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Health Informatics Journal published online 20 September 2013
DOI: 10.1177/1460458213486906

The online version of this article can be found at:
http://jhi.sagepub.com/content/early/2013/09/18/1460458213486906
“Willing but Unwilling”: Attitudinal barriers to adoption of home-based health information technology among older adults

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Abstract
While much research focuses on adoption of electronic health-care records and other information technology among health-care providers, less research explores patient attitudes. This qualitative study examines barriers to adoption of home-based health information technology, particularly personal electronic health records, among older adults. We conducted in-depth interviews (30–90 min duration) with 35 American adults, aged 46–72 years, to determine their perceptions of and attitudes toward home-based health information technology. Analysis of interview data revealed that most barriers to adoption fell under four themes: technological discomfort, privacy or security concerns, lack of relative advantage, and perceived distance from the user representation. Based on our findings, systems to promote home-based health information technology should incorporate familiar computer applications, alleviate privacy and security concerns, and align with older adults’ active and engaged self-image.

Keywords
Consumer health information, data security and confidentiality, ehealth, electronic health records, older adults

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Introduction

The US Institute of Medicine identifies use of information technology (IT) as central to improving health-care quality.\textsuperscript{1} In addition to the need for adequate macro-level support, adoption of ITs such as electronic health records (EHRs) is subject to the attitudes, abilities, and technological capacity of prospective users.\textsuperscript{2} In particular, patient engagement and enthusiasm are key elements in determining success of efforts to apply IT to health care. However, while much research and government funding focuses on adoption of EHRs and other ITs among health-care providers and organizations, much less research explores patient attitudes.\textsuperscript{3} This qualitative study examines barriers to adoption of home-based health IT, particularly personal EHRs, among older adults.

Patients and EHRs

Health IT promises to streamline and improve communication among health-care providers. As such, adoption of health IT is crucial to current government efforts directed at health-care systems change and patient-centered care. EHRs and linked web messaging could facilitate the exchange of personal health information, including patient-generated information, among health-care providers.

Among physicians who have adopted EHRs, most office-based physicians report that use of the technology has enhanced patient care.\textsuperscript{4} Other research reinforces how health IT could streamline care to improve health outcomes.\textsuperscript{5,6} In one study, patients whose physicians used EHRs asked more questions during medical visits.\textsuperscript{7} In addition, patient access to EHRs could also provide patients more information about their own conditions and treatment,\textsuperscript{8} an important element of recent trends toward patient-centered care. These benefits could be particularly acute among older adults who might have more coexisting conditions, see more physicians concurrently, or have more complicated treatment regimens. Among older adults, the incidence of disabilities—a term that encompasses everything from arthritis to Alzheimer’s—doubles every 5 years after the age of 65 years.\textsuperscript{9} In pilot projects, web messaging and EHRs decrease office visits to primary care physicians and specialists,\textsuperscript{10} a trend with potential to influence care among older adults who use much more care per capita.

Past research has shown that patients are generally positive about EHRs and web messaging in a health-care setting. A survey and interviews of users of an insurance company’s system for EHRs and web messaging, half of whom were aged 46–64 years, reported that patients found the system to be fairly accurate and easy to use.\textsuperscript{3} Patients were also proponents of web communication and preferred e-mail to face-to-face for interactions such as follow-up questions, prescription refills, or appointment reminders. A systematic review of barriers to implementing EHRs found that patients reported fewer concerns about privacy and security than did health-care providers.\textsuperscript{2} Another study reported patient perceptions of EHRs as user-friendly, but also found little evidence of public knowledge or interest in them.\textsuperscript{11}

Older adults in particular seem likely to express interest in home-based health IT that allows them to manage care and maintain personal medical records.\textsuperscript{12} In a series of focus groups,\textsuperscript{13} most of the 76 participants aged between 50 and 65 years were very interested in a device that organized all their health-related information, but most wanted to maintain control over who had access to the information and how it was used. Based on another series of focus groups with participants between the ages of 50 and 60 years, authors concluded that Baby Boomers are the driving force behind new technologies in health care.\textsuperscript{14}
Despite general acceptance of health IT, few patients maintain EHRs on their own home computers. Efforts by large tech companies to bring health IT directly to consumers have largely failed, and one analyst describes personal EHRs as “a technology in search of a market.” In 2011, Google shut down its Google Health service, a portal for users to enter and maintain their own health data. A survey that same year found that only 7 percent of consumers had tried online personal EHR services such as Google Health, and only half of those continued to use the service regularly. For most older adults, low adoption rates for home-based health IT and personal EHRs are not necessarily related to lack of technology access, interest, or skill. For the first time in 2012, more than half of Americans over 65 years reported going online, and use is even more prevalent among those younger: 77 percent of those aged 50–64 years reported using the Internet. In addition, most adults over 50 years own cell phones and home computers. One study found that the use of computers by the elderly was not significantly different from other age groups, a finding the authors present as convincing evidence to counter the stereotype that older adults are resistant to trying new technologies. However, with older adults as with other groups, the decision to adopt a new technology is not a given, but is based on perceived ease-of-use and utility, or whether a technology would enrich quality of life. Theory suggests that to be adopted, a new technology should demonstrate relative advantage over existing practice. Another factor shown to influence adoption of new technology is compatibility, or whether potential users perceive that the user group targeted by the technology is congruent with their lifestyle and self-image.

