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## Acceptance and Use of Health Information Technology By Community-Dwelling Elders

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### Abstract

**Objectives**—With the worldwide population growing in age, information technology may help meet important needs to prepare and support patients and families for aging. We sought to explore the use and acceptance of information technology for health among the elderly by reviewing the existing literature.

**Methods**—Review of literature using PubMed and Google Scholar, references from relevant papers, and consultation with experts.

**Results**—Elderly people approach the Internet and health information technology differently than younger people, but have growing rates of adoption. Assistive technology, such as sensors or home monitors, may help ‘aging in place,’ but these have not been thoroughly evaluated. Elders face many barriers to using technology for healthcare decision-making, including issues with familiarity, willingness to ask for help, trust of the technology, privacy, and design challenges.

**Conclusions**—Barriers must be addressed for these tools to be available to this growing population. Design, education, research, and policy all play roles in addressing these barriers to acceptance and use.

### Keywords

Health information technology (HIT); elderly; Internet; community-dwelling

### Introduction

The proportion of elderly adults is rising across the world, primarily due to increased life expectancy.(1) This demographic shift is creating many new challenges for healthcare systems. In the US, one notable measure known as the dependency ratio—the ratio of people 65 and older to every 100 people of traditional working ages—is projected to climb from 22 in 2010 to 35 in 2030.(2) Although families have always had a role in the care of elderly,

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children and other family caregivers will need to shoulder an increasing burden of care for their loved ones who are at risk of experiencing functional and cognitive decline.(3)

The complexity of modern healthcare coupled with the current dearth of good tools to support seniors and their families make information technology a promising aid for an aging population. (4) Health information technology may be able to help older people in independent living and to stay in their own homes longer and “will aid care delivery in an environment of a shortage of carers.”(5) Improvements in communication, information transfer, mobile health and monitoring, and clinical data sharing all have potential to help seniors and their families manage their health at home.(6) In this paper, we review the literature on health information technology tools for the elderly and their families and caregivers, addressing challenges in acceptance of technology in general, HIT-specific barriers, and recommendations for the future. We look at the way the elderly approach information technology and how they might be different in their willingness to use this technology.

## Methods

We reviewed the existing literature, beginning with a PubMed search for [(“older adults” OR “elderly”) AND (“Internet” OR “information technology”)], which yielded 772 articles, including 106 reviews. We searched Google Scholar with the same search term and the additional word “health” to expand our reach beyond those journals indexed by PubMed, reviewing the first 100 results for additional relevant articles. Given the pace of change in technology, we limited our search results to the last 5 years, though key earlier examples were also cited if no newer research had been done. Abstracts were reviewed by an author (either S.F. or D.D.) and articles consistent with the aims of the review—addressing health IT interventions for the use of community-dwelling elderly or their caregivers—were read in their entirety. We then examined the relevant references in the articles we identified. We also consulted other known primary sources, such as the Pew Surveys(7-14) and Cochrane reviews.(15) Lastly, we consulted with geriatricians and IT researchers who have been working on the topic of health IT and the elderly for any relevant articles we may have missed. Many studies found were small, qualitative studies conducted in specific locations or specific disease populations. Selected articles are cited in this narrative review. The search strategy is diagrammed in Figure 1.

## Older Adults and Acceptance of Information Technology

Health information technologies in the field of geriatrics has been organized into five types: telecare, electronic health records, decision support systems, web-based packages for patients and family caregivers, and assistive information technologies.(16) While each of the above subtypes may offer benefits to patients and families, as well as disruption to the current healthcare system, we focus on patient-facing technologies for elders and caregivers in this review of acceptance of technology.(17)

First, we examine the use and acceptance of the Internet, a conduit to social information, data sharing, web conferencing, professional information, and, of course, health information,

including education and online health information and communication with health care providers. Almost ubiquitous these days, the Internet sometimes threatens to leave behind those without access or skills to use it. The elderly are particularly at risk for both limited access and limited skills, and they also have other barriers to acceptance.

The remaining technologies for elders are mostly “assistive technologies,” not necessarily actively used by the elder but which provide monitoring or other types of assistance, sometimes in place of people, for support. Sometimes these tools are used more by caregivers than the elderly themselves. We examine these technologies as well.

