

# Aging-in-place

*M. PARKER (Convener). Active and passive monitoring technologies to support aging-in-place. Gerontechnology 2010;9(2):157; doi:10.4017/gt.2010.09.02.093.00*

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Much of the focus of monitoring technology development has been on safety, identifying people who are at risk of falling and sending alarms to seek help, thereby reassuring families of safety for frail individuals living alone. Monitoring technology has evolved to provide the potential for focusing on personal needs of the individual who requires monitoring by providing information about health and functioning that supports and assists them to maintain independent living in the community. Speakers will discuss research to develop monitoring aids worn by the user and passive monitoring systems embedded in the user's living space.

**CONTENT** The presentations will review the process for developing both active and passive monitoring systems, including how behavioral and vital signs, as well as environmental factors, are linked to the monitoring process. Presenters will describe the methods used to determine acceptability and usability of technology applications and ways in which these technologies may be linked to formal and informal care systems to support independent functioning within and outside the living environment. **STRUCTURE** Cindy Crump will discuss the evolution of research to create a wearable device to detect falls, monitor vital signs and send an alarm. She will describe how wireless technologies have enabled the creation of a device that monitors health needs, while appearing to be a fashionable piece of jewellery. She will present results of community-based research to demonstrate the use of the monitoring device in obtaining physiological and survey data from people living at home and moving about their communities. David Mack will discuss development of an environmental, passive monitoring system that combines proprietary and off-the-shelf sensors, networking, computing, and software technology to deliver a complete monitoring environment, without using cameras. The system provides a low-cost, turnkey solution, that gathers and reports behavioral and wellness information of a cared-for individual, in their home or at a senior living facility. Mary Parker will discuss how these technologies may be integrated into existing public and private care networks and the role of monitoring technologies in preventing disability, as well as reporting safety needs. **CONCLUSIONS** Monitoring technologies are emerging from the laboratory and will become widely available on the market. These technologies have tremendous potential to help frail and disabled individuals to lead fuller, healthier and more independent lives. Therefore, it is important to consider how they can be incorporated into public and private care systems.

**Keywords:** remote monitoring, passive monitoring, ambient technologies,

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*C. CRUMP. Mobile monitoring to support independence and safety. Gerontechnology 2010; 9(2):157-158; doi:10.4017/gt.2010.09.02.094.00*

**Purpose** Monitoring technology that is portable, user friendly and effective has been the goal of many technology companies. Lack of user compliance has been a major issue for effectiveness of Personal Emergency Response Systems (PERS). For older people to use assistive technologies for maximum benefit, they must find them acceptable for continuous use. **Method** AFrame Digital, Inc, a research-based mobile technology company, has developed a 'Personal Help Device', called 'myPHD', that incorporates passive and active monitoring, as well as software-based data analysis and web access. The myPHD is intended to be worn 24 hours a day and monitors an individual's activ-

ity, location and physiological status in real time, indoors and outside and may take the form of a wristwatch, torso clip or under-bandage device, to meet the needs of the monitored individual. The analog watch is lightweight, comfortable and available in an array of colors, attributes based upon user research. The monitoring system is secure, private and HIPAA compliant. Caregivers or managers have a mobile touch-screen device to receive alerts and check activity and health data. Under an SBIR grant from the National Institute on Aging (NIA), the device was tested to detect falls and monitor changes in gait. The research focused on the feasibility of new sensors at the wrist or other locations on the body and monitoring algorithms. The goal is to be able to continuously and non-intrusively monitor individuals to prevent falls and the medical complications that follow. The study is linked to several academic research centers to conduct continuing research on the characteristics of people and input devices that enable effective use across the life-span. The data collected include location information, impact detection, skin and ambient temperature, a researcher-defined event button, health surveys, blood-oxygen saturation, heart rate, blood pressure and weight. Some of the data will be measured using the AFrame myPHD watch monitor. The wireless, third party devices that are part of the AFrame system used for this study will include a pulse-oximeter, which provides both heart rate and blood-oxygen saturation level, a weight scale, a blood-pressure cuff and a user-friendly device for responding to a daily health questionnaire. The goals of this study are to demonstrate the usefulness of this system in gaining both physiological and survey data from individuals living in their own homes. The idea behind the project is that a user-friendly system, which is not intimidating to users, will be accepted and used by seniors, thereby providing the data needed when monitoring individuals during research studies or for their own health and well-being. **Results & Discussion** Cindy Crump will discuss the consumer marketing and usability research conducted to develop the myPHD and analogous wearable monitors. Research was done with 160 individuals in several assisted living and other care facilities.