To understand why home-based health ITs such as EHRs fail to be adopted, we must first determine user attitudes that present barriers. Perceived barriers predict behavior in models such as the Theory of Planned Behavior and the Health Belief Model. In addition, perceived barriers are strong predictors of patients’ self-management, adherence, and compliance behaviors. Using in-depth interviews to discern users’ perceptions and attitudes, this research seeks to answer the following research question: What are the barriers to adoption of home-based health ITs, particularly EHRs, among older adults?

Methods

This study was part of a pilot project to inform development of a home-based health information platform targeted to older adults. Because the purpose of this study was exploratory in nature, in-depth interviews were chosen in order to gain insight into how older Americans perceive technology as it relates to health. Qualitative methodology aims to understand a social phenomenon from the viewpoint of research participants by providing “thick description” of both the social construction of the phenomenon and the meaning behind its context. Qualitative research is also used to explain perceptions of participants in their own words. This research was approved by the University of Missouri institutional review board.

Interviews were conducted with 35 older adults in 2009. We employed purposeful sampling to ensure an approximately equal number of men and women within our target age range. Initial respondents were recruited from an independent living facility in a Midwestern college town and from a series of e-mails sent to those in Baby Boomer age range. Respondents then suggested acquaintances as additional interview participants, a recruitment procedure known as snowball sampling. The only inclusion criterion was age (range, 46–72 years; 16 men and 19 women). This age range was selected to represent the Baby Boomer generation, plus 10 years. While there is no established sample size for qualitative research, 35 interviews were found to be sufficient based on Strauss and Corbin’s concept of “theoretical saturation.”
All of the respondents owned a personal computer and used the Internet for e-mail and "Googling," which was a verb used to mean searching for information online, particularly health information. The most invested in personal computing also used the Internet for reading news, making travel arrangements, and financial transactions such as paying bills and keeping track of stocks. Nearly all respondents described their health as "good" or "pretty good for an old lady" (i.e., good but with some qualifications). Three respondents said their health was "fair."

The interviews were semistructured. The relevant themes, including technology use in general, technology use related to health care, and perceptions of and attitudes toward home-based health IT, were used to develop a list of questions that guided the interviews. Duration of the interviews varied from 30 to 90 min, and they were conducted face-to-face or over the phone (based on respondent preference). All interviews were recorded and transcribed verbatim.

Open coding is "the process of breaking down, examining, comparing, conceptualizing and categorizing data."27 After interviews were transcribed, two researchers independently conducted a line-by-line analysis of responses to locate concepts and themes. The researchers first discussed and then refined the preliminary themes based on a mutual agreement of the underlying properties that comprised each theme. The findings are presented here, followed by discussion and practical implications.

### Results

For most people, the idea of a home-based system to manage personal EHRs and web messaging was unfamiliar. Although several respondents had physicians who maintained digital records and used laptops for notes during examinations, computerized medical information was seen as the purview of the provider only. Analysis of interview data revealed that most barriers to adoption fell under four themes: technological discomfort, privacy or security concerns, lack of relative advantage, and perceived distance from the user representation.

#### Technological discomfort

Although computer use was a constant, many respondents expressed antipathy toward computers. Their workings were mysterious and suspect, they promised to expedite things but actually made them more complicated, and they lacked social presence. The idea of using computers to organize medical information and contact physicians was of dubious value and, to some, downright unappealing. In discussing systems that store personal EHRs online, the Internet was seen as too vast, lawless, and transitory to be a storehouse for something as significant as medical records. In general, health-related communication on the computer was described as impersonal and even inferior. Although respondents used computers daily, they demonstrated skepticism about the need for a program to organize EHRs on a home computer. Such programs represented another unwelcome inroad of computers into their daily lives.