Lastly, we consider specific subpopulations within the elderly, including those with dementia and those with other specific medical conditions, as their needs may be different than others'.

## Older Adults and The Internet

Worldwide, older adults are in many cases the fastest growing computer and Internet user group.(18) A series of survey-based studies, most notably by the Pew Internet & American Life Project of the Pew Research Center, has looked at demographic trends in Internet use. A recently released report(14), based on a survey in July to September of 2013 of 6,224 people ages 16 and older living in the United States, found that 59% of seniors (defined as those 65 and older) reported they use the Internet, up from 53% just a year before,(13) and that 47% now have a high-speed broadband connection. They further report that 77% of older adults have a cell phone, and increase of 8 percent since 2012 and 20% since 2010, though smartphone use among the elderly lags behind with approximately 18%.

Internet use and access drop off significantly after age 75. Internet usage is much less prevalent in the older group than among younger groups, reaching only 47% among 75-79 year olds, while home access was 34 %, an increase from earlier years but still low.(13, 14, 19) These numbers vary greatly by income and education, with higher education and higher income seniors using the Internet at rates approaching or exceeding the general population. (14)

The Internet is increasingly used for help-seeking and for healthcare information by individuals as well as by caretakers.(20) Another recent Pew report, Health Online 2013, based on surveys in August-September 2012, asked questions specifically about the use of Internet technology to seek health information. It found that 81% of adults use the Internet, and 72% of those said that they have looked online for health information in the past year. (9) Across all U.S. adults, 35% have gone online specifically to try to figure out “what medical condition they or someone else might have.” An 2006 review of Pew data found factors increasing medical searching included sex (female), non-fulltime employment, more other Internet use, medical reason for searching, and helping others.(21) A Swedish study found higher cognition, being male, and being between 60 and 80 (compared to older) was related to starting to use the Internet,(22) while another study found that having seen or talked to a medical specialist increased the odds of the use of the Internet for health.(23) Social capital also affects Internet use by the elderly.(24)

Of course, not all of those searching for health information are elderly: already by 2010, “searching for health information, an activity that was once the primary domain of older adults, is now the third most popular online activity for all [I]nternet users 18 and older.” (12) Not surprisingly, half of these searches were on behalf of someone else, and the younger population was more likely to be searching for someone else than the older population.(9) Caregiver use was specifically addressed in a separate Pew study, which found that 79% of caregivers have access to the Internet and 88% of those look online for health information.(8) The researchers conclude that “Caregivers use the [I]nternet to navigate the frontier of home health care,” even if the elderly themselves are not doing so. (8)

Beyond the major Pew studies, other groups have examined Internet use among the elderly. Findings include that, unsurprisingly, age alone is not sufficient to predict Internet use: for example, among 65-year olds in a 2003-2004 survey, those who were more “cognitively advantaged” in other ways, based on high-school scores decades earlier, were more likely to have Internet access at home and more likely to use it, although these effects were mediated by some other factors.(25) Thus the elderly population must be categorized by dimensions beyond simply age in years—such as income, education, and gender—when examining Internet use and acceptance of technology.(26) Beyond these demographics, different models are useful to categorize older adults, including functional age and perceived age as well as social age and cognitive age, each reflecting different populations and different needs.(27) A 2009 systematic review of health informatics and the care of the elderly found an increase in research covering IT for self-care and an increased focus on “socio-technical analyses versus pure technical or clinical studies,” and also an increase in studies exploring technology use by the elderly, though these studies were “still at an exploratory stage.”(28)

## Assistive Technology

A number of reviews have examined the impact of a variety of technological innovations for improving care of the elderly or disabled, often called “assistive technology,” which includes items to improve mobility, monitor for safety, and facilitate communication in emergencies. “Gerotechnology” is defined as the study of the interactions between technological artifacts, elder users, and the context in which technologies are used.(29) Assistive technology can potentially substitute or at least supplement personal assistance in certain cases.(30, 31) The research on assistive technology informs the discussion around acceptance of new tools, and patients often have positive views of these tools.(32) However, patients have raised concerns about user friendliness, lack of human contact, the need for specialized training,(33) and privacy.(33, 34)

