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Telemedicine is Transforming Health Care

Health care as we have traditionally known it is about to become high tech and one of the most significant and rapidly growing components is already changing the way hospitals and care facilities approach patient care. Telemedicine is changing the face of health care in the U.S. There are currently about 200 telemedicine networks, with 3,500 service sites in the U.S. Nearly 1 million Americans are currently using remote cardiac monitors and in 2011, the Veterans Health Administration delivered more than 300,000 remote consultations using telemedicine. More than half of all U.S. hospitals now use some form of telemedicine.

What is Telemedicine?

Formally defined, telemedicine is the use of medical information exchanged from one site to another via electronic communications to improve a patient’s clinical health status. Telemedicine includes a growing variety of applications and services using two-way video, email, smart phones, wireless tools and other forms of telecommunications technology.

Starting more than forty years ago with demonstrations of hospitals extending care to patients in remote areas, the use of telemedicine has spread rapidly and is now becoming integrated into the ongoing operations of hospitals, specialty departments, home health agencies, and private physician offices, as well as consumer’s homes and workplaces.

Telemedicine is not a separate medical specialty. Products and services related to telemedicine are often part of a larger investment by health care institutions in either information technology or the delivery of clinical care. Even in the reimbursement fee structure, there is usually no distinction made between services provided onsite and those provided through telemedicine and often no separate coding required for billing of remote services. One of the industry’s largest trade organizations, the American Telemedicine Association (ATA), has historically considered telemedicine and telehealth to be interchangeable terms, encompassing a wide definition of remote health care. Patient consultations via video conferencing, transmission of still images, e-health including patient portals, remote monitoring of vital signs, continuing medical education, consumer-focused wireless applications and nursing call centers, among other applications, are all considered part of telemedicine and telehealth.

What Services Can Be Provided By Telemedicine?

Sometimes telemedicine is best understood in terms of the services provided and the mechanisms used to provide those services. Here are some examples:

Primary care and specialist referral services may involve a primary care or allied health professional providing a consultation with a patient or a specialist assisting the primary care physician in rendering a diagnosis. This may involve the use of live interactive video or the use of store-and-forward transmission of diagnostic images, vital signs and/or video clips along with patient data for later review.

Remote patient monitoring, including home telehealth, uses devices to remotely collect and send data to a home health agency or a remote diagnostic testing facility for interpretation. Such applications might include a specific vital sign, such as blood glucose or heart ECG or a variety of indicators for home-bound patients.

Such services can be used to supplement the use of visiting nurses.

Consumer medical and health information includes the use of the Internet and wireless devices for consumers to obtain specialized health information and online discussion groups to provide peer-to-peer support.

Medical education provides continuing medical education credits for health professionals and special medical education seminars for targeted groups in remote locations.

What Delivery Mechanisms Can Be Used?

Networked programs link tertiary care hospitals and clinics with outlying clinics and community health centers in rural or suburban areas. The links may use dedicated high-speed lines or the Internet for telecommunication links between sites. ATA estimates the number of existing telemedicine networks in the United States at roughly 200, providing connectivity to more than 5,000 sites.

Point-to-point connections using private high speed networks are used by hospitals and clinics that deliver services directly or outsource specialty services to independent medical service providers. Such outsourced services include radiology, stroke assessment, mental health and intensive care services.

Monitoring center links are used for cardiac, pulmonary or fetal monitoring, home care and related services that provide care to patients in the home. Often normal land-line or wireless connections are used to communicate directly between the patient and the center although some systems use the Internet.

Web-based e-health patient service sites provide direct consumer outreach and services over the Internet. Under telemedicine, these include those sites that provide direct patient care.

continued on page 27
What Are the Benefits of Telemedicine?

Telemedicine has been growing rapidly because it offers four fundamental benefits:

**Improved Access** – For more than 40 years, telemedicine has been used to bring health care services to patients in distant locations. Not only does telemedicine improve access to patients but it also allows physicians and health facilities to expand their reach, beyond their own offices. Given the provider shortages throughout the world – in both rural and urban areas – telemedicine has a unique capacity to increase service to millions of new patients.

**Improved Quality** – Studies have consistently shown that the quality of health care services delivered via telemedicine are as good as those given in traditional in-person consultations. In some specialties, particularly in mental health and ICU care, telemedicine delivers a superior product, with greater outcomes and patient satisfaction.

