The Road to Telehealth 2.0 is Mobile



TELEHEALTH 2.0 - COMING SOON TO A HEALTH CARE PROVIDER NEAR YOU

The aims and goals of telehealth, which combines communications and information technologies to deliver health care at a distance, are to eliminate geographic constraints and deliver patients the right care, at the right time, regardless of location.

Telehealth as an idea and a combination of technologies has existed since the late 1950s. In 1959, clinicians at the University of Nebraska used a two-way interactive television to send neurological exams and other data to medical students.¹ Telehealth has come a long way since then, but many current systems use technology, such as fixed terminals and dedicated ISDN lines, that in today's mobile, wireless world seem antiquated. Providers accustomed to the convenience and freedom afforded by smartphones, tablets and wifi are frustrated by the requirements of tethered systems.

Interest in telehealth is on the rise because its benefits, which include greater access to providers, lower costs and higher quality care, closely align with the Triple Aim goals of health care reform. Yet, despite these benefits, the road to telehealth adoption continues to be long and steep. Barriers include everything from payer reimbursement, licensure issues and the security of protected health information (PHI), to the cost of implementing and maintaining a system. For this paper, leaders in telehealth were interviewed about their current use of telehealth as well as their plans and strategies to increase and expand its adoption. Despite the barriers, many health care organizations are forging ahead with telehealth implementations. Their offerings range from consumer online access to providers for diagnosis and treatment of common ailments such as earaches, to real-time video-based virtual consults between providers and patients, to primary care physicians' access to specialists for consultation and diagnosis.

Studies show that these programs are already saving money, and improving access to available care. But an even greater sea change is on the horizon: the spread of telehealth through mobile technology. The explosion of mobile devices and broader access to wireless connectivity, combined with the increasing acceptance of private and public cloud technologies, have created a robust and cost effective platform for a new era of telehealth. The expensive, location-dependent systems of the past are giving way to essential applications that meet the mobility needs of healthcare professionals who already use smartphones and tablets on a daily basis for many aspects of their work.

DOCTORS LOOK AROUND AND WONDER WHY THEY CAN'T HAVE ACCESS TO ALL THE INFORMATION THEY NEED FROM THEIR SMARTPHONES...

Michael Hill,

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CUMMINGS, STAN

A MOBILE-FIRST WORLD

To support the mobile work style of today's health care professionals, telehealth innovators are incorporating mobile technology into their offerings at an increasing rate. With smartphones and tablets already in the hands of 83 percent of physicians, telehealth offerings that properly support mobile devices have a huge user base ready and able to adopt them.²

A mobile-first IT strategy, the new normal for consumer and enterprise application development, uses mobile functionality to significantly enhance a product or service. A mobile-first product or service does more than make a desktop application smaller. It is designed from the outset to integrate mobile capabilities and create a new experience for users. With a mobile first approach, telehealth is evolving from the fixed video monitors and communication lines of telehealth 1.0 to telehealth 2.0, a modern mobile platform that enables new levels of information access and expertise sharing capabilities.



HIMSS Analytics 3rd Annual HIMSS Analytics Mobile Survey (February 26, 2014)

What's in a name?

As a recent American Medical Association (AMA) statement on telehealth points out, while the "definition of telemedicine, as well as telehealth, has continued to evolve, there is no consensus on the definition of either of the two terms." In addition, there are several other terms used when discussing delivery of health care at a distance including connected health, virtual health and mHealth.

So what do providers and payers mean when they use any of these terms? Many adhere to the standard definition: "The delivery of healthcare services at a distance using information and communication technology."

In the trenches, however, telehealth is just an alternative delivery mode for healthcare. "It has the same standards and the same outcomes as in-person care delivery," comments Kyle Hall, Telehealth Coordinator at The Nebraska Medical Center. As Adam Darkins, the VA's chief consultant for telehealth services pointed out at a recent conference, "[Telehealth] will be the way health care is provided. I don't think we'll call it anything. It will just be health care."³ Increasing awareness of telehealth's benefits has brought about public pressure to create policies that support cross-state delivery as well as appropriate payment systems that support reimbursement for telehealth use. Industry organizations, including the American Telehealth Association (ATA) and the American Medical Association (AMA), have called for policy changes.

