

TRAINING HEALTHCARE PROFESSIONALS TO USE TELEHEALTH TECHNOLOGY: THE MISSING LINK

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Introduction:

Technological solutions to human caregiving needs hold great promise, but without the education and support of healthcare professionals (HCPs) who will recommend or prescribe these devices, and interpret the data they gather, these technological solutions will fail to reach their potential. Despite the utility of telehealth and Health Information Technology (HIT) in addressing the problems of the current healthcare system, little attention has been devoted to determining what and how to teach HCPs about these technologies. HCPs will play a critical role in the deployment and use of these technologies, yet basic questions about the learning model to be used and how to deploy it remain unresolved. Telehealth will eventually be a major component of education for all medical professions as stated by the Technology Administration, Department of Commerce report "Innovation, Demand, and Investment in Telehealth:"

"The convergence of telehealth, healthcare informatics, and e-Health will increase the levels of technical know-how required of healthcare providers at all levels and in all specialties. Medical and healthcare education curricula will be revised with greater integration of information technology and knowledge management"⁽¹⁾.

HCPs need training and educational materials so that they are able to effectively use these technologies. Current barriers to the implementation of caregiving technologies by HCPs include lack of awareness, skills, tools and motivation to use telehealth and HIT. The Age Tech Project, based at the VA New England Geriatric Research, Education and Clinical Center (GRECC), Boston Division, is creating curricular materials to address the growing gap in the knowledge base of health care professionals (HCPs). The focus of this new curriculum is to train HCPs on the concepts and uses of HIT, with a particular focus on chronic disease management for older adults.

This paper will explain the rationale and content of the Age Tech curriculum for HCPs. It begins with an overview of the importance of telehealth and HIT in chronic care of older adults, using diabetes mellitus as an example. It then describes available HIT curricula and the Age Tech educational model and curriculum.

Background:

Rapid changes in healthcare system are creating a need for educational programs and curricula that can teach providers from diverse professions about how to use technology to improve patient care. The aging of the population has increased the prevalence of chronic diseases to where 90 million Americans have a chronic disease and 70% of the medical costs are related to the treatment of chronic illnesses⁽²⁾.

Our current system of care, which relies largely on face-to-face visits with physicians, has limited access to other healthcare disciplines and functions as uncoordinated systems of care that provide little incentive to collaborate. This approach is unable to meet the needs of the growing numbers of patients with chronic diseases.

Two important models have emerged to improve the management of chronic diseases. The Wagner Chronic Disease model^(3,4) provides a theoretical framework that relies on engagement between empowered, active patients and engaged, proactive teams. The use of HIT is central to Wagner's chronic disease model, since it allows for better population management by use of electronic medical records and patient registries. For patients, it enables communications with HCPs, and provides relevant health education.

The other model is the disease management program. Disease management programs also rely heavily upon HIT to identify target populations, monitor patient and professional compliance with guidelines, and to provide educational information for both patients and providers. Many disease management programs focus on

management of diabetes mellitus, a good example of how HIT can improve care of chronic conditions.

Diabetes Mellitus as a Model for Chronic Disease Management:

Diabetes mellitus is an excellent model of a chronic disease whose management can be improved by use of HIT. Diabetes mellitus is a common, costly, and an important cause of morbidity and mortality. The incidence and prevalence of diabetes is rising dramatically, and it is already the fifth leading cause of death in the United States^(5,6). The epidemic of diabetes brings with it heavy health and economic burdens^(6,7,8) that can be delayed or reduced by effective management of the illness.

Diabetes mellitus is almost a prototypical model for chronic disease management because self-management by the patient is critical, systems of care are important, and interventions that result in better control of blood sugar have been proven to delay the onset of morbidity and mortality. Although there is a clear consensus on how to treat diabetes and what the goals for sugar management should be, implementation remains sub-optimal and there is a considerable gap between recommended diabetes care and the care patients actually receive⁽⁹⁾.

Provider, patient and health care system barriers currently prevent effective management of diabetes. Providers often forget to follow-up, have limited time to work with patients and coach them on how to manage their diabetes, and may lack necessary expertise to recommend needed treatment and monitoring^(10,11,12,13,14,15,16). Among patients, lack of knowledge, motivation, time and socioeconomic resources are major barriers^(15,16,17,18,19). The healthcare system, which is fragmented and designed for episodic management of acute illness, lacks the organization and incentives to improve care of diabetes^(19,20,21,22).

The use of biometric monitoring devices in diabetes could overcome several of these barriers. These devices measure blood sugar and transmit their readings to a web page where providers can review it on daily basis. This allows for early intervention if the sugars are out of range, and provides a much more accurate and frequent flow of data than providers usually get. For patients, it allows close tracking of blood sugars over time, and makes it easy to spot trends, and therefore supports compliance. It also increases feedback and interaction with the provider between scheduled appointments. For the healthcare system, it permits enhanced population management and enables guidelines for sugar levels to be tracked and monitored for many patients simultaneously.