Assistive tools may be beneficial to seniors and caregivers, but they have not been thoroughly evaluated.(5, 35) Early reviews often found positive effects of various kinds of assistive technology. For example, a 2001 review concluded that “Video-monitoring, remote health monitoring, electronic sensors and equipment such as fall detectors, door monitors, bed alerts, pressure mats and smoke and heat alarms can improve older people's safety, security and ability to cope at home.”(36) In Europe, a recent innovative system including monitoring and communication was shown to increase older persons' autonomy.(37) There

is further evidence supporting the effectiveness of some specific technologies, such as electronic memory aids for elders with memory impairment, but design limitations may limit adoption.(38) However, many of these assistive technologies have not been systematically reviewed for efficacy.(15, 39)

## Specific Populations

Specific populations, such as those with dementia, have targeted tools and studies, with these primarily targeting caregivers as users rather than the patients themselves.(40) A broad-ranging 2007 review focused on the need for more flexible, personalized care and support but found that informational websites are not personalized and target caregivers. On a practical level, they found that care using information and communication technology (ICT) can be used for the patients in the form of simplified phones or entertainment tools, but tools for patients to help with coping with the impacts of dementia have been disregarded.(41) A number of useful and effective tools were reviewed for this population, including tools to improve memory and orientation and skills in computer-based tasks. The multi-national ENABLE project (Enabling technologies for people with dementia) in which twelve existing products were studied, overall showed their effectiveness to facilitate independent living and found that devices may reduce anxiety in people with dementia as well as in those caring for them.(41-43) Seniors in low socioeconomic communities have their own specific needs resulting from less access and support.(44) However, these findings are specific: positive findings for a distinct population, like elderly with depression(45) or diabetes(46) will not necessarily generalize to all elderly.

## Challenges to HIT Adoption in Older Adults

Older adults face numerous physical or cognitive challenges as they encounter technology, including altered cognition, difficulty hearing or seeing, and perception issues.(47, 48) In addition to these physical limitations which require modified design, elders face barriers that include lack of familiarity and access, discomfort requesting assistance, issues of trust, and concerns about privacy, each addressed below. Blackford Middleton framed IT adoption succinctly as “IT adoption is 5 percent technology related issues, and 95 percent sociocultural issues.”(49) Increased adoption of HIT requires consideration of users' needs. (50)

## Familiarity

Decreased familiarity with technology may limit the potential impact of technology-based web-interventions in older adults.(51) However, the oldest cohorts of adults who simultaneously have the greatest health needs also have the lowest familiarity with HIT.(19) This group is likely to say that they don't use the Internet or email because it doesn't seem relevant to them—they're “just not interested”—raising the question whether availability of targeted resources could overcome these barriers or not.(13) In a comparative study of users and non-users of the Internet in primary care patients, lack of familiarity, either through limited access or not knowing how to use email, was the most common barrier to Internet use for health care information seeking.(52) Lack of confidence has also been cited a key deterrent in the use of electronic medical records amongst older adults with chronic disease.

(53) Overall, the elderly are generally positive about new technologies, but new tools can bring with them worries and anxiety.(54, 55)

Generational differences may have an impact even within this cohort. Older seniors felt less optimistic about their future use for HIT needs, while younger seniors have indicated an increased likelihood of accessing electronic health records, with the support of their family. Collectively, generational differences within the over-sixty population reflect the increasing trend that younger seniors overcome personal barriers that previously limited HIT use. Older adults who are transitioning out of the workplace and into retirement are increasingly likely to have utilized technology in their professional lives. Consequently, with each passing year a larger proportion of retirees are familiar with the Internet, social media, and technological devices for personal use.(12) As a result, these tools increasingly serve to address health-related concerns that become a larger concern as older adults age. Increased use of HIT in elder cohorts takes on added importance as younger elderly not only utilize the technology for personal health decision-making but also themselves serve as caregivers for aging parents. But there are signs that even the older elderly are increasingly using the Internet and are open to doing so for health information.(51)

## Asking for Assistance

Technical barriers, such as the lack of computer literacy, compound other deterrents to technology adoption. HIT training can improve health literacy in older adults while reducing anxiety, increasing interest, and improving efficacy.(56) The psychological barrier of asking for assistance is more readily overcome by adults who have used computers in the work environment and are therefore comfortable seeking training and support.(57) and when facing problems, older adults often blame themselves rather than the technology. (58) At the same time, changes in cognition have been implicated in the decreased ability of older adults to seek out the social support needed to acquire HIT navigating skills.(25) Patients with more dire diagnoses are in the greatest need of information and are more likely to seek health information.(19) Facilitating technological support for older adults will become of increasing importance in the near future.

