



Telemedicine: The University of California and Health Care in the Digital Age

As the state's population becomes larger and more diverse, increasing numbers of Californians lack access to quality health care, resulting in a growing disparity between well-served and underserved communities. California will have a doctor shortage of almost 16% by the next decade, exacerbating current health care disparities. The wide geographical expanses of our state, and limited financial resources for comprehensive, specialized health care in certain areas, also makes it difficult to deliver high-quality health care to all Californians.

The University of California has implemented a broad spectrum of telemedicine, telehealth and e-health programs that enable patients throughout California to receive direct clinical and specialty care without leaving their own communities. Through these programs, UC research and expertise is putting innovation to use the latest in telecommunications technology to improve the access and cost-effectiveness of health care for all Californians.

The telemedicine program at UC Davis provides direct clinical care to patients at a distance, giving 80 clinic and hospital sites in California access to more than 30 medical specialties.

The program first began in 1992 with a tele-fetal monitoring link between the UC medical center and a community hospital. Since then, it has grown to include a variety of innovative telemedicine applications, including video-based consultations, store-and-forward services, ER and intensive care unit consultation, teleradiology, video interpreting of test results, and telehome health. Over the past 14 years, the program has completed more than 13,000 video-based clinical consultations.

In 2000, UC established the Center for Health and Technology (www.ucdmc.ucdavis.edu/cht) to consolidate its telehealth projects, which include telemedicine, distance education and applied medical informatics. The center collaborates with health care professionals, IT experts, medical researchers and engineers to develop and evaluate information and telecommunications technologies that improve access to high-quality patient care, information resources and health education opportunities.

"Telecommunications and information technology have the power to address the health care needs of the underserved population. Our goal is to reduce health disparities by bringing the clinical care expertise and educational resources of the University of California directly to communities throughout the state," said Dr. Thomas Nesbitt, the center's director.

UC's Telemedicine Learning Center teaches physicians, clinic coordinators, business executives and technicians how to establish effective telemedicine programs to meet the unique needs of patients in their communities. Since 1999, the learning center has trained more than 800 health-care professionals. It also serves as an educational resource to staff at other telemedicine sites.

Using a hands-on, multidisciplinary training approach, the center gathers together a broad range of learning, training and research programs concerned with medicine in the digital age.

How does it work? Using high-speed data lines linked to video units at the UC Davis Medical Center and outlying hospitals and clinics, physicians and patients can have a live, interactive consultation with UC specialists by simply dialing them up on video.

Why use telemedicine? It is often very difficult for a patient to drive the many miles it may take to reach a specialist at the medical center. If there are transportation challenges or a particular

condition where time is of the essence, telemedicine is the key to accessing a specialist who can assist in the diagnosis and best possible treatment plan for the patient.

Getting healthy at home: Observing patients through interactive home video systems has reduced hospital admissions, ER visits and related health care costs. In these cases, telemedicine provides the clinician with an overall assessment of the home patient, including blood pressure, heart beat, lung sounds, range of motion and medication management.

Reaching children in rural areas: Using high-resolution video and audio systems, UC delivers high-quality critical care consultations to doctors and nurses who respond to pediatric emergencies in rural hospitals as far north as Mt. Shasta. This service links UC pediatricians to the remote site's physicians whenever acutely ill or injured children arrive in their emergency room. Telemedicine units, located at the hospitals and in the pediatricians' homes, allow for consultations 24/7.

Monitoring patients remotely: UC telemedicine coordinates several remote monitoring projects, allowing rural providers throughout Northern and Central California to send real-time patient data to UC specialists to facilitate phone consultations and improve coordination of care. These data transfer projects keep patients in their own communities whenever possible and facilitate the transfer of patients when necessary. These links allow sites, for example, to electronically transmit ECG strips to the lab for interpretation and provide obstetrical consults to rural practitioners for mothers in labor.

Family ties: UC telemedicine also helps families stay connected when a child must be hospitalized. Using a special camera-and-phone unit, a TV set and a standard phone line, UC's FamilyLink lets parents and siblings see and talk from home with loved ones who are in the hospital, which is especially important for families who live far away and have children hospitalized for an extended period.

Teleradiology: Teleradiology increases radiological access to patients and providers while reducing the number of referrals to outside facilities for STAT interpretations. The films are developed by a radiology technician, scanned through a digitizer and transmitted from a remote site to UC Davis Medical Center for interpretation.

UC optometrists use telemedicine to keep an eye on state's underserved residents

Armed with new telemedicine software, UC Berkeley optometrists are working with doctors at community clinics throughout California's Central Valley to provide eye exams for thousands of low-income diabetic patients, especially Latinos who have a rate of diabetes nearly three times higher than the general U.S. population and are at high risk for diabetic retinopathy, a sight-threatening side effect of the disease.

Since fall 2005, 13 clinics have received retinal cameras and an open-source image management program (EyePACS) developed at UC Berkeley's School of Optometry for storing and transmitting patient information and diagnostic images. The equipment allows doctors to take high-resolution photos of patients' retinas and send them electronically to UC optometrists for diagnosis.

Most low-income residents in the Valley go to community clinics for their general health care, but few clinics have the equipment or expertise to screen for vision problems. The goal is for each of 13 clinics to screen about 1,000 patients per year. And the server that hosts the EyePACS system is big enough to accommodate all of the approximately 600 community clinics in California.

"So often new technology broadens the gap between rich and poor," said Dr. Jorge Cuadros, the project's director. "So it's particularly satisfying in this case to be able to minimize health disparities using technology and at the same time to evolve new ways to deliver health care."

Read more at www.berkeley.edu/news/media/releases/2006/08/14_telemedicine.shtml