Case Study: A Texas Telemedicine Program Offers Lessons for Governments and Care Delivery Organizations Worldwide

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This report analyzes the telemedicine program of the University of Texas Medical Branch (UTMB), in Galveston — one of the world's largest programs of its kind. The report can benefit government healthcare agencies that wish to improve healthcare for patients dispersed over large areas, as well as care delivery organizations (CDOs) seeking to develop sustainable telemedicine services using video visits.

Key Findings

- UTMB has integrated video visits into its daily healthcare services. Video visits are used in conjunction with a set of guidelines and protocols, and are documented in computer-based patient record (CPR) and electronic medical record (EMR) systems.
- UTMB has collected evidence that indicates high levels of patient satisfaction and improved health outcomes from telemedicine.
- UTMB has used its experience in prison telemedicine to expand its telemedicine services to employers and government healthcare agencies.

Recommendations

- CDOs that are interested in developing telemedicine services should recognize the potential of telemedicine, not only to cut costs but also to generate revenue.
- CDOs that are interested in offering video visits should explore the combination of video visits with the use of medical devices for real-time capture of data and images. This makes it easier to replicate an in-person encounter.
- To facilitate clinician adoption of video visits, CDOs must work with clinicians to define protocols for patient assessment and treatment. CDOs can benefit from studying the protocols and policies developed by telemedicine leaders such as UTMB and the U.S. Veterans Health Administration.
- To help justify funding and reimbursement, CDOs should continually monitor the effectiveness of their telemedicine programs and should evaluate them periodically.
WHAT YOU NEED TO KNOW

With approximately 60,000 video visits per year, the UTMB in Galveston has one of the world's largest video visit programs. UTMB's telemedicine work began with a contract with the state of Texas to provide health services to most Texas prisons. Telemedicine, in the form of video visits combined with the use of cameras and monitoring devices to capture images and vital signs, is used in all prisons for which UTMB is responsible. By enabling patients to be seen remotely, video visits have reduced travel costs and have helped patients obtain easier access to specialist care. In addition, UTMB has collected evidence of high levels of patient satisfaction and improved health outcomes from video visits. UTMB has used its experience in prison telemedicine to offer video visits to other government agencies and employers. This case study can benefit government healthcare agencies that are seeking to improve patient access to healthcare and reduce costs for populations dispersed over large geographic areas or with limited access to specialists. It can also benefit public or private CDOs that are interested in developing video-based telemedicine programs for employers and government agencies.

CASE STUDY

Introduction

Interest in the potential for telemedicine to improve access to specialist care and reduce travel costs — especially for chronically ill patients who require frequent monitoring — is growing worldwide. Video visits are one of the more mature applications of telemedicine. They are increasingly used for mental health and rehabilitation in the U.S., and are beginning to be used in other countries. Video visits are an important means to reduce costs and improve access to care. They can also facilitate the sharing of expertise between clinicians and can provide an opportunity for CDOs to make money.

In the early 1990s, the state of Texas determined that its prison health system was not delivering adequate healthcare. Moreover, the costs of healthcare had escalated from $2,262 per inmate in 1989 to $2,839 per inmate by 1992, partly due to the growing number of prisoners with chronic health problems. Since 1994, the Texas Department of Criminal Justice (TDCJ) has outsourced prison healthcare to two universities: Texas Tech University Health Sciences Center in Lubbock, and UTMB in Galveston. The universities receive annual capitation fees to cover all medical expenditures for prisoners. UTMB operates medical, dental, mental health, laboratory and pharmacy services in 111 of the state's prisons, accounting for more than 100,000 inmates, or 78% of the state's inmate population (Texas Tech serves the remainder). At every prison it serves, UTMB operates primary care ambulatory clinics, which also provide basic dental and mental healthcare services. Some prisons also have basic inpatient facilities. All clinical personnel at the prisons, which includes approximately 120 physicians, are employed by UTMB. For most specialist and inpatient care, patients are transferred to a UTMB hospital in Galveston.