## Trust

Lack of trust may be a barrier for older adults using HIT. This lack of trust includes whether people theoretically trust technology playing a role in their health as well as specifically trusting the accuracy and reliability of content. This is particularly an issue for the elderly, who have shown hesitation regarding the Internet as a source of health information (46% saying they wouldn't trust the Internet at all for health information) but who also show skepticism regarding more traditional media, sometimes even more than for the Internet, listing few sources that they trust "a lot."(26) While many older adults welcome the use of technology to improve care and assist in making healthcare decisions, many are also wary of technology replacing people in the process.(59) Furthermore, older adults expressed fear when presented with scenarios requiring dependence on assistive health technology.(60) Generational differences between baby boomers and older adults reflect the difference in trust. Whereas both users have been found accepting of technology use for caregiving and

healthcare needs, the younger cohort was more willing to relinquish control as opposed to the older cohort.(61) while the older cohort may be less able to assess credibility of Internet resources.(62) Their use or non-use of tools like the Internet may therefore reflect not just their access or ability to use the tool itself but also trust in the ability of healthcare technology to assist in decision-making. Despite concerns about trust, however, other research shows that individuals want their technology to know who they are so that it can be customized and appropriate, and they expect it to have access to their full information. When faced with a serious illness, seniors may be less concerned about privacy than their clinicians.(63)

Trust in the veracity of information is another challenge to HIT adoption. In one recent study, elders were asked to rank information sources according to their level of trust. From a list of a number of potential information sources, the Internet was ranked as the third least reliable, behind an assortment of clinical and non-clinical human information sources and newspapers and ahead of only television and radio.(64) While trust in the Internet for health information increased with familiarity, older adults were still less likely to trust the Internet, (65) and the importance of trust in Internet health information adoption increases with age. (66) Unfortunately, mistrust of health information from Internet sources is justified: evaluation of information found online reveals much inaccurate or irrelevant medical information.(67-71) As much as 50% is inconsistent with best practices, depending on the topic.(68)

A last issue regarding trust is the vulnerability of elders to abuse and scams, particularly in the financial and health care realms. The National Council on Aging lists health-related scams in their top 10 scams targeting seniors, including Medicare fraud, counterfeit prescription drugs, and fraudulent products. The elderly are also at high risk for financial scams ranging from being sold items that are otherwise free to more extreme investment and mortgage scams.(72)

## Privacy vs. Utility

Privacy is a primary barrier that impacts HIT adoption by older adults. Older adults with greater privacy concerns will select human support over technology when given the choice. (61) Notwithstanding this barrier, a primary predictor of HIT use by older adults is utility or perceived benefit.(33, 73, 74) For many, prolonged independence, enhanced quality of life, and improved health outweigh privacy concerns that might restrict use. In a focus group study exploring the motivation of older technology adopters, Melenhorst et al. found that perceived benefits has a stronger influence on choosing to use a new technology.(75) Wild et al. found that older adults in the home setting would accept surveillance and sharing of health information if it was of use to their physicians to preserve their autonomy and health. (74)

In a longitudinal study investigating the attitudes of users of in-home sensor monitoring technology, a majority of older adults were accepting of technology, though they did express concerns and their concerns increased during the year of observation.(76)

## Design Challenges

While information technology has been shown to improve outcomes in the elderly, just as in other patient populations,(77) there are specific design factors that need to be considered when the technology targets the elderly population directly. Older adults are much more likely to be challenged by physical and cognitive changes associated with aging. Limitations affecting their ability to use technology include decreased cognitive capacities, loss of memory and poor recall, decreased navigation skills, sight loss, hearing loss, decreased kinesthetic ability, and less experience with technology, as well as less confidence in these systems.(78) Demiris et al. explored older adults attitudes toward “smart home” technology. Addressing the physical challenges associated with aging, participants stated that technology should be sensitive to vision loss, hearing impairment, loss of tactile senses, or loss of balance. Moreover, elders may have cognitive challenges such as difficulty processing information.(79) Data from these systems can lead to information to improve clinical outcomes and quality of life for older adults,(80) but systems designed for this population need to account for these potential limitations, taking into account social, emotional, and environmental factors.(81) Otherwise, the tools may not be used: for example, one 2003 study of elderly persons with cognitive disabilities found that people did not use 15% of the devices they owned mostly because they did not fit their needs.(82)