E-mail was used by all respondents, and they were much more comfortable with the idea of health-related interaction via e-mail than with the prospect of storing their EHRs on a personal computer. Although only a few respondents had used e-mail to contact physicians or other health-care providers, most were open to the possibility and thought it would be useful particularly for questions about medications or asking about whether symptoms warranted an office visit or follow-up. In contrast to the majority who welcomed another avenue of communication with physicians, a minority felt they would prefer never to use e-mail with a health-care provider. These respondents thought e-mail would likely be read and answered by medical support staff, seen as less expert than a physician.
Privacy and security concerns

Computers were woven into the fabric of respondents’ lives, but most still maintained skepticism about their safety, particularly the safety of information on home computers as opposed to computers used by health-care providers. They offered many privacy and security concerns that seemed motivated in part by the idea of using the computer for something as personal as medical records. Hackers were an oft-repeated worry. One man said,

Any information whether it’s on your computer or somewhere, whether it’s Google or whatever it’s vulnerable. You can have best risk prevention kind of things, but hackers or whatever tend to be one step ahead.

Mention of Google Health in particular as a system for storing records was met with confusion or even incredulity because “Google” was associated with public, insecure information.

Physician computers were seen as more secure and trustworthy retainers of sensitive information than personal computers. In addition, the reliance of the US system on profit-making private insurance companies set up a dichotomy between health-care providers, who were seen as having patients’ best interests at heart, versus insurers, who were seen as being concerned with maximizing profit not health. One man said,

That would bother me; because they have a financial interest in it rather than a medical interest; we’re coming at it from two different points of view. … They care about their bottom line and who should we insure and who shouldn’t we insure.

Respondents were also concerned that information they stored in the system could be used against them, as evidence of preexisting conditions.

A few respondents acknowledged that the web was not secure but were resigned to that fact. The perceived vulnerability of information was a fact to be accepted rather than a barrier. One man said,

I would do it very, very reluctantly. I pay credit card bills online, when I was dealing with Social Security I did some things online, and there’s always a little bit of hesitation. I’m cautious. But I will do it.

These respondents were willing to trade privacy and security for perceived utility.

Lack of relative advantage

For many participants who were introduced to the idea of home-based health IT and personal EHRs in the interviews, the response was as follows: Why would I want to do that? Most participants were satisfied with their current systems of paper record keeping. As one woman, a retired librarian in her 60s, put it: “When something’s on the web, I tend to forget it. The web seems so ephemeral, and paper seems solid.” Paper copies of records represented security. One woman could not imagine replacing paper copies with files only stored digitally: “I would probably back it up anyway with hard copies, so what’s the point?”

Storing information on computers was seen not as expedient but as more complicated, because these respondents did not have faith the computer would do its job. The idea of having one more thing to do on a computer was also onerous. One man felt that there were too many technologies to keep up with already. Therefore, a new technology should be user-friendly, so older users did not have to bother others for assistance:
I always worry about these new gadgets because I don’t want to have to learn how to use something. I want whatever it is to just fit me. … I don’t want to have to call my son and ask him to figure out how this new technological gadget fits into my life, or how to use it, how to program it … or if I have a problem with it, I don’t want him to always be burdened with me not knowing. It’s just not worth it.

The burden of proof for the relative advantages of using home computers for EHRs was high, since users did yet not envision a need for these technologies themselves and were wary of new platforms that would require new skills.

An undesirable user representation

The imagined user of a system to manage personal EHRs, as interpreted by respondents, was predominantly someone elderly, infirm, or with a chronic condition; someone obsessed with health; or someone irresponsible about health who needed constant reminders. Respondents did not think that they fit within any of these categories.

Chronic illness was seen as one potential reason to invest time and resources in a system to manage records. One woman said, “if I had an illness that required tracking and integrating information from institution to institution then I might be inspired to use it, but I doubt it.” For some, access to records was also seen as dependent on medical circumstances; in their current state of health, participants felt that, as one woman said, “there’s not anything to keep track of.” For some, reminders about appointments or to take medicine were seen as unnecessary or even insulting, an indication that one could not manage health affairs without assistance. The messages might be helpful not for the participants themselves but “for people older than me.” People were also fearful of being inundated with information, not knowing how to make sense of any of it or being hit with “spam.”

Several participants found the idea of recording personal EHRs to be a sign of an unhealthy health obsession. One man said, “I can’t imagine doing it. Who would care? … That would be like gazing at my navel.” Using computers to manage and store health information evoked some of the same emotions as the social push to Facebook membership: “No, I keep getting emails, these people want you to join, but I don’t know, I just haven’t done it. It’s just kind of another layer of privacy gone.” For many, sharing information about an aspect of their life or health that had previously not been online was an uncomfortable amount of exposure.

