from Research to Reality

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Liberty Mutual Research Institute for Safety

Aging Workforce: New Challenges in Safety and Disability Research

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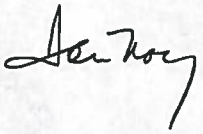
Y. Ian Noy, Ph.D.
Vice President and Director

DEAR READERS,

There is no escaping the fact that we are all getting older. And, for a variety of reasons, many of us are remaining in the workforce beyond the traditional retirement ages of the prior generation. This "graying of the workforce" presents new safety challenges to workers and work organizations. That's why, for the past decade, the Research Institute has conducted occupational safety and disability research geared to the specific needs of older workers.

Through a wide range of disciplines, including disability research, injury epidemiology, biomechanics and behavioral sciences, our scientists attempt to identify modifiable risk factors unique to older workers with the goal of informing interventions. Armed with a deeper understanding of the interactions between age and safety performance, we can better prepare for demographic changes in the workforce and intervene effectively to keep older workers safer on the job.

I hope you find the contents of this newsletter instructive. For further information about the latest Institute news, post-doctoral opportunities, publications, collaborative updates, and more, we invite you to visit out our web site (www.libertymutualgroup.com/researchinstitute). As always, we welcome your feedback.



IN THIS ISSUE...

What's Age Got To Do With It?

Aging Workforce Brings New Research Challenges

According to the U.S. Bureau of Labor Statistics (BLS), the number of workers over age 55 will increase by nearly 40 percent, and the number of workers over age 65 will almost double over the next 10 years. (BLS, *Monthly Labor Review*, November 2007).

These estimates reflect a long-term trend that began in the 1970s and continues today, a result of increased retirement ages, longer life spans, aging baby boomers, and changes in the economy. And, with the recent economic downturn, the trend has gained momentum, as many older workers seek post-layoff or post-retirement jobs to offset financial losses and/or to secure health benefits.

As the older worker population continues to grow, researchers seek to better understand how this phenomenon impacts safety and disability in the workplace. "We are starting to learn more about the specific occupational risks and injury outcomes of older workers," says Glenn Pransky, M.D., M.Occ.H., director of the Research Institute's Center for Disability Research. "For example, we now know that certain chronic conditions, such as obesity and osteoarthritis, are linked to increased risk of injury, greater severity, and longer recovery times in some workers." These findings lead to host of other questions, such as:

- *Can workplace and worker risk factors that are specific for occupational injury in older workers be identified in advance?*
- *Could early identification of such risk factors lead to effective preventive measures?*
- *Are employees who feel that they should retire, but are forced to continue working for financial and health care reasons, more prone to unfavorable injury and return-to-work outcomes?*

"There are no simple answers to any of these questions," says Pransky. "We need to conduct more longitudinal studies of older worker populations to better understand how health, work, and a complex social milieu impact their safety and health on the job. The more we can learn about the specific issues facing older workers, the better we will be able to develop new knowledge and effective interventions to support their continued contribution in the workplace. That's the primary challenge for safety and disability researchers studying older workers."

Q: *What is the definition of "older worker"?*

A: There is no exact distinction between an older worker and a younger worker. The U.S. Age Discrimination in Employment Act defines older workers as employed individuals aged 40 and above. However, scientists generally focus on age-related changes in work ability, which can start at a young age in some workers, but may not be present in others who are well into their 60s. In studies of manual work, older workers are generally defined as those aged 45 or older.[1]