Despite the promise of biometric monitoring devices in diabetes, the literature has not demonstrated major benefits. A study of pediatric patients did not show any differences in blood sugar control between patients with and without devices⁽²³⁾. Several studies of adult diabetes demonstrate differences which were either not statistically significant or had only a small statistically significant difference^(24,25). But some studies in gestational diabetes home monitoring showed an improvement in blood sugar levels⁽²⁶⁾.

Whether these studies failed to improve outcomes because of patient, systemic or provider barriers is not clear. What is clear is that without efforts to improve HCP knowledge and skills, these devices will have even less success once they move from experimental use to practice.

If current trends continue, HIT will become increasingly important for managing care of people with chronic illnesses. Federal policymakers are supporting it through a wide variety of initiatives, ranging from the establishment of the National Health Information Technology Coordinator position within the Department of Health and Human Services, to the Medicare Health Support project (a program enrolling Medicare beneficiaries in Disease Management programs), to support for telehealth and telemedicine research at the National Institutes of Health. Despite this support and momentum, a number of systemic, HCP and patient barriers stand between development of technological tools and their successful implementation. The Age Tech Project curriculum focuses on overcoming HCP-related barriers, including lack of awareness, tools, skills, motivation to use HIT.

Discussion:

Current Educational Models for HCPs:

Despite the rapid evolution of HIT, there is relatively little in the literature about what the core content of educational materials for HCPs should include, and few curricular materials are available. A search of the literature and the World Wide Web for descriptions of curricula related to the use of telehealth technology designed to improve care of patients over distance revealed that there is very little available. The best-developed curricula focus on what has been called “telemedicine” in the past – the provision of specialist or primary care services across distance using video and other fast data connections. There is much less about the use of biometric monitoring devices, personal health records, or electronic health records.

There are a few model curricula available, but most of them focus on one limited aspect of HIT. Health IT Certification is available from a private sector company

offering training in the management of Electronic Medical Records (EMRs) and Health Information Technology (HIT)⁽²⁷⁾. The curriculum does cover these topics and related legal, ethical and technical issues, but does not address telehealth, or home-based technologies. It is also designed for health information management professionals, rather than for clinicians.

There are several telemedicine curricula available that teach about telemedicine using distance learning technologies. Oklahoma State University (OSU) was the first in the nation to implement telemedicine training for students. OSU students receive hands-on training in telemedicine⁽²⁸⁾. The Arizona Telemedicine Program (University of Arizona Health Sciences Center) offers telemedicine distance learning programs through interactive video continuing education programming and as credit for busy health care professionals and students throughout Arizona⁽²⁹⁾. This provides online demonstration of telemedicine projects.

The most comprehensive curriculum we discovered was developed and is being used by the Department of Veteran Affairs (VA)⁽³⁰⁾. The VA has made a commitment to telehealth technologies, as well as telemedicine, because of its aging population which has a high prevalence of chronic disease, recognition that patients would be empowered to manage their own care, desire to achieve efficiencies by using technology to extend the ability of HCPs to care for more patients, and the need to provide services to veterans who live at significant distances from VA medical facilities. These technologies within VA are closely tied to care management initiatives that aim to improve care by coordinating services to meet the needs of each individual patient.

The VA is currently investing millions of dollars to buy two-way videophones, two-way messaging devices with biometric monitoring capacity, and advanced in-home devices that incorporate messaging with advanced monitoring through use of comprehensive arrays of biometric monitors (including scales, blood pressure cuffs, glucometers to measure blood sugar, EKG leads and electronic stethoscopes). This technological investment builds on a longstanding commitment to the use of electronic medical records and complements the development of a web-based personal health record that will permit veterans to directly access their own medical records, have secure e-mail messaging with providers, manage prescriptions and appointments on-line and obtain health information directly from trusted web-based sources.

The current VA telehealth curriculum is mandatory for all staff who work with telehealth, but is not readily available

beyond the VA. It is an internet-based series of self-study modules that introduces important topics related to telehealth and care coordination. Each module includes information about a topic and pre- & post-tests designed to assess the learners' knowledge before and after the completion of the unit. The curriculum content includes basics about telehealth and information technology; principles of care management; how to use the devices currently being purchased by VA; how to create a telehealth program; informed consent, privacy and related ethical issues; and how to code and bill for telehealth visits, among other topics.

This curriculum is an excellent resource and a very good model for other curricula, and is constantly being updated and expanded. New modules in the future will address how to incorporate the personal health record into the patient's care; update the available technology; and address the specific educational needs of physicians, nurses, social workers, care coordinators and others who use these technologies to provide care to patients.

