

Telemedicine and Telehealth – Expanding the Continuum of Patient Care

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If healthcare can be provided in the home through the use of IP technology, an individual may truly be able to age in place.

The rising cost of healthcare is a major concern to federal and state governments, companies and individuals. Along with the medical industry's key drivers to reduce medical errors and improve patient safety, one of the major initiatives being considered and undertaken by many healthcare facilities is the development and implementation of an EMR (electronic medical record) during the next 10 years.

The U.S. House of Representatives recently approved a \$602 billion fiscal-year 2006 spending bill that includes \$75 million for healthcare information technology-related projects, which has further increased interest in health information technology (HIT). The focus on HIT and the need to reduce healthcare costs has brought additional focus to ways that the utilization of technology can improve patient care while reducing cost.

How can we address the rising cost of healthcare for all ages, no matter where you work and where you live? Telemedicine has been around for many years. For example, the movie *Apollo 13* showed a real-world use of monitoring the astronauts while on a mission, and the military has provided immediate medical assistance for soldiers wounded on the battlefield. However, telemedicine or telehealth is receiving new interest as technology offers cost-effective solutions to many issues impacting healthcare today.

Some of the reasons to consider the use of telemedicine include:

- Providing quality care for medically underserved communities whether they are in a remote, rural or inner city area.
- Extending the reach of a physician, nurse, program or facility.
- Improving care to specific populations:
 - Children;
 - Elderly;
 - Specific diseases;
 - Chronic care;
 - Military; and
 - Many other groups that will benefit from this care model
- Responding to emergencies or disasters quickly and effectively.
- Allowing a rural community to survive and thrive through connections to remote specialists, training and medical technology.

While technology enables telemedicine, the primary issue to a successful telemedicine or telehealth program is people. Telemedicine isn't a new medical specialty; it simply offers another way to deliver existing services to people who can benefit from them no matter where they are.

There are many definitions of telemedicine and telehealth. In the Telemedicine Report to Congress documents published in 1997 and 2001, telehealth is defined as "the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration". The definition for telemedicine is "the use of electronic communication and information technologies to provide or support clinical care at a distance".

The two basic technologies that enable telemedicine are “store and forward” and “two-way interactive video”. Store-and-forward technology is typically used in non-emergency situations where a diagnosis or consultation is made within 24 to 48 hours and sent back. It transfers digital images from one location to another. In the following example, a patient’s primary care provider consults with a specialist at another location, but the care of the patient remains the responsibility of the patient’s primary care provider. The direct care of the patient never transfers to the consulting physician, and in fact the patient may or may not even be present in real time for the consult.

Two-way interactive video is used when a face-to-face encounter is necessary. This involves real-time patient interaction. The patient and their healthcare provider (physician, nurse, dietician, therapist or other healthcare provider) are at one location connected via video link to a healthcare provider or specialist at a different location. In this case, the patient can receive treatment from the provider at the distant site, or the patient could receive care from the providers at both the remote site and the originating site.

The following scenario may help illustrate how telehealth can be woven into a community to improve access to care.

Joe lives out in a rural community. The nearest hospital is a 10-bed acute care facility in a town about 15 miles away. A town about 35 miles away has a larger hospital (75 beds), but it is limited in some of the services provided. The state has a large, well-equipped hospital, but it’s a three-hour drive away.

Joe hasn’t been feeling well, and one day he experiences symptoms of a heart attack. Since there isn’t an ambulance close, Joe’s wife drives him to the hospital in the nearest town. At the emergency room, they take Joe to the exam room with an integrated exam table so they can fully evaluate his condition. The integrated exam table has multiple medical devices integrated into a computer that is located within the bottom drawer of the table. The table has an arm that has a monitor attached to it, otherwise it looks like other exam tables. Based on the readings that the emergency room personnel are reviewing from Joe’s examination, they decide that a heart specialist’s opinion would be beneficial to determine the best course of treatment. A relatively small, mobile medical video unit is wheeled into the room and a connection is made to the specialist at the large hospital located across the state. The specialist is sitting in his office in front of a computer where he can review all the information that has been captured in the patient’s electronic patient record, as well as all of the results of the tests conducted and transmitted from the integrated exam table. The specialist can also see both Joe and the ER physician over the video connection.

Based on the analysis of all the data, the specialist and local physician determine that Joe can be treated there at the local hospital, rather than being transported to any of the other hospitals in the state for further evaluation. In addition, to better monitor his heart condition, he will be sent home with a home health-monitoring device. The home health unit will capture blood pressure, heart rate, oxygenation, weight and other measurements as needed. A video phone that works on their telephone line is also provided that includes an electronic stethoscope so the healthcare provider can listen to Joe’s heart as well as view how Joe looks. By monitoring these measurements, an episode may be identified early and addressed so that a future trip to the emergency room isn’t necessary. The focus is on Joe and his family, allowing them to heal while ensuring that the best care possible is being provided.