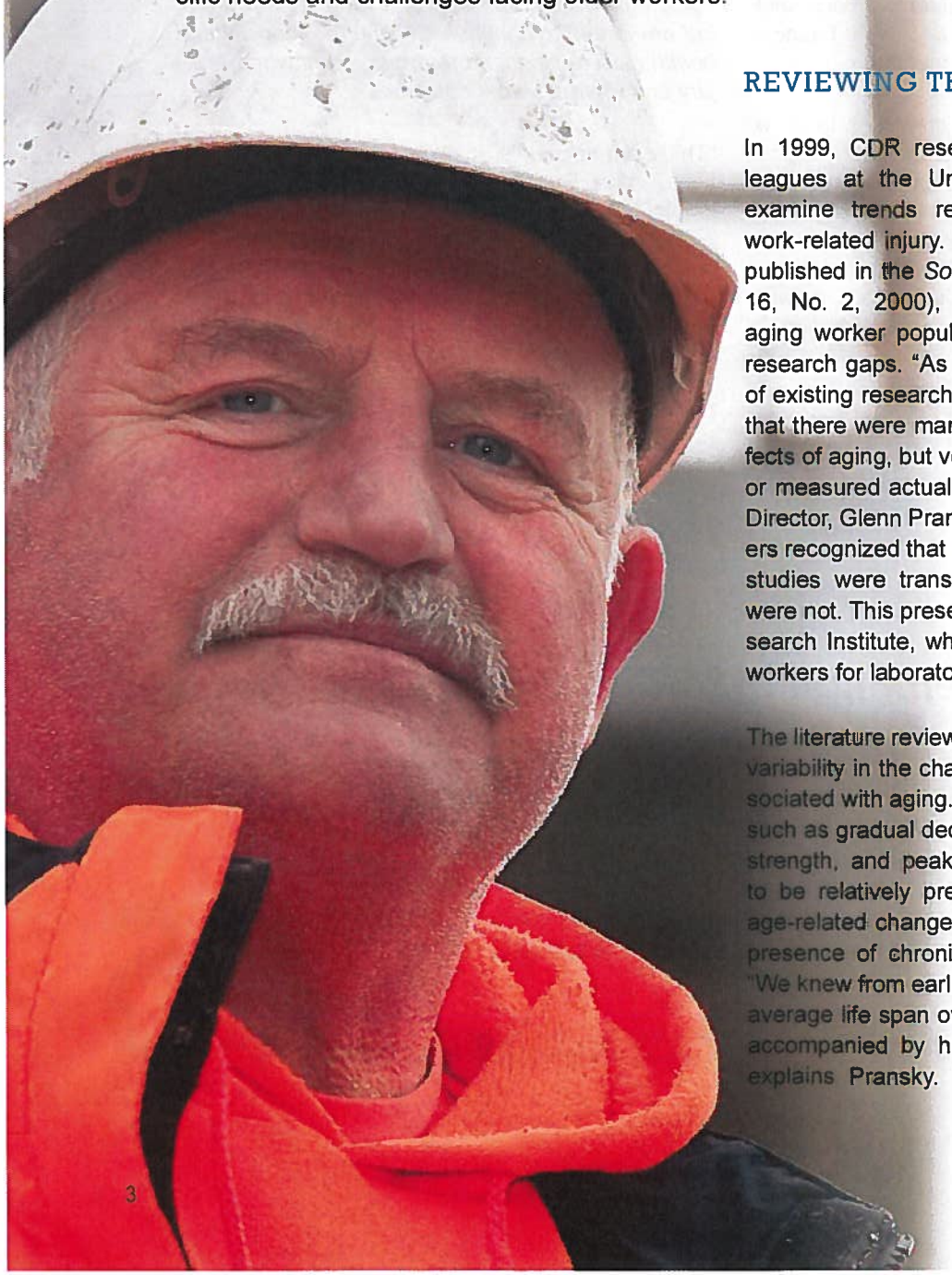
55 45 65

[1]Pransky, G.S., Benjamin, K.L., Savageau, J.A.,et. al., "Outcomes in Work-Related Injuries: A Comparison of Older and Younger Workers," *American Journal of Industrial Medicine*, Vol. 47, No. 2, 2005

The Impact of Work Injuries and Health on Older Workers

Center for Disability Research Investigations

For the past decade, the Liberty Mutual Research Institute's Center for Disability Research (CDR) has studied work injury and disability among older workers. The goals are to find opportunities to reduce injuries and to identify ways to improve post-injury outcomes for this increasingly dominant segment of the workforce. Early research included a review of existing scientific literature and national data specific to older workers. These efforts spawned several Institute investigations, including a multi-faceted field study comparing work-related injury outcomes among 3,000 older and younger workers. The research findings have yielded a wealth of insight into the specific needs and challenges facing older workers.



REVIEWING THE SCIENCE

In 1999, CDR researchers teamed up with colleagues at the University of Massachusetts to examine trends relative to older workers and work-related injury. The resulting literature review, published in the *Southwest Journal on Aging* (Vol. 16, No. 2, 2000), included new insights on the aging worker population and identified significant research gaps. "As we began examining the body of existing research, the first thing we noticed was that there were many laboratory studies on the effects of aging, but very few involved actual workers or measured actual job performance," states CDR Director, Glenn Pransky, M.D., M.Occ.H. Researchers recognized that some of the findings from these studies were transferable to workers, but many were not. This presented an opportunity for the Research Institute, which typically recruits real-world workers for laboratory and field studies.

