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D. Chon Abraham
chon.abraham@mason.wm.edu

David A. Rosenthal

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THE VETERANS ADMINISTRATION'S CARE AND COORDINATION HOME TELEHEALTH PROGRAM (CCHT) IN ACTION: MERGING "HOME" AND "HEALTH"

D. Chon Abraham
College of William & Mary
Chon.Abraham@mason.wm.edu

David A. Rosenthal
East Carolina University
rosenthald@ecu.edu

Abstract

This article discusses a home telehealth project that employs innovative informatics and telemedicine technologies to meet the needs of a Veterans Affairs Medical Center (VAMC). We provide background information concerning the project and program management issues inclusive of the methods for patient selection process, the decision support system used in this process, and descriptions of the home telehealth technologies. Our goal is to articulate program management insights incurred in the implementation of the project to provide useful information to other healthcare systems considering home telehealth as a contemporary option for care delivery.

Keywords: telemedicine, home care, telehealth

Introduction

Governing authorities in the healthcare industry are anxiously seeking technological and process change solutions to the problems plaguing access to and quality of healthcare services (TelecomWeb, 2005). Home telehealth projects are being hailed as potential solutions for overcoming some of these problems characterized by lofty costs of services associated with patient visits to medical facilities, overtaxed workforces augmented by severe staffing shortages servicing a multitude of patients, and antiquated information systems and technology that impair the efficient delivery of quality care (JCAHO, 2004; Utterback, 2005).

The Veterans Health Administration (VHA) Office of Care and Coordination (OCC) sponsors a home telehealth initiative known as the "Care and Coordination Home Telehealth Program" (CCHT) at a number of Veterans Affairs Medical Centers (VAMC) in the U.S., the purpose of which is to incorporate contemporary methods for care delivery by transforming the delivery of veterans' healthcare services (Roswell, 2003). The anticipated benefits of the CCHT program can be categorized into four major areas: (a) cost (i.e., a 24 percent reduction) of services decrease by shifting care delivery from inpatient to outpatient (b) improved access to care via innovative technologies, (c) improved quality of care, and (d) improved patient satisfaction.

The primary goals of the program are to provide better access to care for patients who qualify for program participation, improve care management (i.e., more accessible and comprehensive patient information), improve personal healthcare awareness and self-management capabilities for patients, and increase the productivity of the medical personnel responsible for patient care management.

Technology Acceptance

Technology acceptance research has made valuable inroads into the complexities of the how and why humans choose to accept or reject technology, and the pace at which that acceptance or rejection occurs. Yet many of the studies utilizing Davis' Technology Acceptance Model (TAM) (1989) have centered on the technology acceptance dynamics associated with non-specific user populations working in varying occupational settings, or technology utilization within a wide spectrum of possible solutions (Veiga, Floyd & Dechant, 2001; Venkatesh & Morris, 2000).

Without question, Davis' seminal work (1989) has been the dominant theory within this realm of technology research, and the TAM's utility is evidenced by the numerous modifications and augmentations that have been made by researchers to address the question of technology acceptance as it relates to human variables such as user inexperience (Taylor & Todd, 1995), and culturally induced beliefs (Veiga, Floyd & Dechant, 2001). Rosenthal, Seeman, and Gibson (2005) posited that specific complexities associated with certain professionals – specifically physicians – warrant the inclusion of other theoretical models, such as the Theory of Planned Behavior (Ajzen, 1988) as a means of furthering the understanding of technology acceptance.

The Veterans Administration Care and Coordination Home Telehealth (CCHT) Program provides the opportunity to observe yet another set of human variables within the context of technology acceptance research. Specifically, patients under the care of the Veteran Administration healthcare system, who may be elderly and perhaps homebound, and may lack exposure and familiarity with some of the technologies utilized to monitor and augment their medical treatment protocols. The CCHT program gives certain VA patients the opportunity to utilize telehealth technologies in the comfort and convenience of their own homes, which from a technology acceptance perspective creates an opportunity to move the research in a new direction.

