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***Our Mission:*** Helping to prepare Iowa's health practitioners to care for our growing population of elders. *E-NEWS* is one of our methods of teaching through technology.

Each month, *E-NEWS* delivers abstracts from current multidisciplinary healthcare journal articles related to a specific geriatric topic. This month's *E-NEWS* focuses on ADAPTIVE EQUIPMENT TO PREVENT FALLS BY OLDER ADULTS.

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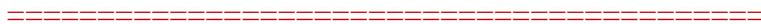
## ADAPTIVE EQUIPMENT TO PREVENT FALLS BY OLDER ADULTS

In this issue of the *E-NEWS*, you will find abstracts for:

- An article that describes a chair alarm for preventing falls using gesture recognition and interactivity.
  - A study that seeks to determine whether fall history influences an older adult's decision to make residential adjustments.
  - A study that assesses how canes are obtained and used by older adults in senior living communities.
  - An article that discusses optimizing footwear for older adults at risk of falls.
  - An article that presents data on wheelchair falls.
  - A study that examines older homebound women negotiating reliance on canes and walkers.
  - A study that explores whether and how attitudes towards and beliefs about mobility aid use vary by race and ethnicity.
  - A study that evaluates unintentional fall injuries associated with walkers and canes in older adults.
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- Knight H, Lee JK, Ma H. Chair alarm for patient fall prevention based on gesture recognition and interactivity. *Conf Proc IEEE Eng Med Biol Soc.* 2008;2008:3698-701.

The Gesture Recognition Interactive Technology (GRiT) Chair Alarm aims to prevent patient falls from chairs and wheelchairs by recognizing the gesture of a patient attempting to stand. Patient falls are one of the greatest causes of injury in hospitals. Current chair and bed exit alarm systems are inadequate because of insufficient notification, high false-alarm rate, and long trigger delays. The GRiT chair alarm uses an array of capacitive proximity sensors and pressure sensors to create a map of the patient's sitting position, which is then processed using gesture recognition algorithms to determine when a patient is attempting to stand and to alarm the care providers. This system also uses a range of voice and light feedback to encourage the patient to remain seated and/or to make use of the system's integrated nurse-call function. This system can be seamlessly integrated into existing hospital WiFi networks to send notifications and approximate patient location through existing nurse call systems.



- Leland N, Porell F, Murphy SL. Does fall history influence residential adjustments? *Gerontologist.* 2011 Apr;51(2):190-200.

PURPOSE OF THE STUDY: To determine whether reported falls at baseline are associated with an older adult's decision to make a residential adjustment (RA) and the type of adjustment made in the subsequent 2 years. DESIGN AND METHODS: Observations (n = 25,036) were from the Health and Retirement Study, a nationally representative sample of community-living older adults, 65 years of age and older. At baseline, fall history (no fall, 1 fall no injury, 2 or more falls no injury, or 1 or more falls with an injury) and factors potentially associated with RA were used to predict the initiation of an RA (i.e., moving, home modifications, increased use of adaptive equipment, family support, or personal care assistance) during the subsequent 2 years. RESULTS: Compared with those with no history of falls, individuals with a history of falls had higher odds of making any RA. Among those making an RA, individuals with an injurious fall were more likely than those with no history of a fall to start using adaptive equipment or increase their use of personal care assistance. IMPLICATIONS: The higher initiation of RAs among fallers may indicate proactive steps to prevent future falls and may be influenced by interactions with the health care system. To optimize fall prevention efforts, older adults would benefit from education and interventions addressing optimal use of RAs before falls occur.



- Liu HH, Eaves J, Wang W, Womack J, Bullock P. Assessment of canes used by older adults in senior living communities. *Arch Gerontol Geriatr.* 2011 May-Jun;52(3):299-303.

The purpose of this cross-sectional study is to provide basic but essential information about how older cane users obtain their canes and how they use these canes for their daily mobility, since there is still lack of information on these areas. Ninety-three older ( $\geq 65$  years old) subjects who use canes for daily activities were recruited from four assisted living facilities and five retirement centers for this cross-sectional study. The assessment involved interviewing cane users with a questionnaire, examining their canes, and investigating how these canes were used by their owners during ambulation. The commonly used canes are (from most to least): adjustable single-tip, un-adjustable (wooden), small quad, and large quad. Five major problems from data analysis were identified: lack of medical consultation for device selection/use, incorrect cane height/maintenance, placement of cane in improper hand, inability to maintain the proper reciprocal gait pattern, and improper posture during ambulation. Only forward-leaning posture during ambulation might be associated with increased falls among the older cane users. Knowledge of these problems could assist health professionals to implement appropriate interventions in clinical settings and to provide community service to address all problems related to cane use.



- Menant JC, Steele JR, Menz HB, Munro BJ, Lord SR. Optimizing footwear for older people at risk of falls. *J Rehabil Res Dev.* 2008;45(8):1167-81.

Footwear influences balance and the subsequent risk of slips, trips, and falls by altering somatosensory feedback to the foot and ankle and modifying frictional conditions at the shoe/floor interface. Walking indoors barefoot or in socks and walking indoors or outdoors in high-heel shoes have been shown to increase the risk of falls in older people. Other footwear characteristics such as heel collar height, sole hardness, and tread and heel geometry also influence measures of balance and gait. Because many older people wear suboptimal

shoes, maximizing safe shoe use may offer an effective fall prevention strategy. Based on findings of a systematic literature review, older people should wear shoes with low heels and firm slip-resistant soles both inside and outside the home. Future research should investigate the potential benefits of tread sole shoes for preventing slips and whether shoes with high collars or flared soles can enhance balance when challenging tasks are undertaken.