The literature review also revealed a high degree of variability in the changes in physical capacities associated with aging. Certain physiological changes, such as gradual decreases in vision, hearing, peak strength, and peak aerobic capacity, were found to be relatively predictable with aging. However, age-related changes in cognition, work ability, and presence of chronic illness were highly variable. "We knew from earlier analyses that the increase in average life span over the past 20 years has been accompanied by higher rates of chronic illness," explains Pransky. "We also knew that changes

in cognitive abilities can occur due to aging (see *Center for Behavioral Sciences*, p. 9). But, we did not realize how much variability exists for these factors among people of the same age." This variability means it is impossible to directly extrapolate a level of performance or risk based on age, alone. "To put it simply, just because a worker is age 62, it doesn't mean he is less physically capable on the job than his age-24 counterpart," notes Pransky. The review also indicated that work-related factors such as experience, skill, maturity, and changes in work tasks over time, often place older workers at a relative advantage with respect to safety and productivity.

> "To put it simply, just because a worker is age 62, it doesn't mean he is less physically capable on the job than his age-24 counterpart."
>
> **Dr. Glenn Pransky, CDR Director**

EVALUATING ACTUAL WORKERS

In 2001, the CDR teamed up with the University of Massachusetts and the National Institute for Occupational Safety and Health to conduct a large, prospective study of age-related differences in work outcomes after occupational injury. Researchers surveyed more than 3,000 workers who were injured on the job in 2001. The surveys, administered within two to eight weeks post-injury, contained questions about prior work experience, illness, post-injury care, as well as health, functional and financial outcomes, and related factors. Half of those surveyed were between the ages of 20 and 54, and the rest were aged 55 and over. Researchers also gathered information on employer and health care provider responses to the injury. A detailed follow-up questionnaire was administered one year post-injury to gather information on long-term outcomes such as pain, function, return to work, and future work concerns.

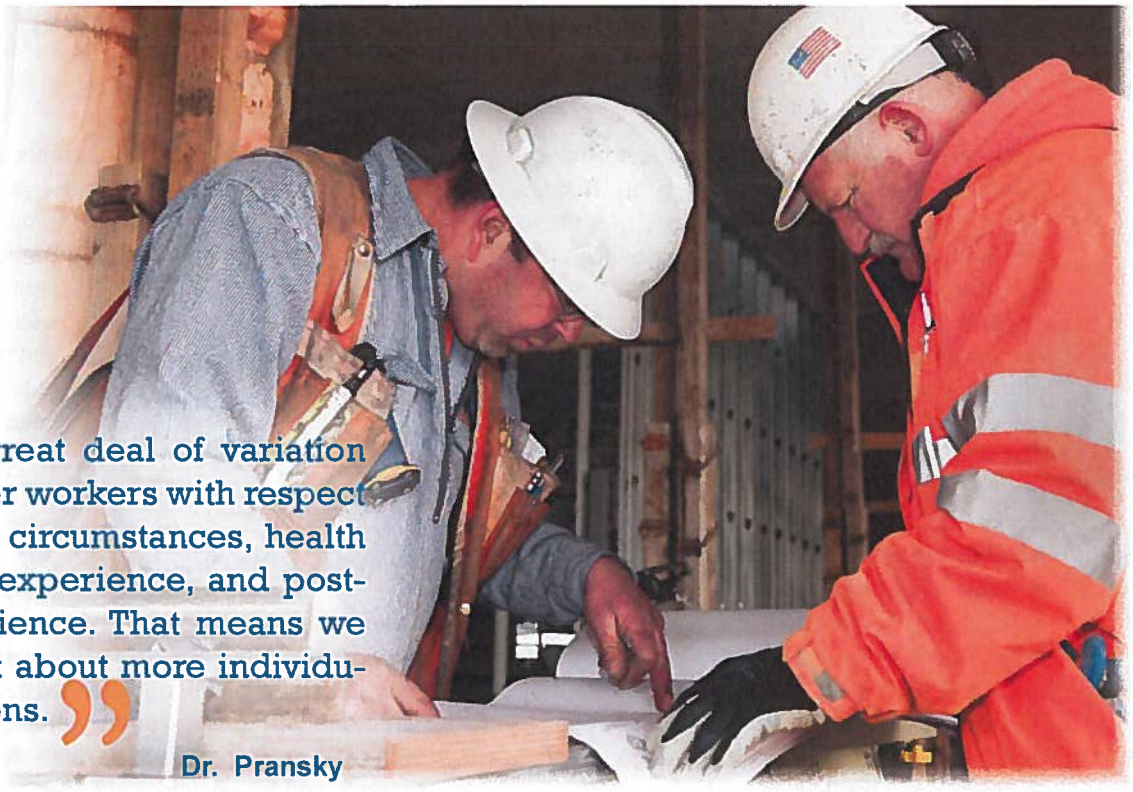
"Our results were surprising," notes Pransky, referring to the initial findings published in the *American Journal of Industrial Medicine* (Vol. 47, No. 2, 2005). "Despite higher injury severity in workers over age 55, outcome measures such as duration of work disability, injury-related pain, decrease in work capacity, and the need for ongoing medical