Age-specific challenges extend to health information web site design, which also requires consideration for the different cognitive needs of the elderly.(3) The presentation of visual information impacts the ability of older adults to receive and process data for decision-making. Compared to younger adults, cognitive challenges in older adults such as decreased performance in spatial orientation and memory tasks are balanced with superior vocabulary. Health information websites that use keyword approaches as opposed to hierarchically organized data can attenuate the technology performance gap.(83) Similarly, age-related vision changes affecting the ability to detect contrasting color between the foreground and background challenge older adults seeking Internet-based information,(56) a problem that can be easily mediated with a change in design of websites. Many seniors, especially those with cardiovascular risk factors like hypertension and diabetes, have executive impairments that make it difficult to plan, organize, and multi-task. Therefore, windows-based platforms may be difficult to use.

In 2008, the U.S. Agency for Healthcare Research and Quality (AHRQ) conducted an extensive review of HIT for the elderly, chronically ill, and underserved, focusing on “highly interactive technologies, intended primarily for use by patients or consumers, that incorporated both patient interaction and patient-specific feedback.”(17) The review covered 13 studies in patients over 65 years. One important finding of the overall review was that the systems tended to be most effective when they provided monitoring, personalized feedback, and interpretation, with communication to the patient with advice, and then repetition of the cycle. They found that, “Systems that provided only one or a subset of these functions were less consistently effective.” In other words, simply digitizing information was not enough: the personalization and communication portions were critical for positive effect. For further guidance, AHRQ found that “convenience and ease-of-use were important drivers of system use” – the tool must be easy to use and fit into a user's daily routine. Other important factors



that influenced use were perceived benefit, system trust, anonymity for sensitive health conditions, and rapid provider response.(17) Challenges vary depending on the technology; for example, hearing or vision may be more of a barrier to website use than decreased mobility. However, the contribution of specific barriers to lack of adoption of specific technologies is not well-characterized.

## Caregivers

Tools are increasingly being developed and targeted for caregivers. Of late, numerous Internet and mobile applications been recently developed targeting caregivers for care coordination.(84-88) Caregivers have different needs and different barriers than the elderly themselves. In dementia, tools that focus on improving caregivers self-efficacy can reduce their care burdens.(40, 41) The effect of other caregiver HIT interventions have been inconsistent.(89-91) However, there is little research on the efficacy and impact of these new tools. Furthermore, the needs of this population are quite different than those of the elderly themselves, requiring a design targeting caregivers and their needs and outcome measures examining the caregivers' stress and satisfaction as well as outcome measures are for the health of the elderly person.

While the Pew surveys did not ask what specific resources caregivers used, they did ask what kind of technology they used, and, as expected, many more caregivers than elderly have computers and Internet access.(8) Technology tools are increasingly being developed for caregivers. For example, the review of tools for patients with dementia identified tools that successfully supported caregivers, both with keeping those they were caring for safer using monitoring and telecare, and by improving caregivers self-efficacy while reducing their burdens.(41) Another review of HIT for people with dementia found that most interventions focused on caregivers, with most but not all studies showing a positive benefit of the intervention on caregiver well-being.(40) These positive findings are encouraging regarding the potential for HIT to help the elderly, but another systematic review of interventions targeting caregivers for patients with dementia found little evidence that these interventions are uniformly effective and endorsed the importance for increased research.(92) The effect of other caregiver HIT interventions have been inconsistent.(89-91)