Now, how can that save money? In many emergency rooms today, patients are transported to another hospital to obtain access to a specialist. While some of those trips are necessary, some are not. If the specialist can come to the patient on demand, no matter where the patient is, better healthcare is provided, the patient isn’t further stressed by additional travel, and the doctor doesn’t lose valuable time to see other patients. In addition, if the patients can stay in their home community, their family and friends will be able to continue with their daily activities while supporting the patient. The family benefits because they can see their loved one while being able to take care of their home and daily living issues. While any hospital stay or illness is disruptive, if our healthcare system can provide quality care while allowing the patient to stay as close to home as possible, everyone wins.

A report by the Veteran’s Administration concerning the outcome of its home health project was published in 2002 in *Disease Management*. The V.A. study found that by monitoring specific health conditions and coordinating the patient’s care, it could reduce the number of emergency room visits by 40 percent, reduce hospital admissions by 63 percent and reduce the number of days in the hospital by 60 percent. It also

reduced the number of nursing home admissions by 64 percent with a reduction in the number of days of care in a nursing home by 88 percent, all while seeing a significant improvement in the quality-of-life measurement. Other studies have validated these findings, and additional studies continue to validate the savings identified in the V.A. study.

In 2005, Frost and Sullivan released the report *North American Emerging Telemedicine Markets*. Not including the medical devices or the telecommunication connections, the study determined that the tele-videoconferencing systems in the United States in the base year 2004 was \$52.8 million. Based on their research, Frost and Sullivan expect this market to expand at a compound annual growth rate of 10.2 percent from 2004 to 2008, resulting in a market value of \$77.9 million for tele-videoconferencing systems alone.

The home telehealth market in the United States was valued at \$140.8 million in 2004, the study's base year. Frost and Sullivan expects this market to expand by a compound annual growth rate of 24.2 percent from 2004 to 2008, resulting in a revenue value of \$335 million in 2008. The future for telehealth technology, and the effective utilization of this technology, is based on the consumer and the medical community's support for this method of delivering medical services.

Telehealth has been utilizing some form of electronic patient record for many years. While the focus now is on integrating this data into a complete patient healthcare record, the experience of healthcare providers who have been utilizing this technology for years should be included in the evaluation. The telehealth community has been focused on improving care while containing or reducing costs through the use of technology. While this could be considered a competitive marketplace, the telehealth community has taken a different approach and has been built on sharing knowledge and expertise. According to the Institute of Medicine 2004 report and the Center for Health Transformation, the reported figures of 44,000 and 98,000 deaths a year that can be attributed to medical errors is costing the industry about \$1 billion each year. Therefore, many organizations are starting programs that focus on the improvement of care for the community at large – and telemedicine and EMR are at the forefront on those programs. *Telemedicine Technical Assistance Documents – A Guide to Getting Started in Telemedicine*, published in 2004 by the Office for the Advancement of Telehealth, Health Resources and Services Administration at the U.S. Department of Health and Human Services, is a perfect example. The editor, Joseph Tracy of the University of Missouri School of Medicine, provides an overview of how to build a telehealth program, followed by chapters written by the directors of leading telehealth programs in the United States on specific clinical applications or disease states, and includes information on building an electronic medical record for rural health systems. Many states have already implemented statewide networks for disaster response and healthcare support. Utilizing these networks for multiple applications will improve the cost benefit analysis and provide a better backbone for healthcare in many of our rural and underserved communities.

What can the future look like for healthcare using this delivery method? It is common knowledge that as the baby boomers retire, the healthcare system in the United States will be under great stress. In the last few years, many baby boomers have been managing the care of their parents and have a new awareness of the impacts of long-term care. This awareness has increased the interest in "aging in place," allowing an individual to continue living at home rather than enter a long-term care facility. But that is only one piece of the puzzle. If healthcare can be provided in the home through the use of IP technology, an individual may truly be able to age in place. This is an evolving area. The concept of the smart home is becoming closer to reality, where your home has some basic technology that allows for monitoring of health conditions and activities to ensure that the individual is functioning as expected. Whether that is an IP device that indicates the bathtub has run over or that the person hasn't taken out and opened their daily medication, the technology is becoming readily available to help baby boomers stay in their homes as long as possible. All of this health-related information can be captured and monitored and included in the patient's EMR, improving the information that the medical community uses to assess an individual's health status. Of course privacy, security, and other issues will need to be evaluated; if the choice, however, is health monitoring that allows an individual to stay in their home versus moving to a long-term care facility, it may be an easy decision for many individuals. The cost to equip a home and provide this type of monitoring will have to be evaluated against the costs associated with long-term care facilities, both financial and personal.

If telehealth technology is readily available in the home, or if businesses offer wellness stations to their employees, what is the overall impact to our nation's healthcare costs? Utilization of telehealth technology

has been limited due to policy issues that are continually being evaluated. As additional focus is placed on HIT, it is important to remember that the bottom line is not the technology itself, or even the money associated with implementing the technology, it still goes back to people. People must recognize the value an electronic patient record affords them, or how the delivery of care through telehealth services can help them stay in their home longer for this area to be fully successful.