Continued next page

Q&A *Are older workers more injury prone than younger workers?*

According to Bureau of Labor Statistics data, older workers actually have fewer lost-time injuries than younger workers per full-time equivalent. However, for older workers who do experience a lost-time injury, the average length of disability is longer than that of their younger counterparts. One study showed that the cost per lost-time workers compensation claim for workers aged 45-64 was more than twice that of workers aged 20-24.[1] Some researchers speculate that the greater length of disability is associated with longer work absences due to retirement from the workforce after the injury.

[1]Restrepo, T., Sobel, S., and Shuford, H., "Age as a Driver of Frequency and Severity," *National Council on Compensation Insurance Research Brief*, December, 2006



> "There is a great deal of variation among...older workers with respect to individual circumstances, health status, work experience, and post-injury experience. That means we have to think about more individualized solutions."
>
> **Dr. Pransky**

care after the injury were similar to those of younger workers. In fact, older workers were actually more satisfied with their medical care and recovery than their younger counterparts." The data indicated that older workers had higher pre-injury job satisfaction, longer job tenure, greater employer attachment, and more positive responses from employers and co-workers after an injury, as well as fewer problems on returning to work. The findings showed that the only significant difference in outcome associated with age was a higher incidence of injury-related financial problems – in the *younger* workers (see chart, next page).

REVEALING INDIVIDUAL DIFFERENCES

In a related analysis, researchers examined data from over a dozen focus group interviews conducted prior to the main field study. Based on these interviews, researchers identified three distinct groups of older workers:

Group 1: Healthy Survivors – These are workers who are in excellent physical and mental health, have considerable experience and knowledge, and are often highly valued by their employers. When these workers suffer a job-related injury, they usually recover quickly and are brought back on the job promptly, performing a variety of alternate tasks until they are ready to go back to their usual position.

Group 2: Post-Retirement Workers – The workers in this group have already retired from a prior job and are often working in a completely different occupation. Sometimes these workers encounter problems because of inadequate training or a mismatch between their capabilities and the requirements of their job. They may be reluctant to return to this job after an injury.

Group 3: Job-Locked Workers – This group includes those who would very much like to retire or reduce their work hours, but are unable to do so because of economic/financial issues.

"There is a great deal of variation among these three groups of older workers with respect to individual circumstances, health status, work experience, and post-injury experience. That means we have to think about more individualized solutions," explains Pransky. "For example, we now know that some older workers have a strong attachment to the workplace.

We need to capitalize on that. But, we also need to recognize that other older workers might not want to return to work at all after experiencing an injury."

CDR researchers were especially interested in the third group, those who were job locked. Job lock, which had been described previously in younger workers, refers to a worker's inability to consider a more desirable job due to concerns about income or benefits loss. "We found a similar problem in our focus groups of older workers. Many said that they were unable to retire due to concerns about loss of income or health insurance," says Pransky. "We decided to look more closely at the factors surrounding retirement-related job lock in older workers."

Researchers set out to evaluate the relationship between health, work environment, and job lock in recently injured older workers. The resulting paper, published in *Disability and Rehabilitation* (Vol. 30, No. 26, 2008), indicated that retirement-related job lock affected more than half of those surveyed. Compared to other older workers, job-locked older workers had experienced worse health prior to injury, and those health problems appeared to have a significant negative impact on their work ability both before and after the injury. Their pre-injury job satisfaction and relationships with co-workers were relatively worse, and they were more often in comparatively unskilled occupations. Furthermore, job-locked workers had more residual problems, worse long-term health outcomes, and more concerns about future employment following a work injury.

According to Pransky, "Many of these job-locked workers were struggling at work before the injury, and thus appear to represent a priority group for interventions that might improve their health and work ability. This group is a major area of interest for us in future investigations."