- Opalek JM, Graymire VL, Redd D. Wheelchair falls: 5 years of data from a level I trauma center. *J Trauma Nurs.* 2009 Apr-Jun;16(2):98-102.

Falling from a wheelchair can result in a serious injury. Our report details injuries sustained by 30 individuals who fell from a wheelchair and presented to our level I trauma center over 5 years. Most fall victims (60%) were older than 65 years. The most common injuries were traumatic brain injury, femur fractures, and concussion. The most serious injuries were traumatic brain injuries and a vertebral fracture with resultant spinal cord injury. In the trauma setting, practitioners discharging patients using wheelchairs should be aware of this mechanism of injury and should provide education to ensure proper fit and use of the device.



- Porter EJ, Benson JJ, Matsuda S. Older homebound women: negotiating reliance on a cane or walker. *Qual Health Res.* 2011 Apr;21(4):534-48.

Canes and walkers are commonly characterized as assistive devices that serve the same purpose: as walking aides. These general views were reappraised and tempered in this descriptive phenomenological study with 40 older women (aged 85 to 98 years) who were unable to leave their homes without help. The purpose was to describe the phenomena of negotiating reliance on canes and walkers as walking devices and the lifeworld context underlying each phenomenon. Relative to lifeworld, there were differences between coming to terms with using a cane and coming to terms with using a walker. Data revealed similarities and distinctions between the basic intentions of relying on canes and walkers and the associated purposes served by canes and walkers. Participants did not view either device as consistently assistive. Findings evoke opportunities for dialogue among older persons, scholars, practitioners, and designers of these devices about coming to terms with such devices and relying on them.



- Resnik L, Allen S, Isenstadt D, Wasserman M, Iezzoni L. Perspectives on use of mobility aids in a diverse population of seniors: implications for intervention. *Disabil Health J.* 2009 Apr;2(2):77-85.

BACKGROUND: Many older adults who might benefit from using mobility aids do not or will not use them. Studies show that attitudes and beliefs strongly affect the decision to use mobility aids. Despite the growing diversity of the population, no prior studies have compared attitudes towards and beliefs about mobility aids by race and ethnicity. OBJECTIVE: This study aimed to explore whether and how attitudes towards and beliefs about mobility aid use vary by race and ethnicity. METHODS: We conducted 12 focus groups with 61 community dwelling persons age 65+ years from three groups: White, non-Hispanic Black, and Hispanic. Data were coded and compared across groups. RESULTS: For all groups, perceived benefits of mobility devices in maintaining independence and control produced positive attitudes. However, the association of mobility aid use with aging and physical decline contributed to stigmatizing attitudes. Black and Hispanic participants expressed apprehension about using unsafe or inappropriate secondhand equipment, heightened concerns about mobility aid users becoming subjects of negative biases, and a preference for fashionable aids. Hispanic participants expressed a preference for human assistance. Participants of all groups perceived physicians as influencing their decisions to use aids. CONCLUSIONS: Social pressures and perceived stigma deter mobility aid use, particularly in minority populations. Greater physician involvement, positive peer models and affordable, safe, visually appealing devices would promote greater acceptance of mobility aids.



- Stevens JA, Thomas K, Teh L, Greenspan AI. Unintentional fall injuries associated with walkers and canes in older adults treated in U.S. emergency departments. *J Am Geriatr Soc.* 2009 Aug;57(8):1464-9.

OBJECTIVES: To characterize nonfatal, unintentional, fall-related injuries associated with walkers and canes in older adults. DESIGN: Surveillance data of injuries treated in hospital emergency departments (EDs), January 1, 2001, to December 31, 2006. SETTING: The National Electronic Injury Surveillance System All Injury Program, which collects data from a nationally representative stratified probability sample of 66 U.S. hospital EDs. PARTICIPANTS: People aged 65 and older treated in EDs for 3,932 nonfatal unintentional fall injuries and whose records indicated that a cane or a walker was involved in the fall. MEASUREMENTS: Sex, age, whether the fall involved a cane or walker, primary diagnosis, part of the body injured, disposition, and location and circumstances of the fall. RESULTS: An estimated 47,312 older adult fall injuries associated with walking aids were treated annually in U.S. EDs: 87.3% with walkers, 12.3% with canes, and 0.4% with both. Walkers were associated with seven times as many injuries as canes. Women's injury rates exceeded those for men (rate ratios=2.6 for walkers, 1.4 for canes.) The most prevalent injuries were fractures and contusions or abrasions. Approximately one-third of subjects were hospitalized for their injuries. CONCLUSION: Injuries and hospital admissions for falls associated with walking aids were frequent in this highly vulnerable population. The results suggest that more research is needed to improve the design of walking aids. More information also is needed about the circumstances preceding falls, both to better understand the contributing fall risk factors and to develop specific and effective fall prevention strategies.



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*Next Month's Issue:*

Home Evaluation for the Prevention of Falls

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