In the spring of 2014, Congress joined the conversation holding a hearing on "Telehealth to Digital Medicine: How 21st Century Technology Can Benefit Patients." The hearing focused both on the promise of telehealth and the barriers to its widespread adoption. One common payment policy dysfunction is Medicare coverage for telehealth in rural areas only. As the ATA's CEO Jonathan Linkous said in a statement, "It is time to unleash the power of modern technology and allow Medicare beneficiaries, regardless of whether they live in a rural area, underserved inner-city, in a clinic or at home to be eligible to receive the benefits of telehealth."⁴

Steven Levine, MD, a professor of neurology and emergency medicine at SUNY Downstate University Hospital of Brooklyn, echoes this view that coverage for telemedicine is needed as much for urban as rural patients. Levine, who studies the use of telemedicine for stroke patients notes, "Have you ever driven in New York? Time to treatment is just as critical for patients who live in cities where traffic can cause delays. The urban versus rural difference in reimbursement policies is an artificial distinction."

In May 2014, the AMA released guidelines to support the "appropriate coverage of and payment for telemedicine services," including uniform compensation for professional services whether they are delivered via telephone, fax, email or real-time audio and video technology.⁵

To address licensing for providers who treat patients across state lines, the Federation of State Medical Boards (FSMB) has drafted a model law that would allow providers to practice in multiple states. The FSMB's interstate compact would have a significant impact on access to care for rural patients. California providers located in the state's urban centers, for example, would be able to treat both the state's own rural population as well as rural patients in the neighboring states of Oregon, Nevada and Arizona. FSMB's compact is a start towards a solution that meets the needs of modern telehealth practices.

Together, these announcements and statements all point towards the policy foundation that telehealth needs for broader adoption. STROKE PATIENTS TREATED AT TELESTROKE HOSPITALS HAD A SIGNIFICANTLY LOWER MORTALITY RATE THAN THOSE TREATED AT NON-TELESTROKE HOSPITALS, WITH THE SAME COST OF CARE.

> University of Arkansas for Medical Sciences - 2013 study conclusion

While policy evolves, industry-leading organizations continue to move ahead with telehealth innovation. "We know that telehealth saves lives and we're all impatient with the political bottlenecks," explains Michael Hill, MD and professor of clinical neurosciences, community health sciences, medicine and radiololgy at the University of Calgary.

When addressing reimbursement issues, provider perspectives vary significantly. Many see reimbursement as a real and current barrier to telehealth implementation. At SUNY Downstate Medical, expansion of telehealth beyond its current use for stroke patient care depends on reimbursement. "We need a sustainable model. Put telehealth into a financial model and it's a new world," explains Levine.

UPMC's (University of Pittsburgh Medical Center's) extensive telehealth program offers patients the option of virtual visits through its on-line platform called UPMC AnywhereCare. "Our program is not focused primarily on making money,rather we are committed to offering patients access to high quality, lower cost care and to developing new models of care delivery utilizing advances in technology," comments Natasa Sokolovich, executive director of telemedicine at UPMC. The virtual primary care visits also save the health system approximately \$86.60 per episode of care compared to an emergency department, urgent care or in-person primary care physician visit. ⁶

Evidence of telehealth's ability to lower costs is increasingly well documented. Through over 1.7 million telehealth care interactions for over 600,000 patients, the U.S. Department of Veterans Affairs (VA) has amassed a good deal of research on cost reduction. Its Home Telehealth program reduced bed days of care by 59 percent, saving \$2,000 per patient per year.⁷

In addition to cost savings, telehealth can also provide a backbone of connectivity that is essential for patient care coordination. Consolidation of health care organizations into integrated health systems is increasing, creating a need for systems and technology that allow providers to share patient information and access specialists within their networks.

