Disease Management Technologies: User Needs Can Guide Decision Making

by Rachel Shapiro and Lorenzo Moreno

Disease management programs for chronically ill people have proliferated in recent years. Health care insurers, providers, and the federal government now recognize that chronic illnesses, especially among seniors, account for most health expenditures in the United States. To manage care for people with chronic conditions, such as asthma, depression, congestive heart failure, coronary artery disease, diabetes, hypertension, and renal disease, providers are turning to disease management programs that incorporate emerging health information technologies, in particular, computers with telecommunication features. Although these technologies hold promise for improving care coordination and delivering timely information more effectively to help chronically ill people take better care of themselves, little is known about which technologies are best suited for seniors not knowledgeable about health matters and not facile with computers. This brief explores these issues.

Needs of a Vulnerable Population

Purchasers of technology-based disease management systems often assume that users are both health and computer literate. But these assumptions may not be true for older adults. Consequently, purchasers may need to consider how accessible and usable systems will be for their target populations, such as chronically ill seniors with substantial barriers to care. Yet purchasers may lack information about the technologies these systems use, demands on users, and consequences of making the wrong choice.

Health literacy—defined by the Institute of Medicine as “the degree to which individuals can obtain, process, and understand the basic health information and services they need to make appropriate health decisions”—is commonly low among seniors, racial and ethnic minorities, and people with chronic conditions. One study found inadequate or marginal health literacy in about a third of English-speaking and half of Spanish-speaking Medicare managed care beneficiaries. This problem is compounded by low literacy levels of seniors in Medicare managed care: about 30 percent did not graduate from high school. Furthermore, inadequate health literacy may be associated with more severe health problems—for instance, those with diabetes and poor health literacy have worse glycemic control and higher rates of retinopathy than their more health literate counterparts. Finally, seniors with inadequate or marginal health literacy are more likely to be hospitalized than those with adequate health literacy.

The Technology Conundrum

Americans of all ages differ widely in their access to and comfort with computers, and many seniors remain apprehensive of and intimidated by new technology. According to recent surveys conducted by Pew and Kaiser, only between 29 and 42 percent of people over 65 have ever used a computer. Furthermore, seniors are half as likely as younger people to have used the internet, which assumes being comfortable with using a computer.
Seniors’ computer literacy also varies considerably on the basis of income, education, age, race or ethnicity, and gender. Functional impairments resulting from cognitive, physical, and other disorders can also weaken computer literacy. In general, low-income seniors—who make up 64 percent of the Medicare population—are less likely than those with higher incomes to have ever gone online. For instance, 15 percent of seniors with incomes under $20,000 have ever gone online (see table). Only 18 percent of seniors with a high school degree or less have ever gone online, compared with 60 percent of those with a college degree. And the older the senior, the less likely he or she is to have used the internet or email. Finally, whites are more likely than blacks, and men are more likely than women, to have ever gone online.

New Technology Options

Technology-based disease management applications may reduce barriers to care, improve quality of care, and cut administrative costs. These applications fall into three broad categories: (1) data capture and monitoring systems; (2) audiovisual communication systems; and (3) self-help, education, and training systems.

1. Data Capture and Monitoring Systems. Patient-reported data on health status and well-being are the cornerstone of most disease management programs. Designers have developed a range of applications for monitoring chronically ill people’s health status, from autonomous devices (or “appliances”) that record data and transmit them through home telephone lines, to home-based telemedicine systems that require a personal computer and an internet connection. In general, these systems store a patient’s uploaded data in clinical databases or repositories, enabling providers to track trends in patients’ measurements.

Many of the monitoring systems designed for seniors are easy to use and do not require a personal computer. For instance, to monitor blood sugar levels of seniors with diabetes, some disease management programs rely on glucometers connected to telephone lines or, wirelessly, to a remote computer. Seniors with diabetes, already familiar with measuring blood sugar regularly, find such devices easy to operate—they need only turn on the device, put a drop of blood into it, and press a button to transmit the reading to a central repository. Similar devices monitor blood pressure, heart rate, and body weight. Some systems rely on a touchscreen to ask users questions about their health, symptoms since the last contact, and medications taken. Other devices have prerecorded instructions that guide users in responding to questions, placing few demands on their computer skills. With computer-based touchscreens, however, users must be able to turn a computer on and off and log in, which might be problematic for those not acquainted with these functions and the use of a keyboard and mouse.

