementation of the Obama administration's Patient Protection and Affordable Care Act (PPACA).⁶

The federal government has also structured Medicare and Medicaid to make telemedicine more easily reimbursable. Medicaid, which covers approximately 10 percent of the population, does not treat telemedicine as a distinct service and permits states to select from a variety of HCPCS codes, CPT codes and modifiers to identify, track and reimburse for telemedicine services.⁸ To-date, 15 states have passed laws requiring insurance companies to cover services provided via telemedicine, to be recognized as on par with face-to-face visits. There are still five more states pending similar legislation.¹ Government Healthcare IT (HIT) initiatives, including federal mandates to have electronic health records (EHRs), will further simplify and streamline telemedicine reimbursements through Medicare.

Technological feasibility

Technical advancements are also accelerating telemedicine adoption. Device innovation, the convergence and standardization of healthcare technologies, and Web-based applications are all making the implementation of remote medicine solutions simpler and less costly to implement, use, and manage.

Hardware, from mobile devices to imaging and monitoring equipment are smaller, more powerful, and less expensive. In addition to connecting to private networks and wired Internet, device support for Bluetooth wireless networks enables telemedicine to be mobile as well as distant. In 2011, for example, the FDA cleared the first mobile radiology application that allows physicians to view medical images, such as computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET), on mobile devices.⁹ While not intended to replace workstations

⁶ Global Telemedicine Market Headed For \$27 Billion, March 21, 2012, InformationWeek Healthcare.
<http://www.informationweek.com/news/healthcare/mobile-wireless/232602930>

⁷ Health Care Spending in the United States and Selected OECD Countries, April 2011, Kaiser Family Foundation.
<http://www.kff.org/insurance/snapshot/oecd042111.cfm>

⁸ Medicaid Program Information for Telemedicine, The Center for Medicaid and CHIP Services.
<http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Delivery-Systems/Telemedicine.html>

⁹ FDA Clears First Diagnostic Radiology Application for Mobile Devices, February 4, 2011, US Food and Drug Administration.
<http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm242295.htm>

and indicated for use by the FDA only when a workstation is unavailable, the application shows the shape of possibilities to come.

Industry standards

As the industry has matured, concerns about compliance with HIPAA and other regulations have lessened, as telemedicine solutions have demonstrated compliance. Barriers to interoperability have also come down as industry standards have emerged to replace proprietary solutions, such as the Digital Imaging and Communications in Medicine (DICOM) standard for distributing and viewing any kind of medical image and Health Level Seven (HL7). Any-to-any devices are also appearing on the market, which enable complete transparency across software and hardware bundles.

The Integrating the Healthcare Enterprise (IHE) industry initiative, supported by the Healthcare Information and Management Systems Society (HIMSS), Radiological Society of North America (RSNA), American College of Cardiology (ACC), American Academy of Ophthalmology, and others, also addresses the interoperability challenge for vendors by having an open and global framework for sharing health information across applications and systems in multiple healthcare enterprises. IHE Integration Profiles focus on the regional deployment of interoperable IT systems; and more than 300 manufacturers have demonstrated support for one or more IHE Profiles.¹⁰

Adoption challenges

As the healthcare industry comes up to speed and sees what can be done with telemedicine, its adoption will certainly continue to gain momentum. Large-bed hospitals that weren't considering telemedicine just a few years ago are now embarking on programs to put remote care to work for them.

As telemedicine approaches the critical mass to have a transformative effect on healthcare, the big-picture case for telemedicine is hard to refute—providers gain new sources of revenue; insurers see costs go down; and patients can choose more affordable and convenient care options.

Nevertheless, when it comes to introducing and integrating telemedicine into a specific practice at a specific hospital, in a specific healthcare network, or specific clinic or physician's office, challenges remain.

For example:

- Existing and often older infrastructures can make telemedicine solutions costly to implement.
- Payment structures may need to be adjusted so that those who pay for the telemedicine applications and infrastructure are those that benefit.
- Designing, implementing, using, and managing a successful telemedicine solution still requires informed decisions about technology, including, networks, how best to handle large data/video files, archiving, security, and compliance. Ensuring that networks can handle high-definition video over distance, and that information management policies and the storage scalability and efficiency required to retain and archive telemedicine sessions are in place, may be especially challenging for certain organizations.
- Despite progress on standardization, interoperability is likely to continue to be an issue on the organizational, regional, and national level—and certainly on a semantic level, considering how many terms each specialty and just one particular diagnosis can have—along with the continued need to support legacy image files/formats and enterprise and inter-enterprise applications, systems and networks.
- Some states don't allow doctors to practice across state lines without the proper state license.
- Reimbursement by some insurers can be difficult to obtain for certain telemedicine services.