Discussion

Patient comfort and facility with personalized EHRs is necessary for the mutually beneficial exchange of information envisioned in patient-centered care. The purpose of this study is to examine barriers to adoption of home-based health IT, particularly personal EHRs, among older adults. Analysis of data from 35 in-depth interviews reveals four thematic barriers to adoption of personal EHRs: technological discomfort, privacy and security concerns, lack of user representation, and perceived distance from the user representation. As in previous research, respondents demonstrated a lack of knowledge about EHRs and a lack of motivation to change their current practices, due, in part, to distaste for or distrust of computers in general. Among respondents in our study, computer use was ubiquitous, but use did not necessarily translate to comfort, particularly related to applications of computers to new domains such as health. Most respondents had few preconceived ideas about whether they would be likely to use computers to store personal medical information, but when confronted with the idea, they were dubious. The general feeling seemed to be that computers were creeping into every facet of life; computerization of health
care was seen as inevitable, despite the fact that they felt doing things on computers was sometimes less efficient and less convenient than the paper-based systems that were most familiar. One respondent described herself as “willing but unwilling.” Respondents made it clear that this innovation had to come with obvious advantages that could combat concerns about privacy and security as well as the perceived difficulty of using computers to manage information that was currently stored in file cabinets.

An increased focus on prevention and the American cultural value of individual responsibility for health suggest that patients will be increasingly responsible for documenting health behavior and maintaining personal EHRs. While participants uniformly considered digital record storage to be a good idea for health-care providers, including their personal physicians, they considered their home computers as separate from health IT at the systems level. Physician computers were seen as more secure and trustworthy retainers of sensitive information than personal computers. Health records in particular were seen as too private to be stored on the Internet, in contrast to financial information. In addition, although a purported benefit of personal EHRs is provision of more information to patients, the participants in our study did not mention this as a boon but rather as a factor that complicated their lives. More information entered or received via computer would require more organization, on a computer platform many were not comfortable with, and more interpretation of complex and confusing medical records. Finally, respondents imagined the person who would use a computer to store medical records and receive medication or appointment reminders as feeble, forgetful, and chronically ill: in short, as someone older and less able than themselves. The view of a user implicit in a technology has been called the user representation. In other studies of technologies explicitly related to aging, user representation is a barrier to adoption when it conflicts with a potential user’s self-image as mentally sharp, independent, and socially and physically active. Research on health technology assessment emphasizes the need to solicit and consider patient perspectives. For technologies that rely on voluntary patient adoption, consideration of user representation could be one avenue for eliciting public opinion regarding the compatibility of technologies with a potential user’s lifestyle and self-image.

The barriers are significant but also suggest direction for future personal EHR research and practice. First, many respondents seemed to operate within a digital comfort zone. Computers were used over and over for certain tasks such as e-mail and “Googling,” but the need to learn anything new provoked anxiety. Home-based health IT could capitalize on this preference for existing technologies by bundling existing sites and services already familiar to users in a new platform, with new benefits. In addition, developers of health technology products for older adults should ensure that the user representation implicit in the technology is of someone who is active physically, mentally, and socially. Even respondents in their late 60s, some with multiple medical problems, did not see themselves as needing a system to manage their health information. The idea of a system framed in terms of family medical history might be more appealing than a system described as promoting aging in place, or some other outcome associated with elderly persons. Incorporating web messaging with physicians, a popular idea, social communication, and health news could also increase interest, which is consistent with findings that health platforms including social and information elements are more popular with users.

**Limitations**

Our study was preliminary in nature and was limited in scope by the chosen approach, in-depth interviews. Another limitation of this study is the homogeneity of the sample. All respondents had personal computers and at least a baseline level of computer literacy. Future research could explore...
this research question with respondents who are less technologically savvy or among groups most susceptible to disparities in treatment or health outcomes.

**Conclusion**

Although most studies of health IT and EHRs focus on health-care providers and organizations, patient perception of technology is important for both in-home and in-office use. Our study of attitudinal barriers to adoption of personal EHRs found lack of knowledge and resistance among technologically capable older adults, those likely to benefit from home-based health IT. Future studies exploring development and adoption of home-based medical technologies should take care to incorporate user needs and attitudes. Based on our findings, a successful system should incorporate familiar computer applications, be as simple and secure as a sheath of file folders, and respect users’ active and engaged self-image.

**Funding**

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

**References**

7. McGrath JM, Arar NH and Pugh JA. The influence of electronic medical record usage on nonverbal communication in the medical interview. *Health Informatics J* 2007; 13: 105–118.