Overall, virtual visits using telehealth technology are expected to continue on a high growth trajectory. A recent report from Deloitte predicts that almost one in six interactions with physicians in the U.S. and Canada will be through virtual visits. The report points to mobile technology as a key driver for this growth. ⁸ WE KNOW THAT TELEHEALTH SAVES LIVES AND WE'RE ALL IMPATIENT WITH THE POLITICAL BOTTLENECKS

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TELEHEALTH ADOPTION LAGS BEHIND BENEFITS

Despite evidence of telehealth's cost benefits and increased levels of patient satisfaction, surveys consistently show a relatively low rate of adoption. According to a Health Information and Management Systems Society (HIMSS) 2013 survey of 4,727 hospitals, 34 percent of rural and 32 percent of urban hospitals offered telehealth services. Data from a 2012 American Hospital Association (AHA) survey shows a slightly higher rate of use: 42 percent of 2,891 hospitals surveyed said they had telehealth capabilities. The HIMSS survey digs a little deeper into actual use of telehealth whereas the AHA survey asked only about telehealth capability, which explains some of the differences in results. ⁹

While the HIMSS data doesn't show large differences in adoption between urban and rural hospitals, it does show a difference in how telehealth is used. Urban hospitals' top disciplines using telehealth are cardiology/stroke, neurology and obstetrics. At rural hospitals, the greatest uses are in radiology and emergency and trauma care. Overall, for both rural and urban providers, radiology tops the charts at a 15.7 percent adoption rate.

TELEHEALTH ADOPTION RATES BY DEPARMENT/APPLICATION

Radiology	15.7 %
ER/Trauma Care	7.5 %
Cardiology/Stroke	6.8 %
Psychiatry	3.5 %
Critical/Intensive Care	3.3 %
OB/NICU	3.2 %



DRIVING ADOPTION WITH TELEHEALTH 2.0

Forward-thinking HIT professionals are looking at mobile telehealth applications to be the bridge to wider adoption, in part because today's caregivers use both smartphones and tablets at a very high rate. "More and more often, you see doctors carrying around smartphones and tablets at work," comments Levine of SUNY Downstate. Mobile technology is used to look up both patient information and non-protected health information on a regular basis, and they offer the perfect combination of information access and communications in a form that meets the mobility needs of health care settings.¹⁰ "Doctors look around and wonder why they can't have access to all the information they need from their smartphones," comments University of Calgary's Hill.

Health care professionals' rapid global adoption of mobile technology prompted a study from the Boston Consulting Group to describe smartphones and tablets as "the most popular technological development for providers since the invention of the stethoscope." ¹¹

With mobile already integrated into many aspects of their daily workflow, it makes logical sense that providers want mobile support for clinical telehealth applications as well. Virtual imaging is one area where providers are extending their use of telehealth to mobile. Providers across the country have started integrating smartphone and tablet-based virtual imaging with telestroke, a telehealth discipline that benefits significantly from the extension to mobile.

Telestroke has been in use for almost two decades and studies show that it is highly effective in saving lives. Stroke care is extremely timesensitive and minutes can mean the difference for patients between recovery and permanent disability, and even death.

"When I'm called in on stroke cases, I run from the parking lot to the ER," explains University of Calgary's Hill. Without a telestroke option, patients in rural areas or in underserved urban areas spend vital, life-saving minutes traveling to get specialist care. A 2013 study from the University of Arkansas for Medical Sciences concludes, "Stroke patients treated at telestroke hospitals had a significantly lower mortality rate than those treated at non-telestroke hospitals, with the same cost of care." ¹²

FROM TELEHEALTH 1.0 TO MOBILE, INTEGRATED TELEHEALTH 2.0

Traditionally, telehealth has been defined as a set of three applications or technology areas: video conferencing, store and forward and remote patient monitoring.

Video Conferencing

Video conferencing uses audio/ visual technology to provide realtime consultations between providers and patients in different locations. For reimbursement purposes, video conferencing can take the place of an in-person face-to-face consultation to establish a provider-patient relationship.

Store & Forward

Store and forward is essentially secure email. In closed point-to-point systems that use fixed terminals and ISDN lines, store and forward is a way to send an image for provider to view at a later time. For telehealth applications that use the open platform of the Internet, store and forward becomes secure email.