The Challenge

Given the size of Texas, many transfers of prisoners to the hospital at Galveston cover long distances at great expense. Because of the chronic shortage of physicians at Texas prisons, many prisoners were not being properly evaluated prior to their transfer to Galveston, resulting in a high number of inappropriate admissions. Within two years of taking over the TDCJ contract, UTMB had decided to use telemedicine to provide more cost-effective and better-quality healthcare to prison inmates.
Approach

UTMB developed a business case for telemedicine that included four goals: 1) cost savings through reduced prisoner transfers, 2) better quality of care, 3) expanded accessibility and utilization of care by prisoners, and 4) revenue generation from expanding the program beyond the prison healthcare service. The sponsors of the prison telemedicine program were the president of the university and the director of the correctional managed care program, both of whom were physicians. UTMB developed protocols to help prison-based clinicians decide when to refer patients for video visits; the protocols are updated twice a year.

Telemedicine at UTMB includes video visits between patients and clinicians; store-and-forward image transfer; the use of ambulatory and inpatient CPRs for all clinical orders and documentation; and the use of care management guidelines and quality monitoring. UTMB uses the Pearl CPR from Business Computer Applications for its prison healthcare work. For its nonprison work, it uses either Epic Systems or a self-developed application known as EMR Lite, which includes functionality for scheduling, physician order entry, clinical documentation, limited clinical decision support and audit trails. UTMB's prison telemedicine program started in 1994 with four prisons linked to the Galveston site. Initial capital outlay was $1 million for the equipment needed by these sites. By 2000, telemedicine had been implemented in every prison served by UTMB.

UTMB's Electronic Health Network (EHN), created in 2004, centrally manages all telemedicine services at UTMB. EHN includes a center that conducts evaluations of the program and that offers consulting services to other CDOs. As a state-owned institution, UTMB is a not-for-profit entity and is forbidden from providing clinical services or selling equipment to most organizations outside Texas. Therefore, in 2006, UTMB set up NuPhysicia, a for-profit company that offers UTMB's telemedicine services outside Texas. NuPhysicia pays UTMB for the use of its telemedicine equipment and staff. NuPhysicia is owned 50% by a private equity firm, 35% by UTMB and 15% by NuPhysicia managers.

Telemedicine has become the default point of entry to the prison healthcare system. Although the use of telemedicine is mandatory at prisons served by UTMB, physicians are free at any time to refer patients for a face-to-face visit. For patients who require surgery, video visits are frequently used for preoperative and postoperative consultations. When a prison-based clinician refers a patient for a video visit, the referral is automatically sent to a central referral system managed by TDCJ. After the prison medical director has approved the referral, TDCJ's utilization review department reviews the referral and decides which clinician will see the patient. Subsequently, EHN staff schedule the patient in the referral system, which sends an alert to prison officers so they can prepare for the patient's appointment.

EHN includes seven dedicated telemedicine physicians. In addition, approximately 50 physicians in UTMB's faculty group practice conduct video visits as part of their regular workload. Most physicians are salaried by UTMB; the nonsalaried physicians are paid to be available for video visits during certain blocks of time.

Prisons are equipped with telemedicine carts on wheels, known as T-Carts, comprising video screens attached to medical devices such as dermatoscopes, otoscopes, laryngoscopes and stethoscopes. A clinical presenter supervises the patient and manipulates the devices. Clinical presenters can include primary care physicians, nurses, nurse practitioners, paramedics and medical assistants. The devices capture streaming video, which the remote physicians can view in real time. UTMB uses two-way videoconferencing based on International Telecommunication Union standard H.323 over Ethernet networks with a typical connection speed of 384 Kbps.
UTMB does not record the streaming video due to the storage requirements it would create, and because this is not considered medically necessary. However, remotely located physicians often capture still images that are stored in the CPR and can be viewed by other physicians for second opinions. This is done routinely for dermatology. For patients with cardiac conditions, the clinical presenter captures an electrocardiogram reading and uploads it to the CPR prior to the video visit with the cardiologist.

UTMB has used its experience in prison healthcare to expand its video visit program to other clients, most of whom lease T-Carts as part of their service package:

- **Employers**: UTMB uses video visits to enable employees to consult with a primary-care physician without leaving the workplace. In some cases, employers pay UTMB on a fee-for-service basis; in other cases, employers prepurchase a block of telemedicine time during which they are guaranteed access to physicians via video.

- **County governments in Texas that operate community mental health clinics and primary care clinics serving the indigent population**: Currently, UTMB provides primary care video visits to two government clinics, and also employs a nursing coordinator to manage patients’ concerns after their video visits. This program seeks to save counties money, principally by reducing the number of unnecessary emergency room visits.