**Cost Efficiencies** – Reducing or containing the cost of health care is one of the most important reasons for finding and adopting telehealth technologies. Telemedicine has been shown to reduce the cost of health care and increase efficiency through better management of chronic diseases, shared health professional staffing, reduced travel times, and fewer or shorter hospital stays.

**Patient Demand** – Consumers want telemedicine. The greatest impact of telemedicine is on the patient, their family and their community. Using telemedicine technologies reduces travel time and related stresses for the patient. Over the past 15 years study after study has documented patient satisfaction and support for telemedical services. Such services offer patients the access to providers that might not be available otherwise, as well as medical services without the need to travel long distances.

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**MEDICAL TECHNOLOGY MEETS SUPERSTAR SUPERCOMPUTER**

In 2011, a supercomputer named Watson famously competed on the game show Jeopardy!, beating out former mega winners Brad Rutter and Ken Jennings. Watson, named after IBM founder Thomas J. Watson, was built for the competition by a team of IBM scientists who set out to accomplish a grand challenge – build a computing system that rivals a human’s ability to answer questions posed in natural language with speed, accuracy and confidence. With that accomplishment, the uses for this futuristic computer began expanding. For more than a year, IBM partnered with WellPoint and Memorial Sloan-Kettering Cancer Centers to train Watson in the areas of oncology and utilization management. During this time, clinicians and technology experts spent thousands of hours “teaching” Watson how to process, analyze and interpret the meaning of complex clinical information using natural language processing, all with the goal of helping to improve health care quality and efficiency. And in February of this year the first commercially based products based on Watson for medical usage were unveiled. These Watson-based systems are designed to assist doctors, researchers, medical centers, and insurance carriers, and ultimately enhance the quality and speed of care.

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Telemedicine Security and the Malware Industry

Telemedicine, the practice of electronically connecting geographically separate doctors, patients, and other elements of health care delivery, is not new; but it’s now growing faster than ever before. Interestingly, the same can be said for another industry, one about which many medical professionals know surprisingly little: malware.

A. Historic lack of focus on security within telemedicine.

The systematic review of telemedicine literature published in 2011 by Garg and Brewer made it pretty clear that the sector was not yet living and breathing security in the way it must if it wants to survive exposure to the malicious elements that will eventually attack it. “There is a dearth of standardization in telemedicine security across all chronic illnesses under study. It also appears that many telemedicine researchers are unfamiliar with the field of security in general.”

B. The sad state of health care security in general. You need look no further than the Ponemon Institute’s Third Annual Benchmark Study on Patient Privacy & Data Security, published in late 2012, to know that all is not well: “Health care organizations seem to face an uphill battle in their efforts to stop and reduce the loss or theft of protected health information (PHI) or patient information…. The consequence of not having adequate funding, solutions, and expertise in place is clear. Since first conducting this study in 2010, the percentage of health care organizations reporting a data breach has increased and not declined.”

During the rollout of the HIPAA privacy and security rules a decade ago, I had the pleasure of working with Dr. Larry Ponemon and know that he does not jump to conclusions or make casual assessments. The above is his considered opinion, and it is a chilling one when you flesh it out with statistics like the percentage of organizations in the study that had at least one data breach in the past two years: 98 percent. Indeed, the average number of breach incidents for each participating organization in the past two years was not one or two, but four. Clearly, the existence of a framework of privacy and security regulations and fines has not forced health care institutions to do a stellar job of protecting patient data.

C. The emergence of the malware industry. While factors A and B would be bad news enough for telemedicine, the third factor, the emergence of a sophisticated malware industry, is perhaps the scariest. Why? Because it is not yet on the radar of enough people in the world of health care IT.

In recent years, we have entered a new phase of digital malfeasance, in which all of the elements you need to rip off people and companies, from malware to mules, are available to rent or buy. For those not familiar with the jargon of this thriving underworld that exists just below the surface of the web, malware is malicious code, the software that infects and suborns digital devices, from desktops to smartphones, laptops to tablets, card readers to web servers. Mules are the people who turn fake credit cards into cash, like the $45 million that was taken from ATM machines around the world earlier this year, in a matter of hours.