Remote Monitoring

Remote patient monitoring (RPM), also called homecare telehealth, is a type of ambulatory healthcare that allows a patient to use a mobile medical device to perform a routine test and send the test data to a healthcare professional in real-time.

MOBILE PLATFORM OF TELEHEALTH 2.0

Add mobile technology into this mix and the distinctions between these three application 'buckets' begin to blur. For example, a smartphone or tablet can be used for both remote monitoring and video conferencing. With mobile technology, proprietary store and forward systems are essentially eliminated.

Instead of being a series of separate, distinct technologies and applications, telehealth 2.0 is a foundation of modern technologies, including mobile tools and the cloud, which integrate all elements of patient care.

In a 2009 article, SUNY's Levine and two colleagues proposed an updated version of telestroke they call Telestroke 2.0. One of the key factors for modernizing telestroke is mobility, or site independence. The authors propose a web-based system to allow "consults to be conducted from anywhere at anytime so long as the consultant has access to the [web]." This flexibility accelerates response times by eliminating delays created by getting to a workstation, and enabling consults to view neurological images of stroke patients from anywhere in a hospital, office, home or even on the road.¹³

Five years later, this vision of integrating mobile with telestroke systems is making inroads into telehealth strategy and planning. Using a combination of tablets, cloud-based tools and virtual image viewing software, innovative organizations are adding mobile image-viewing to their telestroke and other telehealth implementations.

TELEHEALTH 2.0 AT WORK IN NEBRASKA

A recent pilot conducted by Nebraska Medicine showed how mobile devices can support the speed and quality required for telestroke image-viewing. For the pilot, Nebraska created a unique, virtual imaging platform using iPads, virtual imaging software and cloud technology. The telestroke pilot, run in partnership with Faith Regional Health Services of Norfolk, NE, provided stroke specialists at Nebraska with remote, mobile access to stroke patient images.

The pilot's resulting metrics were impressive. In 25 plus exams, image access from the cloud-based server to the iPad tablet were viewable with no compatibility issues and 100 percent uptime. The providers in the pilot described the images as "excellent," according to Kyle Hall, Telehealth Coordinator, Nebraska Medicine. The server-based solution does not transfer a single byte of personal health information to the tablet, making the entire system fully compliant with the Health Insurance Portability and Accountability Act (HIPAA). The IT footprint of the pilot's technology is lightweight and virtually support-free. Providers self-administer the image-viewing software on the iPad and the cloud-based virtual image server has no installation needs. The piloted system also saves money: Calculations by Hall showed that using an iPad instead of a laptop results in 75 percent savings in support and software costs over a 4-year period.

Results on download speeds for Purview (powered by Calgary Scientific's ResolutionMD[®]), the cloud-based virtual image service used in the pilot, were faster than using a teleradiology client on an iPad (Aycan Mobile), another cloud-based imaging solution (MIM Software) and a virtual private network (VPN).

DOCTORS AREN'T CHAINED TO THEIR COMPUTERS ANYMORE AND NOW CAN QUICKLY AND SECURELY ACCESS TIME SENSITIVE INFORMATION FROM ANYWHERE AT ANY TIME WITH THEIR MOBILE DEVICES. THE DOCTORS ARE HAPPY, BECAUSE THEY HAVE THE MOBILE TOOLS TO HELP PROVIDE THE BEST CARE POSSIBLE.

Kyle Hall Telehealth Coordinator Nebraska Medicine

TELEHEALTH 2.0 AT WORK -U.S. DEPARTMENT OF VETERANS AFFAIRS

The U.S. Department of Veterans Affairs (VA) operates the nation's largest integrated health care system, with more than 1,200 hospitals, clinics, community living centers, domiciliaries, readjustment counseling centers, and other facilities. In May of 2014, the VA announced plans for an enterprise image-viewing solution to provide VA clinicians with secure, on-demand access to radiological images across a variety of mobile and desktop devices. The VA selected Calgary Scientific's ResolutionMD® to integrate into their industry-recognized mobile health system. The solution will help the VA improve care by accelerating and improving diagnosis and treatment, strengthening collaboration, and expanding telehealth options.

