

Telehealth and Telemedicine in the United States

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For millennia, the fastest methods for exchanging information over long distances was by means of visual communications, or by special messengers travelling long distances by either running or riding horses. The practice of smoke signals can be traced to ancient cultures such as the Chinese, the Greeks and Native American Indians who used these signals to exchange news, warn for danger, and gather people. The “chasquis” were fast runners that were able to connect thousands of miles through a relay system across the Inca Empire. In the mid XIX century, messages between the East and West coast of the United States were reduced to 10 days using the Pony Express, a novel mail service using a relay system of horse riders.

Since the exchange of information on issues about human health and well-being has always been one of the most important concerns for people in all civilizations, the transmission of health information was always among the most common and relevant topics to be exchanged, using the above means of communication. These systems became increasingly faster and more efficient and were readily used by the evolving medical communities and patients. With the development of the first electronic devices such as the telegraph and the telephone, the communication between physicians and patients was significantly improved. Using a novel coding system developed by Samuel Morse, the first telegraph message was sent in 1844; this was followed by the patenting of the telephone in 1876 by Alexander Graham Bell. With these two new devices, patients and physicians were able to communicate as never before, and for the following century, the transmission of basic medical information and consultations became increasingly popular, creating the basis of what we now know as telehealth and telemedicine.

Further advances of telemedicine in the USA during the XX century, was characterized by the development of in-

novative forms of information and communications technology (ICT), with the convergence of two rather independent events in telecommunications. The first was originated by the National Administration Space Agency (NASA) with the advances of special biomedical telemetry to relay medical data to and from innovative space ships flying around the earth. The first astronauts orbiting the earth were remotely connected to different medical systems for cardiac monitoring with devices developed by NASA and affiliates. Back on Earth, these systems were a significant jump-start in connecting patients and physicians, creating a new paradigm in the way healthcare and medicine can be delivered regardless of the distances. The second event was derived from the private sector in the ICT industry with the development of health data processing.

Almost one century after the invention of the telegraph and the telephone, in 1960, the Nebraska Psychiatric Institute in Omaha and the Norfolk State Hospital, located more than 200 kilometers away, established the first interactive videoconference, providing reciprocal sound and video contact between physicians. This was followed by a quick acknowledgment of the new health professionals, that working with established protocols, and with the possibility of communicating with remote specialists, they could significantly improve and expand the capabilities of the general practitioners, as well as to reach underserved populations. These and other technological advances in telemonitoring have spread worldwide to the point that have become firmly integrated into the normal procedures of hospitals in all medical specialties, home health agencies, private physician offices as well as consumer’s homes and workplaces.

The initial stage of the development of telemedicine tools in the USA was characterized by the pioneering efforts of a few individuals who resorted mainly to their own financial resources and / or their organizations, but with very little public or private financial support.

A second stage of progress was between 1965 and 1973, characterized by a deliberate effort towards the research and development of the potential of telemedicine, stimulated by the infusion of short-term federal support by the American government.

The third stage in the advance of telemedicine started around 1973, with the assembling of interdisciplinary teams. For this, social scientists gathered for the first time together with team building experts, business administrators, and specialists in the planning and delivering of medical care and health services. A series of well-planned national conferences created a common place for the interaction of researchers, telemedicine users, designers, and representatives of the industrial sector to share their experiences, plans and conclusions. These efforts gave place to the development of great cooperation among individuals and institutions integrating the practice and evaluation of telemedicine. The analogous developments of telecommunications of the space program and the public sector fostered critical cooperative research in a large-scale telemedicine project called 'STARPAHC' (Spatial Technology Applied to Advanced Health Care in the Rural Zone of Papago). This was the first joint effort sponsored by NASA, the Papago Indian Reservation near Tucson Arizona, and the service of Indigenous Health of the United States.

After more than fifty years, telemedicine in the USA has emerged from the efforts of individuals and corporations as the most affordable and reliable system to solve health care problems and make medical delivery more efficient. The development of new ideas and protocols have been gaining general acceptance for the establishment of institutional and governmental policies for its further execution and dissemination. It is now being considered that telemedicine is in its "post-evaluation phase" or the "post-hardware evaluation phase" but its widespread practice is just being implemented and a more general and comprehensive evaluation has not been done completely.

The main benefits provided by telemedicine today in the USA are the creation of value for payers, patients, and providers, increasing patient access to specialized medical services, enhancing the reach of all kind of healthcare services, providing 24/7 coverage, higher customer satisfaction, and reduced cost structure.