**Keywords:** remote monitoring, ambient technologies, falls.

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*D. MACK. Passive monitoring to meet individual health and safety needs. Gerontechnology 2010;9(2):158-159; doi:10.4017/gt.2010.09.02.095.00* **Purpose** Passive home monitoring technology has been emerging over the last 10 years and is rapidly gaining importance due to the growing senior population. Its main goal is to create an economical, effective and efficient method for a caregiver to have more comprehensive information about how a senior is functioning in their living environment. **Method** The WellAWARE solution combines passive sensor technology with an intricate inference engine that is driven by algorithms developed to provide caregivers with important information about their residents. In addition to off the shelf motion and contact sensors that detect movement throughout the residence, WellAWARE Systems incorporates augmented motion sensors to detect temperature and humidity, as well as proprietary technologies that include a floor vibration sensor to detect disabling falls and a bed sensor to detect sleep patterns and sleep quality. The inference engine behind these sensors is what makes all of this technology useful and provides caregivers with daily reports that vary in level of detail from top-level overview to a granular focus on an individual. Trends are captured over extended periods of time to help caregivers see any changes in a resident's day-to-day patterns. WellAWARE Systems has placed about 100 systems in VOA and GSS sites across Minnesota, Colorado, Nebraska and Arizona. These systems were placed mainly in assisted living and memory care facilities, while some are deployed by home care agencies. During this initial deployment period, WellAWARE Systems conducted a study in association with GSS that focused on 11 residents at one site over the course of a year. These residents were either in assisted living (n=6) or being cared for by a home health agency (n=5). Residents were monitored for varying lengths of time ranging from as long as nine months to as short as one month, for an average of about seven months per resident. Caregivers were provided with daily reports that contained inferences about their clients' day-to-day behavior and wellness along with trend indicators that were based on that person's individual data that ac-

cumulated over time. **Results & Discussion** During the course of the study, there were several cases where the WellAWARE Systems reports helped caregivers become aware of symptoms and conditions that led them to recommend further investigation. The most prevalent of these were urinary tract infections (6 found across 5 clients), medication related issues (3 found across 3 clients) and constipation (3 found across 2 clients). In addition, through the use of WellAWARE Systems' floor vibration sensor and alert notification system, several disabling falls were reported to caregivers (14 found across 8 clients), allowing them to provide assistance more quickly. The use of WellAWARE Systems' monitoring solution led to an improvement in the proactive delivery of care and allowed nurses to identify symptoms and conditions earlier in the process, thereby increasing the seniors' quality of life. Additionally, it successfully alerted staff more quickly when a resident had fallen and was unable to get up on their own.

**Keywords:** passive monitoring, ambient technologies, aging-in-place

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**Purpose** The major intention in developing passive and active monitoring technologies has been to support safety, serve health needs and provide medical monitoring, creating a 'medical home'. However, technology applications that collect information unobtrusively and require little interaction from the user, summoning assistance on an as-need basis, or when data indicates a need for inquiry about the individual's health or well-being, provide opportunities to provide support for maintaining and improving independent functioning, through timely assistance. In the United States, Europe and elsewhere there is increased interest in helping people to 'age-in-place', where they are living in the community, to avoid the personal and public expense of nursing home or hospital placement. **Method** In 2009, Mary Parker conducted a literature review, interviews with technology developers and users, and visited sites where new technologies have been incorporated into services for residents, interviewing housing managers, program staff and residents. She has written a chapter outlining the use of technology in the 21<sup>st</sup> century to support resilience in aging, to be published in 2010. **Results & Discussion** It is important to examine the ways in which 21<sup>st</sup> century technologies may support or encourage an individual's capacity to achieve, retain or regain a level of physical or emotional health after illness or loss. 21<sup>st</sup> century technologies also may be used to encourage adaptive behavior with regard to social functioning, morale, and bodily health, by supporting new preventive care behaviors. As these technologies are implemented in residential settings, researchers should consider studies to evaluate the effects of monitoring in maintaining and prolonging independent functioning of older individuals in community settings.

**Keywords:** active monitoring, passive monitoring, aging-in-place, resilience in aging

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