Thanks to these markets, and the natural processes of specialization and division of labor that they foster, the people who write the elements of malicious code – the droppers, bootkits, rootkits, keyloggers, exploit packs, DDoS modules, spam modules, obfuscators, packers, and injection scripts – have been able to focus on what they do best, then sell their wares and services to the highest bidder, in most cases with very little risk of detection, lone prosecution. That means new exploits can be developed and deployed quicker than ever.

As soon as they figure out how to profit from compromising the massive amounts of data flowing through telemedicine systems, the bad guys will attack that “market” with the same vigor we have seen in their exploitation of the banking system, retailers, telemark operators, and just about any business that handles a lot of money. The fact that, in the case of telemedicine, malware-based attacks may put people’s lives at risk will pose no impediment to the perpetrators.

Conclusion

As a big fan of technology, I can see the enormous benefits to people and society that we are poised to reap from telemedicine. The president of the American Telemedicine Association, Edward Brown, MD, recently pointed to exciting new initiatives “like ACOs, Medicare reamission penalties, and the medical home – programs that need telemedicine at their core – including telehomecare, remote monitoring, text messaging, videoconferencing, and eConsultation.” Yet, there is one set of bars on a chart in the Ponemon study that tells me the task of realizing these benefits in a safe and sustainable way is not going to be easy. It shows the percentage of health care data security incidents classified as criminal attacks. That number rose from 20 percent in 2010 to 33 percent in 2012. I fear we are seeing the result of too little security expertise applied too late. Whether it is health care in general, or telemedicine in particular, failing to respond adequately to this situation could have tragic consequences for an industry full of promise.
Telepsych Program Taking Hold in California

Telemedicine – connecting patients and health care professionals through the use of television cameras and microphones – is not new, but telepsychiatry, as practiced by Psychiatric Centers at San Diego (PCSD), has become one of the most successful of all the telemedical applications to date. Telepsych, the PCSD name for its telepsychiatry program, began in 2010.

“As the technology gets better, the need for our Telepsych program has grown,” explains Dr. Sabah N. Chammas, president and CEO of PCSD. “Today, more people are exploring the benefits of psychotherapy as it relates to chronic illnesses, such as diabetes and chronic pain where depression and anxiety play a significant role, and for those in certain geographic areas, where our Telepsych program is the perfect solution.”

Telepsychiatry is an effective intervention for psychiatric patients who have difficulty accessing care, patients with special needs, and for consultation on complex cases. Telepsychiatry is among the many treatment modalities recognized by local, state, and federal agencies and is covered by most insurance plans.

One of the drivers behind telepsychiatry’s growth in the United States is a national shortage of psychiatrists, particularly in specialty areas like child and adolescent psychiatry. There has been a national rise in psychiatric consumer needs, but few facilities have the staff to properly treat all patients. Thus telepsychiatry services have become an alternative.

Locally, PCSD uses centrexIT, San Diego’s leader in IT management, to handle all of the facility’s IT services including its Telepsych program. In the beginning, centrexIT works with PCSD clients around the state in the design and implementation of set up at remote locations. centrexIT provides a detailed spec sheet that outlines the required IT set up that is compatible with PCSD’s system. The remote locations are then responsible for ongoing system management.

“When setting up a telemedicine system, it is important to install a mature and well-designed IT network to ensure that the system can operate in real time with no hiccups or glitches,” explains Eric Rockwell, president and CIO of centrexIT.

The PCSD telepsychiatry team consists of four licensed psychiatrists and one nurse practitioner who specializes in psychiatry and handles patient prescriptions, appointments and coordinates doctor/patient activities. The psychiatrists specialize in areas such as child, adolescent, family, and senior therapy; alcoholism/chemical dependency; chronic pain; cognitive therapy; mood disorders; anxiety disorders and eating disorders. To date, PCSD has logged nearly 6,000 patient treatment hours since 2010 and is currently serving about 850 active patients throughout California.

“Typically the patients we serve are in the underserved areas of central and northern California such as Modesto, Shasta and Stockton,” says Chammas. “Geriatric patients in senior living environments or those in a hospital setting benefit the most from using a remote location for psychological counseling.”

According to Chammas, the future of the Telepsych program is bright. “Down the road, we hope to provide patient prescriptions and medical records and of course, private psychiatric counseling via a home unit Telepsych system,” he says. “This would allow patients to choose whether or not they want to drive to the doctor’s office or simply sit on the couch and talk to their doctor from the comfort of home.”

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