Developing an Educational Model and Curriculum:

Successful curricula are based on educational models that take into account the current knowledge of the learners, and use adult learning theory to communicate important information. Adult learning theory holds that learners need to acquire awareness, skills, tools and motivation before they are able to use new technologies. Awareness in this context means that HCPs must learn at a minimum about the range of technologies available, how the technologies work, and who will pay for them. They need the skills to effectively deploy the technology, to interpret the information gathered from these devices, to assess when a particular technology is effective, and to understand how the process of care is different when using a particular technology. They need tools to do this – guidelines about which patients will benefit from what kind of technology and knowledge of how to educate and train patients to use these technologies. Finally, they need to be motivated to actually recommend the technologies to their patients and to incorporate them into routine practice.

In order to create awareness, skills, tools and motivation, a technology curriculum for HCPs must address how these technologies will affect the role of HCPs, describe (or at this point estimate) how the technology will change the processes of care, and explain what effect these changes will have on the providers in terms of how they will do their jobs and how it will affect the relationship between HCPs and patients.

These technologies will powerfully affect and change the process of health care delivery. They will empower

patients to take greater control over their illnesses and health needs, and will enable them to get not only needed information but helpful feedback and some day, provision of care through robotics, artificial intelligence and other advanced technologies. In turn, the traditional model of health care where patients meet face to face or talk on the phone with providers on a very periodic basis will be replaced with a model where there is continuous monitoring of health and disease states, and greater and more frequent interactions with HCPs, but through technology rather than in-person contact. This will change the roles of HCPs, and new professions such as telehealth care coordinators and health coaches will evolve and become a common part of the health care system.

The Age Tech Project Curriculum:

The Age Tech Project is building an HIT curriculum for HCPs to provide them with the awareness, skills, tools and motivation needed to effectively use HIT in managing chronic diseases in older people. Age Tech is developing an integrated geriatrics and telehealth curriculum for interdisciplinary team training, developing a dissemination plan for curricular materials, and creating a Technology Education Advisory Panel (TEAP) consisting of local, regional and national experts on the use of telehealth to improve the care of older adults.

At the end of the training, AGE Tech's curricular model will enable participants to: (1) define chronic disease models and the various components involved with disease management and care management; (2) deepen the role of telehealth and HIT in chronic disease management and the various components of HIT; (3) attain a basic understanding of the infrastructure involved in the functioning of HIT in chronic disease management; (4) demonstrate the use of telehealth devices & HIT tools and the process involved; (5) critically assess the current knowledge and limitations involved in prescribing the valid HIT tools for the right persons; (6) describe and critically evaluate chronic disease management strategies with the help of HIT through the examples of chronic heart failure and diabetes; (7) identify the needs of geriatric patients and understand how HIT can assess these needs; (8) identify the major ethical aspects involved in the implementation of telehealth/HIT in chronic disease patients and (9) demonstrate new insights about how interdisciplinary team (IDT) uses HIT.

The curriculum will use a combination of power point presentations, case studies and pre- and post-tests. All materials will be available through the World Wide Web, and will be useful for either distance learning by individuals, or for presentation to small group audiences. The curriculum is being carefully evaluated and

developed using an iterative process so that it will meet the needs of HCPs using it.

Conclusions:

A HIT curriculum for HCPs must create awareness, skills, tools and motivation to use the technology. In the same way the telephone revolutionized care of patients one hundred years ago, these new technologies will have profound effects on the way healthcare is provided.

Review of the effect of one particular technology, the use of biometric monitoring devices to manage diabetes, reveals that in order for the technology to work, the health care environment must adapt to how these technologies change the ability of patients to manage their own health and how they relate to HCPs. More needs to be done to address professional, patient, and systematic barriers to implementation of these devices, and a number of demonstration projects and disease management initiatives in both the public and private sectors are ongoing.

Curriculum development needs to catch up with technological development. Questions about the core educational model and how to effectively educate HCPs must be addressed and answered today, so that patients and HCPs alike are able to understand, accept and utilize these technologies to achieve maximal benefit. A dialogue between technologists, HCPs, patients and health care administrators about what should be in these curricula to ensure that HCPs have the necessary awareness, skills, tools and motivation needs to occur now. HIT may be a solution for some of the health care problems facing us today.

“The automation of clinical, financial and administrative information and the electronic sharing of such information among clinicians, patients and appropriate others within a secure environment are critical if the 21st – century health care system (envisioned by the committee) is to be realized”⁽³¹⁾.

Despite the challenges of overcoming the existing knowledge gap among HCPs about the uses and applications of telehealth and HIT, curriculum development and training must proceed. As Albert Einstein said, “In the middle of difficulty lies opportunity.”

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