"The VA is a leader in the use of mHealth technologies to connect patients and health care services anywhere, changing the traditional facility-based healthcare model," said Dr. Wyatt Smith, vice president at Agilex, a developer and integrator that was awarded a contract for its image-viewing system. "By applying this same model for clinicians, diagnostic images will become more readily accessible, improving clinician efficiency and care quality." ¹⁴



TELEHEALTH 2.0 AT WORK - INTERMOUNTAIN HEALTHCARE

In 2013, Intermountain's Geoff Duke managed an enterprise-wide implementation of a vendor-neutral image storage system and web-based viewer. This massive project, which includes millions of images, gives each of its 22 hospitals and 185 clinics a common image storage and access platform. Intermountain's providers now have web-based viewing access to millions of images, no matter what system originates them, from a single interface.¹⁵ The system also makes it easier for providers to integrate images into electronic health records and share images with other health care providers as well.

Intermountain successfully integrated Calgary Scientific's ResolutionMD[®] into their proprietary EMR and connected to 8 data archives. The archives were comprised of 7 PACS and a VNA from a number of different vendors. The enterprise viewing solution leverages their current architecture and does not add another storage location as a virtual database system is created that eliminates the need to copy or move data. All clinicians now have access to one enterprise viewer and have gained a platform for multi-user collaboration and mobile access with diagnostic capability.



Intermountain's enterprise-wide viewing platform serves 10,000+ clinicians

comprised of 2 VNAs and 7 PACS

TELEHEALTH 2.0 AT WORK - MAYO CLINIC

In 2012, the Mayo Clinic conducted a study that incorporated smartphones into a telestroke network, which includes "hubs" with specialist expertise that connect to "spoke" clinics and hospitals that do not have inhouse stroke expertise. The study compared brain CT scan interpretations conducted using a Picture Archiving Communications System (PACS) and mobile image-viewing software on a smartphone. Radiologists at Arizona's Yuma Regional Medical Center reviewed the images and their reviews were studied for agreement or differences. The results showed a strong level of agreement between reviews whether conducted on the smartphone or the PACS viewer. ¹⁶

"Smartphone are ubiquitous, they are everywhere," explained Bart Demaerschalk, MD, professor of neurology and medical director of the Mayo Clinic Telestroke in a video about the study. "If we can transmit health information securely and simultaneously using video conferencing capabilities for clinical assessments, we can have telemedicine anywhere." ¹⁷

A subsequent Mayo Clinic study showed that accessing patient images on iPads running image-viewing software is actually six times faster than using a high-resolution PACS viewer or a desktop image viewer developed by the clinic. Along with the faster access times, the iPad image-viewer provided better or comparable diagnostic confidence and ease of use and presented fewer technical issues than either of the other viewers.¹⁸



Mayo study used mobile devices to reduce time to access images

MAKING IMAGE ACCESS MOBILE: PROVIDER LEARNINGS

The providers interviewed for this paper are planning for or piloting mobile or virtual imaging platforms that allow providers to view images and in some cases diagnose using smartphones or tablets. In their explorations and development, they describe common requirements for mobile image viewing systems. These include FDA clearance for diagnosis; scalable architecture for fast, reliable, image viewing; HIPAA compliance and high Protected Health Information (PHI) security; low IT footprint and ease of use.

FDA Class II clearance for diagnosis.

An image-viewing application that has FDA Class II accreditation for diagnosis has been through the rigorous testing processes of the FDA. The assurance of FDA accreditation is critical because it is impossible to predict when or if an application will be used for diagnosis or treatment. With FDA accreditation, providers can be assured that an application has met stringent standards for both safety and effectiveness.

Scalable architecture for fast, high quality image viewing.

In every health care setting there is a need for the image-viewing application to display images quickly, with a high level of quality and without interruption. To ensure consistent viewing response times, it is important to deploy a system that has a scalable architecture and can meet the demand for fast access to 2D and 3D images, in any sized health setting.