"Generally speaking, our findings show that there is no one-size-fits-all solution to maintaining a healthy and productive older workforce," says Pransky, who notes that individualized solutions that promote flexibility, accommodation, and wellness will become increasingly important as the older worker population continues to expand. "We will continue to study different segments of the older worker population and their particular needs and circumstances, so we can identify individual strategies that support their safe and sustained employment."

COMPARISON OF OLDER AND YOUNGER WORKERS (LOST-TIME CASES) WITH RESPECT TO KEY OUTCOMES[1]

OUTCOME	AGE < 55	AGE ≥ 55
Returned to work at time of survey (2-8 weeks post injury)	84%	79%
Mean duration of work disability (days)	11.0	11.6
Mean decrease in work capacity scale post-injury	0.18	0.14
Perceived change in quality of work life (lower score = more negative change)	-0.43	-0.11
Injury will prevent performance of all regular work tasks in next four weeks	25.7%	24.8%
Injury will prevent working regular hours in next four weeks	15.6%	16.8%
Worry about future job loss due to work injury	34.5%	28.8%
Worry about future work capacity (possible score range =1-5; higher = more worry)	1.5	1.5
Economic difficulties due to work injury (higher score = more difficulty)	0.91	0.55
Mean number of medical care visits for treatment of injury	5.6	5.0
Injury-related pain in past 7 days	66.0%	66.7%

[1]Pransky, G.S., Benjamin, K.L., Savageau, J.A., et. al., "Outcomes in Work-Related Injuries: A Comparison of Older and Younger Workers," *American Journal of Industrial Medicine*, Vol. 47, No. 2, 2005

A Multi-Disciplinary Approach

Broadening the Institute's Older Worker Research

While the Center for Disability Research (CDR) has traditionally taken the lead in the Institute's older worker research, the Centers for Injury Epidemiology, Behavioral Sciences, and Physical Ergonomics have also contributed to an accumulating body of knowledge on the topic. This multi-disciplinary advantage enables Institute scientists to achieve a broader understanding of the effects of age on occupational injury risk.

Below are highlights of the Institute's epidemiological, physical, and behavioral research on the effects of age on worker safety.

Center for Epidemiology (CIE): In collaboration with other Institute centers, the CIE has conducted studies into the risk factors for occupational slips and falls among older and younger workers.

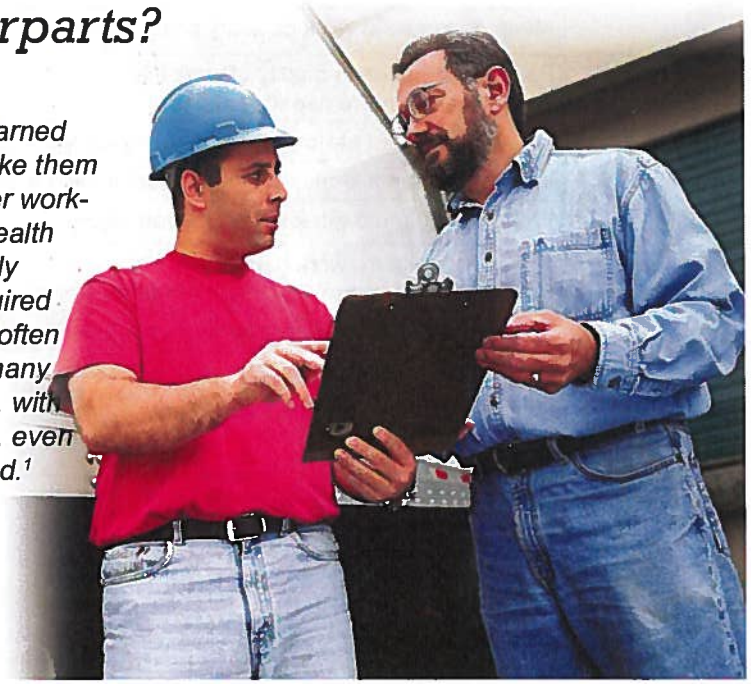
The Issue: Same-level slips and falls are the second leading cause of occupational injuries in the United States, and according to the Bureau of Labor Statistics (BLS), older workers (aged 55+) suffer nonfatal, same-level, fall-related injuries at higher rates than younger workers (aged 20 – 54) (BLS Table R110). Furthermore, when older workers suffer a fall, the median number of work days lost is nearly double that of their younger counterparts (*BLS Issues in Labor Statistics*, 1996), which suggests more severe injuries and more lengthy recovery times. Improving understanding of the association between age, same-level falls, and injuries is an important step in injury prevention and disability management.

