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HEALTHY LONGEVITY Extending Independence

It is no surprise that the majority of adults age 65 and older want to stay in their homes for as long as possible.¹

The emotional ties and social support of a community with connections, history and familiarity can boost a person's overall wellbeing as they strive for a healthy and thriving longer life. As the population of older adults increases in the coming years, new innovations, social constructs and opportunities to assist older adults in **extending independence** will not only help them remain in their preferred environment but will also reduce the burden on caregivers, the healthcare system and costly assisted living facilities.

Age-related decline in older adults can mean a loss of independence and emotional vitality. Functional decline, or the inability to perform activities of daily living, is the greatest threat to independent living.² Someone experiencing increased difficulty in daily activities may respond by avoiding or limiting those activities altogether, often leading to a less active lifestyle, frustration, and gradual inability to function on their own. Extending independence strives to support older adults in all stages of aging and wellness through connected health technologies and applications that maintain the interactions and support they need to maintain a fulfilling life.

Accommodations and assistive devices in the built environment can mitigate the physical manifestations of age-related decline; the physical space and products in the home have been shown to have an impact on health and quality of life.³ Items such as railings, walk-in bathtubs, ramps and accessible cabinets and storage spaces help with some of the physical limitations in the home. New digital tools can also help with physical effects of age-related decline with adjustable and portable text magnifiers for vision and

advanced digital technology hearing aids for hearing loss. These and other accommodations and assistive devices in the home can help people with age-related decline and functional limitations realize longevity better quality of life with independence, emotional health and a sense of well being.

The ability to control lights, thermostats, door locks and communication or entertainment systems with voice commands or from a mobile device can help seniors manage their homes despite physical limitations. Smart home technology systems integrated by Amazon's Alexa, Apple's Siri or Google's Assistant present a suite of connected appliances and features that can make household management easier for aging adults.

Assisted technology systems for homes specifically designed for older adults living independently, such as Qorvo's Senior Lifestyle System, the CurrentCare-IBM partnership in the UK, and TruSense in the US, integrate a series of sensors in the home to monitor and report on eating, sleeping and activity patterns to notify family or caregivers of any unusual changes that could signal a decline in health or an emergency. In a partnership between IBM and the city of Bolzano, Italy, smart home technologies for the aging population are being employed in the "Secure Living Project" with a collection of home sensors and an interface for communication with health professionals. These systems use information from a number of sensors in the ambient environment to monitor wellness, detect emergencies, track early signs of physical or mental conditions and enable a safe living environment for residents. The safety features, alert systems, and assisted technology for managing the home can help people stay in their home environment longer to maintain a thriving independence.

Intelligent sensing is now able to monitor mental health and cognitive indicators through facial recognition, voice analysis and self-reported symptoms for adults experiencing early stages of dementia or cognitive decline. Carealia in Greece, Sonde Health and Catalia Health in the US are some of the innovators developing interfaces with sensors and algorithms that can interpret a user's emotions to target motivational messages or track changes in cognitive ability that could signal the need for early intervention by the patient's support team of caregivers and healthcare providers.

Home assistance technology is also under development in the form of robots and robotic tools that can help with physical tasks such as lifting, mobility, and fetching items in the home. Prototypes incorporating the latest advances in touch sensors and voice commands have been developed and tested in Japan to assist with getting in and out of bed and performing household tasks (Honda's ASIMO is one example). Panasonic's Resyone transforms from a bed, equipped with a virtual home assistant, into a fully robotic wheelchair. The Singapore-MIT Alliance for Research and Technology (SMART) is testing an autonomous self-driving wheelchair in hospitals in Singapore using the same technology found in self-driving cars. A prototype robot from IBM and Rice University (IBM MERA) uses sensors that respond to motion, scents and sounds to detect signs of an accident, record resident's vital signs, respond to facial expressions and signal for help. The robot works with multiple sensors in the living environment as part of a smart home system that synthesizes the data into actions for preventing hospital readmission and accidents. Robots assisting with daily activities are destined to become an important part of integrating sensor data streams and facilitating a user-friendly interface for residents in smart homes and long-term care environments.

Many of the connected health technologies that enable healthy lifestyle choices can be used by independent living older adults to encourage and monitor diet, promote activity and facilitate cognitive exercises. Wearable activity trackers, smart scales and other technologies that target modifiable health and wellness activities can help users track progress on key lifestyle behaviors and transmit that information to health providers or apps that tailor advice and motivational messages. Maintaining a healthy lifestyle, especially one that includes regular physical and mental exercise, has shown to delay functional decline and disability.⁴

The improvements in sensors and system algorithms are advancing rapidly. However, many of these innovations have not progressed beyond the pilot or prototype phase to reach the growing population of aging adults who need assistance to continue a safe and healthy life in their homes. The challenge is now to find the best ways to integrate these innovations into the social support networks of family, caregivers and medical services. The technologies to promote independent living require the support and coordination of a system that values independence for seniors and will use these tools to assist in the goal of extending independence.

REFERENCES

1. <http://www.aarp.org/home-family/your-home/info-2017/boomers-not-selling-homes-fd.html>
2. Assessment of Activities of Daily Living, Self-Care, and Independence <https://academic.oup.com/acn/article/31/6/506/1727834/Assessment-of-Activities-of-Daily-Living-Self-Care>
3. Built Environment and Elderly Population Health: A Comprehensive Literature Review <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4211137/>
4. Successful Aging: Advancing the Science of Physical Independence in Older Adults <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4661112/>



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