## Decision-Making About Health

Seniors and caregivers may turn to the Internet for information to support medical decisions. We are still learning how Internet health information seeking differs from seeking information from traditional source, but we know that the elderly are likely different than younger people. For example, a 2007 survey of people who sought out health information (the National Cancer Institute's Health Information National Trends Survey) found that those who did so using the Internet were younger, more educated, and more likely to think it was important to get information electronically,(93) while another showed that sicker individuals, particularly those with cancer, were more likely to see out health information online.(19) Information seeking can be done independent of desire to participate in decision-making, too, and elders primarily still rely on doctors to make decisions about diagnosis and treatment.(94, 95) One study that aimed to teach the elderly to use the Internet for health

care information similarly found that while they may be willing to use the Internet as a source for general health information, “when making decisions about their health care, our participants seemed to adhere to a physician-centered model of care.”(96) However, the barriers to decision-making in the elderly, such as information, activation, and communication issues, are modifiable,(97) and as such, technology may be a means to help overcome those barriers. Indeed, Internet use frequency has a relationship with preferences for decision-making autonomy, though it differs for the kinds of decisions and it is not clear what factors drive the relationship.(98)

## Moving Forward with Technology

Given the aging population and need to improve care processes and care for the elderly, technology offers great promise, yet the potential is tempered by lagging adoption by older patients and human factors challenges. Research has shown efficacy of some tools and approaches and has identified some factors that play a role in use and acceptance, but further work is certainly needed.

## Recommendations

### 1. Design for the elderly

Much is known about best practices in design, as we have covered, but these approaches are not universally followed. Design should be consistent and user-friendly. It should be able to accommodate various physical and cognitive limitations. Some concrete recommendations for the older user include:

- Reducing complexity of interfaces and executive function
- Removing layered windows that challenge memory/motor function
- Formatting consistently throughout a web site design to minimize confusion
- Replacing drag-and-drop features, a complicated motor function, with keyboard functions(99)
- Displays: Use of prisms to project images for people with macular degeneration(100)
- Additional modifications such as:
  - Vision: Large font and appropriate lighting
  - Motion: Tremor-stabilizing mouse controls
- Provide training, potentially within websites, to aid users(101)

Designers should include geriatricians(33) and the elders themselves as active participants so that they do not become simply receptors of technology.(29) Design must address privacy concerns not only during the design of HIT but continually throughout its use. Some of the psychological barriers to Internet use by the elderly could be overcome with increased marketing, uniform page design, and more provision of training.(57)

## 2. Address family and caregivers needs

Existing HIT tools are mostly addressed either at an elder or at a caregiver. Increasingly, caregivers are older adults themselves and these new tools are often used collaboratively. Elders often have a large number of people involved in their care, from children to paid help to numerous healthcare providers of different kinds. Tools for the elderly should consider the whole care network and take into account who will be using the tool, who has access to what information, and how these factors may change over time. Design should target the potential multiple users and their different needs, abilities, and levels of sophistication.

## 3. Address access and experience of the elderly

Access and training are critical pieces of allowing all older adults who want to benefit from health information technology to be able to take part. Education through senior programs and maximizing access will be increasingly important. Better design may obviate the need for training. Elders themselves can become IT advisors and helpdesk staff in retirement communities to help others overcome challenges.

## 4. Improve Internet usability and trustworthiness and prevent abuse

Concerns about reliability of Internet information does not deter people from searching online for answers to health questions: while 49% of people said they prefer to ask their physicians first, only 11% actually turned to their physicians right away with health questions, with 49% going online first.(102) We therefore need trustworthy sites and an easy way to identify them and certify their reliability, as well as policies to help prevent fraud and abuse. Mechanisms could include tools to confirm important decisions such as embedding memory tests into websites.

## 5. Research

Despite the large amount of research done on HIT efficacy and use, much is still unknown about how to provide the best resources to the elderly. Researchers have often defined elders as being over the age of 65, yet increasingly families have loved ones who are in their 80's or 90's. The health information needs of frail elders need further exploration. More research is also needed to determine the elderly population's needs in general and specific needs for people with dementia, caregivers, and other specific populations.(28, 40) Any research on HIT should be sure to include, perhaps even intentionally oversampling, older adults in order to assess age-related differences.(51)

## 6. Health policy

Policy must be developed to structurally and financially support caregivers, both family members and those hired to care, as the population ages. In the United States, major support programs like Social Security and Medicare face budget shortfalls, and the Older American Act and the National Family Caregiver Support Program have increased access but need updating, including addressing the needs for research and access discussed above. Small changes on a policy level can have significant implications for families and individuals.(4) Policies should also support physician reimbursement for patient monitoring and other feedback using information technology.