- **Employers that operate in remote locations**: This includes transportation companies, shipping companies, cruise lines, oil platforms and the U.S. Antarctic Program.

For all clients, UTMB documents every telemedicine encounter in either the Epic application or the self-developed EMR Lite application.

UTMB also uses telemedicine to further its research and education in infectious diseases. UTMB has miniaturized T-Carts so they fit into briefcases and can transmit data through the cellular network, Ethernet or satellite. UTMB equips physicians with such units, known as B3 Zeros, and sends them around the world to set up telemedicine consultations, known as "global grand rounds," between patients suffering from infectious diseases and physicians and medical students at UTMB. NuPhysicia is selling the B3 Zero at a cost of approximately $45,000 per unit.

In the future, UTMB intends to deploy more B3 Zeros, which could enable its telemedicine services to reach patients in a greater variety of settings, including at companies without dedicated videoconferencing suites, in nursing homes and in patients' homes. In addition, UTMB wants to upgrade its equipment to allow for high-definition video. Because of the large installed base of equipment at prisons, this upgrade will take some years to complete.

UTMB's ability to expand its telemedicine services in the U.S. beyond government programs and self-insured employers faces several challenges, including the inconsistent approach of U.S. Medicaid and Medicare programs to telemedicine reimbursement, the restrictions on practicing medicine across U.S. state lines, and the restrictions in many U.S. liability insurance policies against practicing medicine in other states.

**Results**

UTMB conducts more than 60,000 video visits a year (an average of 5,000 per month or 200 per day), of which 60% are for the TDCJ. Since the telemedicine program's inception in 1994, UTMB has conducted 345,000 video visits, 253,000 of which have been for the TDCJ.

An academic study published in the Journal of the American Medical Association estimated $215 million in savings from the correctional managed care program in the years 1994 to 2000. These
savings are attributed not only to the use of telemedicine, but also to the use of common
formularies, disease management guidelines, CPRs and EMRs, and education programs for
patients and physicians. The same study also attributed reductions in mortality rates and
improvements in health outcomes for patients with chronic diseases such as asthma, coronary
artery disease and diabetes to the correctional managed care program.

UTMB recently conducted a survey of 880 indigent patients at county-operated community clinics
to assess their satisfaction with telemedicine video visits. Patients were asked if they:

- Considered the telemedicine visit to have delivered a quality of care equal to an in-
person visit
- Considered telemedicine to be important in their healthcare
- Would recommend telemedicine to their family and friends
- Had a positive perception of the remote clinician
- Had a positive perception of the on-site clinical presenter
- Found the technology easy to use
- Believed their privacy was protected

While most of the patients surveyed were new (their first telemedicine visit had been within one
month), more than 200 were follow-up patients, some of whom had been using telemedicine for
more than three years. Responses were on a five-point scale.

For each question, at least 88% of respondents responded in the highest two categories ("agree"
or "strongly agree"), indicating a consistently high level of satisfaction.

UTMB also has data indicating a decline in emergency room visits for patients at community
clinics who have used its telemedicine services, and other data indicating that its telecardiology
consultations for patients with cardiovascular disease are associated with an improvement in
patients’ New York Heart Association functional classification ratings.

Critical Success Factors

- UTMB had participation and support from all relevant government agencies, which
demonstrated a commitment to telemedicine.
- UTMB leadership was willing to make the initial capital investment and saw the potential
for revenue generation from the program.
- UTMB developed protocols and guidelines to facilitate clinician adoption.
- UTMB uses a standard set of clinical equipment, which lowers purchasing and training
costs.
- UTMB uses CPRs and EMRs that can incorporate images captured through video visits.
- UTMB has conducted research and evaluation of its programs from an early stage. This
has enabled it to use metrics from the prison healthcare program to convince other
organizations to use UTMB's telemedicine services.
Lessons Learned

- Clinician adoption was a significant challenge. UTMB had to devote resources to train clinicians on how to use the telemedicine equipment, to convince them that telemedicine was a valid tool for clinical assessment, and to instruct them on when to use it and when to refer patients for a face-to-face encounter.

- Training patients was also an important task. UTMB had to convince patients that telemedicine was a tool to enhance the work of clinicians rather than a means of replacing clinicians.

RECOMMENDED READING

"Telemedicine Focus Group Highlights Progress With Remote Consultation and Diagnosis"

"Others Can Learn About Telemedicine From the Experience of the U.S. Department of Veterans Affairs"

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