2. Audiovisual Communication Systems. Most technology-based disease management programs rely on some sort of audiovisual communication system to link patients and providers. These interactive systems, which can easily be targeted toward seniors with inadequate or marginal computer literacy, enable patients and providers to interact during an “e-encounter” or “televisit.” During the encounter, they exchange information, and the provider ensures that the patient understands how to follow self-care and comply with instructions. Most systems include an appliance with a video camera and integrated video display, a microphone, a speaker, and an activation button. Some systems transmit video, voice, and clinical data over telephone lines; others use computers and the internet and require a monitor, keyboard, and mouse.

Some non-web-based appliances have replaced the video display with an ordinary television and remote control, which most seniors know how to operate. Typically, communication is established through a telephone modem or an internet connection. Sometimes peripherals, such as telephonic...
stethoscopes or digital thermometers, are attached to the appliance or computer for monitoring. Complexity of use in computer-based systems—the need to log in, establish a stable audiovisual connection, operate a mouse, and perhaps adjust contrast on a computer screen—may be challenging for some seniors.

Disease management programs usually provide self-help, education, and training to patients, often over the telephone, through case managers or specialists, such as dietitians and psychologists, whose goal is to modify behavior and control risk factors associated with a chronic condition. Some programs also offer technology-based tools or information for self-managing chronic conditions. The range of applications is vast—from web-based resources requiring a computer and internet connection, to multimedia, interactive CD-ROMs and DVDs using only a computer or DVD player. In general, seniors are expected to operate most of these systems on their own, although some systems may involve interactions with providers.

Perhaps the most usable and accessible educational systems provide information through web pages on management of chronic conditions, preparation for physician visits, and health-related news. Seniors can also access information through links to medical dictionaries and encyclopedias, as well as interactive tools. These web-based resources assume that seniors are acquainted with the operation of computers and the internet. Some designers have developed systems that preclude the need to use the internet and instead run preloaded interactive presentations on appliances with an audiovisual display or on personal computers with a monitor and speakers. These applications use plain text and animations to inform seniors about self-management of their conditions or their daily medications.

The simplest systems involve CD-ROMs or DVDs, with information appearing in text, audio, and video format. Although they require only basic skills for operating electronic equipment (such as starting and stopping a presentation with a click of the mouse), they may be difficult to follow if the information is not presented at an appropriate pace and in the right format, since seniors process information more slowly than younger people. Some sophisticated systems combine functionalities and can be used for monitoring, audiovisual conferencing, and education purposes. Although these systems hold promise, particularly in improving communication between patients and providers, and are well-liked by providers for their efficiency, they may be challenging for seniors to use.

Choosing a System
Deciding which systems to use involves considering acceptability, usability, and technical factors. Disease management system purchasers and health care providers should consider the following when selecting a disease management system:

- Assess the technology and applications. This step involves analyzing systems to understand what will be required of users. Consider whether vendors...
have already developed applications for the target disease(s) and, if so, whether the applications include the appropriate functionalities. In analyzing usability, think about the health- and computer-literacy levels users must have to operate the application successfully.

• Understand users’ skills and needs. Assessing health literacy and familiarity with the technologies involved in the application under consideration should also involve consideration of the socioeconomic characteristics of future users, as well as cognitive and physical limitations. Education level and occupation can be used to estimate literacy levels. Pretesting the application can help in assessing usability and understanding whether modifications may be needed to improve user friendliness.

• Assess the needs and skills of the health care providers, such as physicians and nurses, who will use the proposed application. Ask them to examine the application’s plan of care and goals, and to review functionality and ease of use. Determine what level of training will be needed for this group.

• Consult with health information technology experts on the technical merits and features of the application. A product that seems to address the right needs should be examined by internal and external experts to determine whether it has any technical issues rendering it inadequate for its targeted use. Consideration should be given to the affordability and appropriateness of any hardware and software that may be needed in the future, as well as interoperability and security of the application and data repository system.

Implications for the Future

Purchasers of information technology for disease management are likely to face a multitude of choices in the future. This brief illustrates the importance of focusing on the needs and skills of intended users in decision making. It also shows that acceptability, usability, and technical features should receive equal weight in deliberations. Although the broad range of applications available and the rapid technological advances on which these applications rely can seem daunting, incremental steps can help illuminate the right choices.

Making a sub-par choice could lead to failure for a number of reasons—including inefficient use of providers’ time, high costs that strain an organization’s resources, and accessibility or usability barriers that frustrate users or providers and interfere with care. In contrast, choosing wisely can help disease management programs fulfill their considerable potential to improve patient self-care, quality of care, and satisfaction, as well as reduce costs.

References


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