## Conclusion

While this is not a systematic review of all literature related to health information technology for older adults and their families, we have attempted to show through an overview of recent research some of the many competing factors which challenge the ability to create useful and effective HIT for older adults and their “informal” caregivers. Health information, communication, sensor and electronic records technology all have the promise to reduce costs and preventing hospital admissions in older adults, but systemic challenges are difficult to overcome.<sup>(103)</sup> Barriers to HIT use include age-related changes that pose challenges to use; challenging features of the technology itself, some of which can be overcome with design changes; and social factors that are more difficult to quickly modify. Technological innovation for healthcare requires not only the unique design considerations for an aging population, but also the recognition that each elder lives within a social context or “care network.” Tools that activate this social network around our frail elders will help independent living and hopefully decrease caregiver burden on their children.

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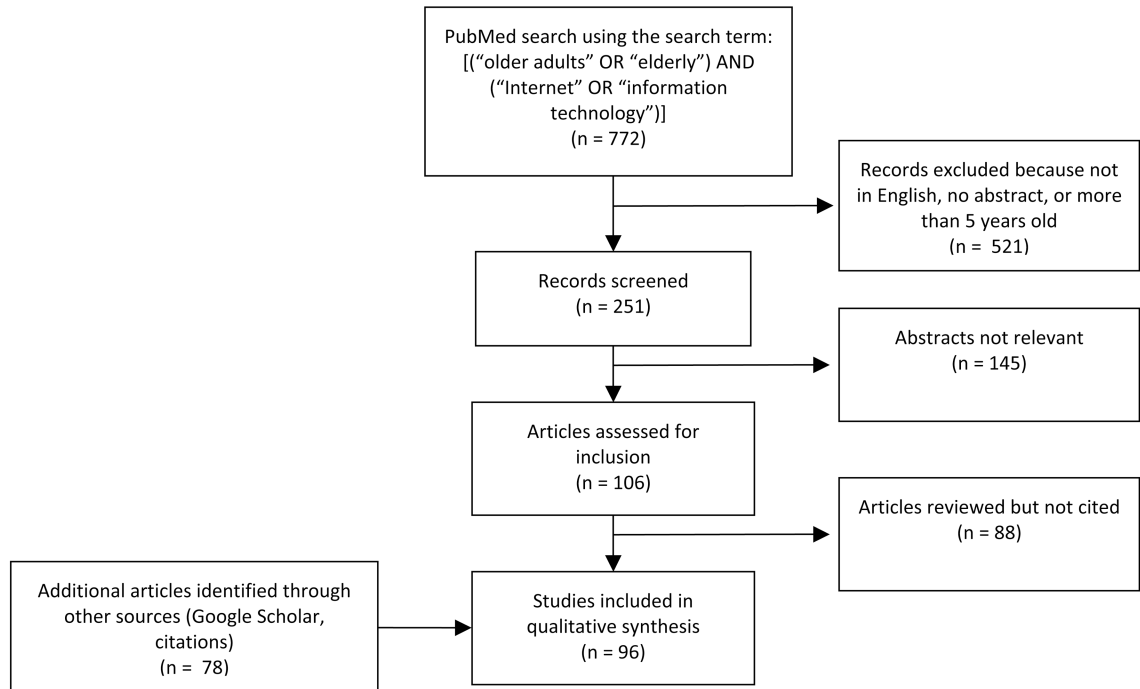
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### Highlights

The elderly use technology in different ways than younger people

The elderly have numerous barriers to using technology

Research on caregiver use of technology is limited



**Figure 1.**  
Search Strategy

**Table 1**

## Barriers to HIT adoption in the elderly

|   |
|---|
| Familiarity and access  |
| Need for assistance   |
| Trust   |
| Privacy issues  |
| Design Issues <ul style="list-style-type: none"><li>• Physical issues such as<ul style="list-style-type: none"><li>○ Sight loss</li><li>○ Hearing loss</li><li>○ Decreased kinesthetic ability</li></ul></li><li>• Cognitive, navigation, and memory issues</li></ul> |