By Janet M. Marchibroda

New **Technologies** Hold Great **Promise** for **Allowing** Older Adults to **Age in Place**

What is currently working, and where do barriers remain to full-scale technology adoption in the older adult cohort?

Imagine turning on a computer in Montana and receiving an in-depth medical diagnosis from leading experts in Boston. Blood pressure, weight, blood sugar levels—all monitored remotely through new, innovative technologies. Imagine having access to medical devices that prevent major health crises before they occur, and a wealth of services that provide reminders to take medicines, schedule check-ups, or even restart your daily exercise routine. With advances in health technology, these new innovations are within reach—good news for the growing number of older Americans who wish to age in place.

These new technologies could not have come soon enough. By the year 2030, nearly a fifth of the U.S. population will be age 65 or older—most with one or more chronic conditions (U.S. Census Bureau, 2014; Centers for Disease Control and Prevention, 2013). At the same time, physicians and nurses are in increasingly short supply (Kane et al., 2009; American Association of Colleges of Nursing, 2014). And a number of surveys indicate that older adults overwhelmingly prefer to age in place at home (AARP, 2010). The emergence of new health technologies can help address these needs, providing older adults with an opportunity to receive the proper care and attention they need in an efficient, convenient, and cost-effective way.

A cardiac telemedicine program showed reductions in hospitalizations and length of hospital stays.

Such technologies range from those that help older adults access resources and connect with social networks, to those that enable monitoring and management of general wellness and chronic conditions, to those that support interactions with the health-care system. The Bipartisan Policy Center (2012) examined the types of technologies in each of these areas (see Figure 1, page 53).

Successful Technologies—and Where Jury's Still Out

One example of a technology that has supported better health outcomes and reduced the use of health services is telemedicine. Researchers in Ontario, Canada, evaluated the use by cardiac patients of weekly videoconferencing with a nurse, combined with daily transmission of weight and

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Figure 1. Types of Technology and Common Uses

Types of Technology	Examples
Technologies that Provide Education and Support Social Networking	• Online or mobile access to information that helps individuals self-diagnose, manage symptoms or conditions, share in decision making, and improve their health and well-being. • Online communities that help individuals share their experiences and gain advice from others.
Technologies that Support Monitoring and Management of Health and Well-being, and Chronic Conditions	• Electronic devices such as weight scales, blood pressure cuffs, blood glucose meters, and heart rate and sleep monitors, all of which can be connected to the Internet to enable self-monitoring and monitoring by clinicians and care teams. • Electronic devices that provide medication reminders and track when medications are taken. • Electronic devices that track exercise (e.g., number of steps taken), calories burned, and diet. • Other home-monitoring systems, including personal emergency response systems that can track falls or other medical emergencies, and in-home sensors that can track presence of smoke, fire, carbon dioxide, or carbon monoxide levels.
Technologies that Support Interactions with the Healthcare System	• Electronic messaging tools that support secure online e-mail communication between clinicians and patients. • Telemedicine, or the use of technologies to enable clinicians to remotely diagnose, monitor, and treat patients. • Electronic methods for conducting healthcare-related transactions, such as scheduling appointments, renewing prescriptions, receiving reminders, or accessing test results and other information contained in the clinician's health record. • Electronic decision-making tools that can help individuals compare the cost and quality of various treatment options.

Source: Bipartisan Policy Center, 2012.

blood pressure, and periodic transmission of a twelve-lead ECG. Reductions in hospital admissions and length of hospital stays were noted (Woodend et al., 2008).

Another large study of Medicare beneficiaries reported cost-savings and improvements in health outcomes among patients who used the Health Buddy Program—a care coordination approach that integrates a telehealth tool with care management for chronically ill patients (Baker et al., 2011).

Concerns about privacy, cost, and lack of reimbursement remain.

Other technologies—such as robots—hold great promise to promote exercise, support rehabilitation, improve medication adherence, and provide some care for those with severe dementia (Gadde et al., 2011; Bäck, Makela, and Kallio, 2013; Takacs and Hanak, 2008; Tamura et al., 2004). However, for now, robots have insufficient usefulness and acceptability, they are very expensive, and they lack safety standards (Bäck, Makela, and Kallio, 2013; Hayashi, 2009). Greater

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investments in research and development can improve robots' usability and acceptance among older adults, and advancements in technology are expected to bring down their costs.

Other technologies, however, increasingly are being adopted due to a number of factors, such as the following:

- There is a higher comfort level with technology among older adults. More and more, older Americans are accessing the Internet and using cell or smartphones, tablets, and e-readers (Pew Research Center, 2014);
- The increasing shortage of clinicians, including physicians and nurses, as well as caregivers (Kane et al., 2009; American Association of Colleges of Nursing, 2013; West et al., 2014);
- A growing movement toward delivery and payment models that reward better health and cost outcomes versus more volume of healthcare services, which provides an incentive for preventing and more effectively managing chronic conditions; and,
- Regulatory requirements associated with greater patient engagement with electronic health records, including those focused on secure electronic messaging and ensuring that patients can electronically view, download, or transmit to a third party information contained in their health records (Centers for Medicare & Medicaid Services, 2012).

Remaining Barriers to Adoption

Still, barriers stand in the way of greater levels of adoption, including the cost of such technologies and the lack of reimbursement—particularly under fee-for-service methods of payment; concerns about privacy and security; lack of interoperability and information-sharing across systems; and, in particular for clinicians, concerns about managing the workflow associated with adopting new technologies (Bipartisan Policy Center, 2012).

To meet older adults' needs, technologies must be easy to use, intuitive, and affordable.

For older adults, especially, barriers exist in the form of concerns about usability, limited Internet access, lack of awareness about the availability of tools, and low levels of health literacy. According to the Pew Research Center (2014), physical challenges to using technology, skeptical attitudes about its benefits, and difficulties in learning to use these technologies are some challenges older adults face.

To effectively meet the needs of older adults, these new, innovative technologies must be easy to use, intuitive, and affordable, and they must take into account the whole person—addressing not only health needs, but also social and functional needs. This cohort also will need to be made aware of the availability of such tools, and there must be supports in place to help people take advantage of these technologies. Finally, connections between personal and mobile devices, clinical and administrative health system software, medical devices, and apps must be seamless: these systems must be interoperable, requiring little or no intervention by the individual.

A new world is within our grasp—one that holds great promise and benefit to the growing aging population in America. These new technologies will bring healthcare and social connections to individuals where they live, making it possible for older adults to live more independently and age in place, in the comfort of their own homes.

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