The Care and Coordination Home Telehealth (CCHT) Program

The CCHT program is a means to improve care delivery to patients who may not be closely monitored or are not able to access care on a regular basis, and therefore may be noncompliant with prescribed medical regimens. At a time when the healthcare industry is facing a dearth of nurses in both the public and private sectors due to issues such as poor work conditions, inadequate compensation, work stress, and lags in recruitment and retention (Bass, 2002), the VAMCs are struggling with a high volume of patients. The CCHT program is an attempt to institute preventative measures for better healthcare management so that controllable medical conditions can be more closely monitored and do not escalate into costly emergent conditions. Moreover, a well-implemented CCHT program can help alleviate the strain on VMAC staff, who must provide medical care to a vast number of geographically dispersed patients.

Patients are assigned to VAMCs based on the proximity of their residences to the medical facility. The VAMC observed in this study accepts patients from three contiguous states in the eastern region of the U.S. who are typically older, sicker and poorer than the non-VA patient population treated in the private sector (Cox, 2001).

It is hoped that the CCHT program will decrease the volume of patients under the direct care of a VAMC, and promote preventative measures that are likely to decrease costs associated with care. A diagram of the general CCHT process flow is found in Figure 1.

The Patient Selection Process

The selection process for potential CCHT program enrollees is arduous and patients must meet all of the following criteria or must be in need of wound care management (i.e., surgical, vascular, or pressure) to be accepted:
- Diagnosed with chronic and/or congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), diabetes mellitus (DM), or hypertension (HTN);
- Requires more than one nursing home visit per week due to severity of conditions;
- Hospitalized in the previous fiscal year with total costs over $5,000;
- Enrolled in a primary care clinic for more than fourteen outpatient visits in the preceding fiscal year;
- Prescribed more than ten active medication prescriptions;

- Residing in a home environment that does not inhibit daily care and management of medical problems and that has in place an operable phone line and electrical service;
- Willingness of enrollee and caregiver to use and accept telehealth technology in the home;
- Demonstrated competency of the patient and/or caregiver to use the telehealth technology and to communicate interactively with the CCHT team; and
- Presence of a responsible caregiver that can intercede on behalf of the enrollee if the enrollee has ongoing mental health management of any pre existing conditions (e.g., post-traumatic stress disorder (PTSD).

Enrollee Selection

The CCHT program enrollee selection process begins with the review of the electronic medical records of current VA patients within the integrated service network. A data technician pre-screens on average, 13,000 records per quarter of VA patients not currently enrolled in the CCHT and assigned to that VAMC for care. Once the data have been extracted it is imported into a decision support system that applies logic based on the selection criteria, resulting in nearly 1,000 more records on average of eligible patients for further screening by the CCHT Lead Care Coordinator (LCC). According to LCC, this process is in place to assess a patient's (a) unwillingness to give consent, (b) unwillingness or inability to operate the telehealth equipment, (c) uncooperativeness or combativeness, (d) lack of access to a compatible phone line and/or electrical service in the home, and (e) documented history of non-compliance or behaviors such as active substance abuse. Issues and behaviors such as these have an impact on the safety of the CCHT staff and may result in damage to the telehealth equipment. However, this process may be improved by considering additional selection or screening criteria, such as interviewing next-of-kin, guardians, or previous care-givers.
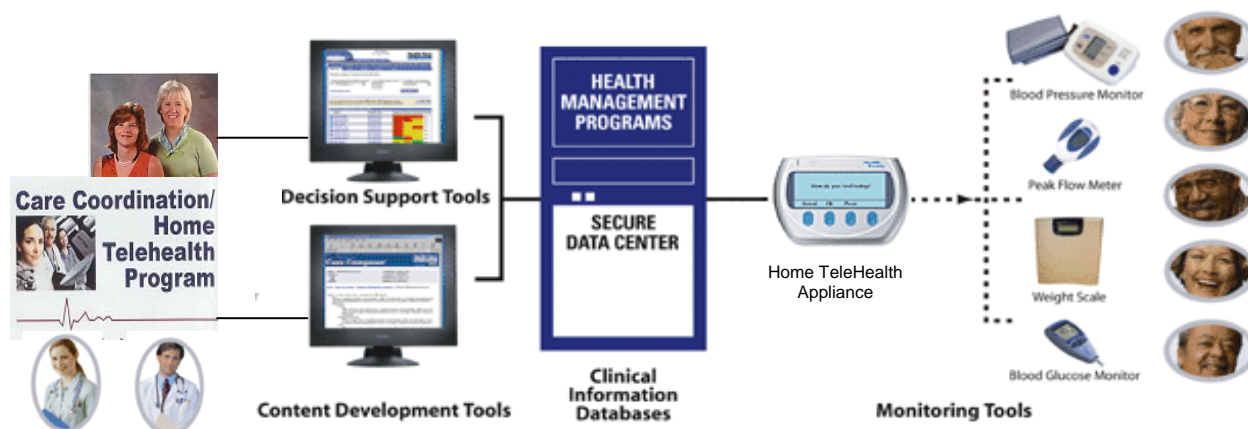