¹⁰ Flexible Templates and Tight Integration Are Critical for Specialty EMRs, March 14, 2011, Information Management Compare.

<http://www.informationmanagementcompare.com/453-Articles/1141-Flexible-Templates-and-Tight-Integration-Are-Critical-for-Specialty-EMRs/>

Making telemedicine work

Despite the difficulties, there is a price to pay in not moving forward to integrate telemedicine into a practice. Lost opportunity costs include patients moving to providers that do offer the cost, health, and convenience advantages of telemedicine.

Indeed, a growing number of patient and consumer groups expect access to remote services. In fact, several recent lawsuits were filed (and settled out of court) against hospitals for not providing telemedicine services.¹¹

As already noted, telemedicine is a means not an end in itself, so determining how to use it must start with a clear vision of what is to be accomplished and why.

Important questions to consider:

1. What is the business case?

What is your financial model? How do you expect to get a return on your investment? What new revenues are expected? What procedures are reimbursed? What time or effort will staff save? What additional time, effort or staffing might be required? Mapping it out with these questions in mind can be an important first step.

2. What is the patient experience?

How will telemedicine increase patient satisfaction? How will the telemedicine program fit into the in-person practice? Talking to a cross-section of patients about your plans and getting their feedback early on can help avoid unforeseen issues and identify capabilities or features that might only become apparent when the system is in place.

3. How will workflow be affected?

The introduction of a telemedicine program provides the opportunity to assess existing workflow. Is now the time to make best-practice workflow improvements? Or is the objective to minimize the change to existing routines? Proactively involve people in all positions in the analysis of how their job may be affected. Find out how much time they think they can realistically allot in their existing schedules to new telemedicine services.

4. What are the specific requirements?

While knowledgeable solution providers are valuable partners in helping to determine "how" best to deploy technology, providers should have a clear understanding of "what" they want to be able to do. Considerations include: What tests or assays are needed? In what physical locations will equipment need to be placed? What health network or hospital system do you need to be able to work with? What cross-enterprise document sharing needs to be supported? What existing applications, such as a health information system (HIS) or systems, such as a picture archiving communication system (PACS) does the solution need to support? Will the existing network support the applications, or are changes to your infrastructure required?

5. How might requirements evolve over time?

Are there hospital systems or health networks where you plan to have privileges in the future? What are your plans for integration and IHE interoperability? While it can make practical sense to focus on one area of telemedicine initially, are there other specialties you will want to add in the future?

6. What types of training and ongoing support are needed?

What new skills will people need to be able to use to manage the system? How much telemedicine system downtime, if any, can you afford? Are you willing to work with multiple service providers to support different components, or would you prefer having one service provider support the entire system?

Getting started

For nearly 50 years, HP has been delivering healthcare information technology innovations. HP and its certified telemedicine software and equipment solution partners bring a first-hand understanding of converging healthcare technologies and practical experience to help medical practices of all types explore their telemedicine opportunities and options.

HP has long supplied the leading platform for HIS, with an extensive portfolio of products, solutions and relationships to help drive digital healthcare. Today's expansive HP healthcare product line provides a wide range of options to enable care providers to meet their unique telemedicine requirements today—and as the industry leader in converged infrastructure, servers, storage, and network technologies, to stay ahead of the technology curve tomorrow.

¹¹ ATA 2012: *Telemedicine Technology Creating a New Standard of Care*, April 25, 2012.

<http://www.prnewswire.com/news-releases/ata-2012-telemedicine-technology-creating-a-new-standard-of-care-148852195.html>

HP integrated healthcare solutions are designed to work together to reduce cost, effort, and time-to-implement—yet flexible enough to be tailored to fit a specific practice and its workflow requirements. Other examples of HP telemedicine solutions include Mobile Cart, eSharing software applications, Health Information Exchange (HIE) compliant, vendor-neutral archiving platforms, compatible peripherals including desktops, workstations, notebooks, thin clients, and handheld PCs, and features like antimicrobial surface coating.

In telemedicine, as in many healthcare applications, downtime is often not an option. That's why HP solutions are designed with the highest levels of reliability, security and manageability backed by world-class support. HP and its healthcare solution partners also work together to provide a single point of service and support for end-to-end telemedicine solutions.

For more information

To read more about HP telemedicine solutions and partners, please contact your HP representative, or go to hp.com/go/healthcare

Call to action

Telemedicine offers tremendous promise for a new digital age of personalized medicine. As hospitals, clinics, and physicians turn to telemedicine to cut costs, expand access, and generate revenues, they need to carefully analyze their patients' needs, their own financial model, and how telemedicine fits into their existing patient experience and workflows.

Practical solutions are available from HP today to begin to deliver and realize the benefits of telemedicine, while also building an extensible, flexible foundation for future expansion and change.

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