HIPPA compliance and PHI security.

Mobility increases security risks significantly for health care providers. Health IT departments must impose strict security protocols to ensure HIPPA compliance and keep PHI secure. Applications that access PHI must be designed at the outset for security. For example, imageviewers must be architected to view patient images on a smartphone without transferring any data to that device. Once the viewing session ends, access to the PHI should end as well.

Low IT footprint.

Smartphones and tablets have very limited support needs. Software installation and version control for mobile technology is completely self-administered, and providers with smartphones and tablets are already well-versed in how to install and update an application. In the area of user support, mobile technology can decrease the burden on health IT departments.

The server corollary to self-administered software is the cloud, which also has very low requirements for IT support. Cloud-based services have no installation or updating requirements, no compatibility issues and can expand according to customer needs. Storage services, for example, can grow to meet increased storage needs without requiring any capital investment by the customer.

Ease of use.

If an application is hard to learn and use, its potential benefits are significantly lessened. Ease-of-use must be a central factor in the design of any patient care application as stopping to figure out what button to push is a burden too great to impose on working providers.

TELEHEALTH 2.0 - JUST A CLICK AWAY

While a number of leading health care organizations are embracing powerful new technologies and building mobility into telehealth offerings, providers have a long way to go before mobile health care applications are common place. Technology advancements aside, it may well be the demands of smartphone and tablet users—whether health care professionals or consumers—that become the catalyst for broad mobile health care delivery and the realization of telehealth 2.0.

Just as mobile technology empowers consumers, it also makes the clinical work of providers more effective and efficient. Doctors do not sit at desks; the very nature of patient care is mobile. Healthcare organizations that have extended telehealth to mobile devices improve the ability of providers to get high-quality care to patients.

"Mobile access takes away the pain of the after-hours consult and allows me to participate using my mobile device from wherever I am. Using mobile access to patient images makes my knowledge, skills and experience accessible to my trainees, referring providers and patients much more readily and effectively," says Jason Helvey, MD and neuro radiologist at Nebraska Medicine.

The power of mobile technology with its always-on applications has had a profound impact on many industries, and its potential impact on an industry as diverse and complex as healthcare is equally limitless. In many ways the benefits realized by mobile access to information and expertise is ideally suited to the needs of health care. Applications such as telestroke, that integrate mobile image-viewing capabilities, have been proven to save valuable minutes in accessing images, thereby cutting the time it takes to begin diagnosis. It would be hard to find a greater industry benefit than the provision of quicker care when time is most crucial.

The combination of proven telehealth benefits, the ubiquity of mobile devices and emergence of cost effective technology platforms is pushing health care toward a tipping point. On the other side is telehealth 2.0 - telehealth applications extended to mobile devices for all areas of patient care.

ABOUT BLUEPATH HEALTH

BluePath Health is a California-based consulting firm that partners with government agencies, public health organizations, health IT companies, providers and payers to develop policies and strategies that improve the delivery of patient care and build community health. For more information visit bluepathhealth.com.

ABOUT CALGARY SCIENTIFIC INC. AND RESOLUTIONMD®

Calgary Scientific is the global leader in web and mobile diagnostic medical imaging solutions and collaboration enablement technologies. Their diagnostic medical-imaging software, ResolutionMD, enables doctors to securely view patient images and reports from a wide variety of computers and mobile devices, collaborate with other practitioners and diagnose from any location. Whether you are a single facility or a large healthcare system with tens of thousands of users, ResolutionMD is the best choice for seamless image access across multiple departments. The FDA cleared, CFDA certified, Health Canada licensed and CE marked mobile medical diagnosis software can be integrated into any EMR and easily plugs into existing distributed storage systems. ResolutionMD's federated approach is an important differentiator from other solutions as highly sensitive data is never moved to a device and no additional data storage locations are created. ResolutionMD is published in 11 languages and is currently installed in leading healthcare institutions around the world via a network of more than 45 world class healthcare partners.

For more information on ResolutionMD, please visit our website or access our self-serve demo.

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