Telemedicine in the USA is now considered like the natural evolution of healthcare within the digital world. This new paradigm in the practice of medicine has created a multi-billion-dollar industry in which nearly every major healthcare system leverages it to transform and to re-invent healthcare.

Videoconferences have become a commonplace in hospitals and healthcare systems around the country and the world, with practically no frontiers. Remote monitoring of vital signs, patient consultations, exchange of radiology and pathology images, creation of patient portals, continuing medical education, consumer-focused wireless applications and nursing call centers, are just a few of the main

applications used for the delivery of medicine at a new and improved level. It is being considered that soon, we will stop talking about telemedicine, and this new arsenal of communication tools will become just part of the everyday practice of medicine.

Next, we highlight some of the most relevant and prestigious telehealth and telemedicine institutions in the USA, which have provide a very significant influence in the spreading of these disciplines:

The American Telemedicine Association (ATA)

ATA was established in 1993 as a non-profit organization with the mission to promote access to medical care for patients and health practitioners via ICT. ATA recognizes the terms telemedicine and telehealth to be compatible, encircling a wide definition of remote clinical and healthcare. Nevertheless, the use of either term recognizes a significant improvement in the quality, fairness, and affordability of healthcare access all over the world.

Membership in ATA is open to individuals and corporations involved in healthcare and technology. ATA seeks to bring together diverse groups from traditional medicine, academic medical centers, technology and telecommunications companies, e-health, medical societies, government and others. They believe that this partnership is indispensable to overcome barriers to the advancement of telemedicine through the professional, ethical and equitable improvement in health care delivery. ATA is governed by a Board of Directors elected by the Association's membership. ATA's main objectives are:

- To educate government about telemedicine as an essential component in the delivery of modern medical care.
- To serve as a clearinghouse for telemedical information and services.
- To foster networking and collaboration among interests in medicine and technology.
- To promote research and education including the sponsorship of scientific educational meetings and Telemedicine and e-Health publications.
- To lead the development of appropriate clinical and industry policies and standards.
- According to ATA, there were over 10 million telemedicine meetings last year, with 5.5 million being teleradiology sessions. It was reported that approximately 900,000 of the encounters were clinical consultations.
- Among the services provided by ATA for its members and the industry as a whole are:
 - ATA Annual Meeting – this is the world's largest scientific meeting and exposition on telemedicine, with hundreds of presentations, posters and workshops.
 - On-line Member News Updates – news briefs via email about the latest event and activities affecting telemedicine professionals.

- ATA Website (americantelemed.org) – a resource for telemedicine news and information.
- ATA Online Membership Directory – the source of who's who in telemedicine.
- Telemedicine and e-Health – a peer-reviewed publication on clinical telemedicine practice; technical advances and enabling technologies; continuing medical education; and the impact of telemedicine on the quality, cost-effectiveness, and access to health care.
- Special Interest Groups (SIGs), Regional Chapters and Discussion Groups – allow members to address issues related to the advancement and application of telemedicine regarding specific areas including home telehealth, ocular telehealth, technology, teledermatology, telemental health, telenursing, telepathology, and telerehabilitation.

The Arizona Telemedicine Program (ATP)

The ATP was established in 1995 by the efforts of Arizona State Representative Robert “Bob” Burns (now Senator Burns) who worked with legislative staffer John Lee. The University of Arizona College of Medicine was directed to establish a pilot telemedicine program with eight sites to serve the Arizona prison system and rural underserved communities. The University recruited Dr. Ronald S. Weinstein, an international expert on telemedicine, to be director of the new Arizona state-wide program. Senator Burns and Dr. Weinstein have collaborated in developing and managing the ATP since its inception.

The Arizona Telemedicine Program is a large, multidisciplinary, university-based program that provides telemedicine services, distance learning, informatics training, and telemedicine technology assessment capabilities to communities throughout Arizona, the sixth largest state in the United States, in square miles. The program has succeeded in creating partnerships among a wide variety of not-for-profit and profit healthcare organizations, and has created new inter-agency relationships within the state government. Functioning as a “virtual corporation,” the Arizona Telemedicine Program is creating new paradigms for healthcare delivery over the information superhighway. The program is recognized as one of the premier programs at the University of Arizona College of Medicine, and has received numerous awards at the national level for its research and innovations.

With the fast advances in technology and with the development of current mobile-phone devices, the computational capacity of patients and health practitioners is now several times superior than the first systems that went to the moon. Current telemedicine programs are increasing and growing rapidly in the USA. and in many parts of the world.

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