Figure 1. Home Telehealth Data Flow

Technologies Utilized for Home Care

The main appliances used in the home for collecting vital measurements from patients enrolled in the CCHT program are the *Health Buddy* device developed by Heath Hero Network and the *Viterion 100* developed by Viterion Telehealthcare (Table 1). Both devices allow for programming of specific personalized measures for patient blood pressure, blood oxygen, blood sugar, weight, temperature, and peak bodily fluids flow.

Table 1. Home Telehealth Technologies

Equipment Type	Primary function	Number	Cost per appliance	Time availability of patient data accessible via the vendor sponsored web interface provided for CCHT personnel
Health Buddy	Appliance that enables self-reports and transmits data via telephone lines for the patient's daily health condition that are manually entered by the patient (i.e., the patient take their own blood pressure with external equipment and then manually enters the data into the Health Buddy)	40	$575	Following morning (system down-uploads at 2AM daily)
Viterion 100	Appliance with auxiliary equipment plug-n capability (e.g., electronic scale and blood pressure apparatus) that transmits patient data (i.e., daily overall health condition, vitals, self-reported adherence to medication and dietary regimen) that transmits data via telephone lines the patient's daily health condition	37	$1299	Immediate upon patient submission

The device vendors each provide a web interface for accessing the data entered by patients, including the following features:
- ad-hoc and standardized reports
- data querying capabilities based on various selection criteria
- alerts for abnormalities reported
- a log of the abnormality-specific communication generated automatically to assist the patient (i.e., call 911)
- an audit trail documenting patient activity (logging on and off)
- Status ratings ("low", "high", "medium" or "non-applicable") for data entered on each symptom, behavior, and compliance with the personalized regimen coded in the patient's home telehealth appliance.

Insights

The main assessment indicator for program success is patient utilization of services (i.e. the OCC asserts that the utilization of services such as transport to the VAMC for scheduled or emergent visits should decrease because of delivery of care via the home telehealth program). The results of this study indicate that the current assessment indicator could be more clearly defined, as it only addresses utilization as having some influence (positive or negative) on program success and organizational payoff (i.e. a decrease is costly expenses associated with transport and 'in-hospital' services). However, increased patient utilization of certain self-help services such as proper dietary

planning for diabetes patients (also an 'in-hospital' service) should lead to increased regimen compliance and less occurrences of emergent conditions, which usually require expensive emergency room visits or in-hospital stays. Additionally, it was observed that the patient's self-awareness of his or her own medical status should also be a measure of program success.

Value of Home Visits for Service Quality

In an attempt to maximize the efficient utilization of hospital staff, the OCC suggests minimizing home visits by CCHT personnel and encourages the facilitation of program enrollments during the patient's scheduled visits to their respective medical center. It appears to some program staff members however, that enrolling patients in the comfort of their own home environment - as opposed to an office/hospital setting - provides the lead care coordinator with a better awareness of the environmental factors that could preclude the patient from benefiting from participation in the CCHT program. In the home setting, an LCC can better discern possible factors that may prevent the patient from being compliant with their regimen (e.g. an inability to physically access medications due to physical/architectural obstacles in the home, or the absence of a responsible caregiver to assist the patient in medication administration). In addition, a home setting gives the lead care coordinator the opportunity to provide "hands- on" training to the patient in the proper use of the home telehealth technology.

From a technology acceptance perspective, the lead care coordinator and the program support assistant stated that enrolled patients seem much more apt to comply with the physician prescribed regimens because of the 'ease of use' of the devices, heightened patient self-awareness of their own health, and contentment with the amount of attention received or social interaction with the CCHT staff. The program support assistant ascertained that the 'ease of use' of the devices is a main contributor to patient acceptance of the home telehealth technologies, which simplifies implementation of the technology in the homes and promotes subsequent patient use.

Conclusion

Due to the arduous Institutional Review process within the VA system, we have been unable to move this project past the realm of this particular patient sample within this specific CCHT environment. However, it is hoped that the observations, insights and takeaways from this project will help to validate the VHA's model of care coordination and home telehealth implementation, and make an important contribution to the body of knowledge concerning the socio-technical aspects of implementing telemedicine and telehealth technologies within a multi-stakeholder setting.

References

Ajzen, I. (1988): *Attitudes, personality and behavior*. Milton Keynes (UK): Open University Press.

Bass, J. 2002. "It's not just nurses anymore: Survey of three other health occupations that finds patient safety at risk due to understaffing." http://www.aft.org/press/2002/041102.html

Cox, J. 2001. "Statement of J.David Cox, Vice President, National VA Council, for the American Federation of Government Employees AFL-CIO before the Veterans Affairs Committee, United States Senate, Hearing on VA's Nursing Shortage and the Effects on Patient Care." http://www.afge.org/Index.cfm?Page=CongressionalTestimony&File=1_061401.htm

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-339.

Joint Commission on Accreditation of Healthcare Organizations (JCAHO). Health care at the crossroads strategies for addressing the evolving nursing crisis. [serial on the Internet]; 2004 [cited 2005 Nov]; [47 p.]. Available from: http://www.jointcommission.org/NR/rdonlyres/5C138711-ED76-4D6F-909F-B06E0309F36D/0/health_care_at_the_crossroads.pdf

Rosenthal, D., Seeman, E., & Gibson, S. (2005). Applying Theoretical Frameworks to Explicate Physician Acceptance of Computerized Physician Order Entry (CPOE). *Journal of International Technology and Information Management*, 14 (4), 61-72.

Roswell, R. 2003. Transforming VA Healthcare. U.S. Medicine Information Central, January 2003. Available on the World Wide Web: http://www.usmedicine.com/column.cfm?columnID=112&issueID=46 Accessed on November 12, 2004.

Taylor, S. & Todd, P. (1995). Assessing IT usage: The role of prior experience. *MIS Quarterly, 19*(4), 561-570.

TelecomWeb. U.S. healthcare providers see growing IT budgets by over 10 percent. [serial on the Internet]; 2005 [cited 2005 Nov 21]; [about 4 p.]. Available from: http://www.telecomweb.com/news/1086273449.htm

Utterback, K 2005. Supporting a New Model of Care with Telehealth Technology. Telehealth Practice Report, v9(6): 3 - 11. reprinted by Telemedicine Information Exchange http://tie.telemed.org/articles/article.asp?path=homehealth&article=telehealthTechnology_ku_tpr05.xml Accessed on 23 Sept 2006.

Veiga, J., Floyd, S., & Dechant, K. (2001). Towards modeling the effects of national culture on IT implementation and acceptance. *Journal of Information Technology, 16*, 145-158.

Venkatesh, V. & Morris, M. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly, 24*(1), 115-139.