The Studies: In 2006, CIE researchers studied the impact of occupational physical demands on the risk of fall-related fractures among older and younger women.[1] The study demonstrated that same-level falls at work were more likely to cause fractures in older women (aged 50+), although having a job with significant physical demands seemed to provide a slight protective effect against such fractures. The

Q *How do older workers "measure up" to their younger counterparts?*

A *In many jobs, the experience, quality, and learned efficiencies of older workers can actually make them more productive than younger workers. Older workers are less likely to miss work due to non-health reasons (e.g., family obligations) and typically develop compensatory strategies (time-acquired skills) that make them as effective as – and often more effective than – younger workers for many kinds of tasks. Sometimes a trade-off exists, with older workers producing higher quality work, even though speed might be somewhat decreased.*[1]

[1]Liberty Mutual Loss Prevention Reference Note 5439, 2008



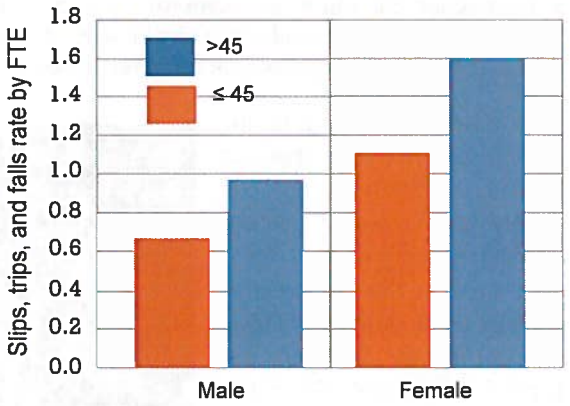
study also found that the proportion of same-level falls resulting in fracture increased linearly with age.

A later CIE study examined the circumstances surrounding occupational same-level falls and the risk of wrist, ankle, and hip fracture in women over 45 years of age.[2] The findings indicated that falls due to tripping increased consistently with age in women over 45. The study also found that falls during pushing/pulling were associated with increased risk of wrist fracture; falls due to tripping were associated with increased risk of wrist fracture, but decreased risk of ankle fracture; and falling outdoors was associated with increased risk of both wrist and ankle fracture. Similar results emerged from a collaborative study involving CIE and Center for Physical Ergonomics (CPE) scientists as well as researchers from the National Institute for Occupational Safety and Health (NIOSH). This study indicated that slip, trip, and fall claim rates among health care workers were significantly greater for employees older than 45 years compared with younger employees.[3] (See chart, top right.)

Interestingly, a cross-center field study of slipping in limited-service restaurant workers found that older workers had lower odds of self-reported slipping. However, older workers also rated the same working conditions to be less slippery than their younger counterparts, suggesting that there might be an influence of age on the ability to detect or adapt to slipperiness.[4]

What It Means: "We know that part of the aging process involves the development of limitations in vision, balance, and other sensory and motor perception areas," says CIE Director Theodore K. Courtney, M.S., C.S.P. "These changes, combined with age-related decreases in gait and postural control, and balance recovery, may make workers over 45 more vulnerable to slippery conditions than their younger colleagues. However, this remains to be established. We have slip, trip, and fall studies underway that will help us better explore and understand age-related effects. Consistent with the scientific literature, our findings underscore the importance of effective interventions for reducing slip and fall risks, particularly as the working population ages."

SLIP, TRIP, AND FALL CLAIM RATES AMONG HEALTH CARE WORKERS



Slips, trips, and falls claims by age group and gender - Full time equivalents (FTE)

Related Papers:

[1]Verma, S.K., Sorock, G.S., Pransky, G.S., et. al., "Occupational Physical Demands and Same-Level Falls Resulting in Fracture in Female Workers: An Analysis of Workers Compensation Claims," *Injury Prevention*, Vol. 13, 2007

[2]Verma, S.K., Lombardi, D.A., Chang, W.R., et. al., "A Matched Case-Control Study of Circumstances of Occupational Same-Level Falls and Risk of Wrist, Ankle and Hip Fracture in Women Over 45 Years of Age," *Ergonomics*, Vol. 51, No. 12, 2008

[3]Bell, J.L., Collins, J.W., Wolf, L., et. al., "Evaluation of a Comprehensive Slip, Trip, and Fall Prevention Programme for Hospital Employees, *Ergonomics*, Vol. 51, No. 12, 2008

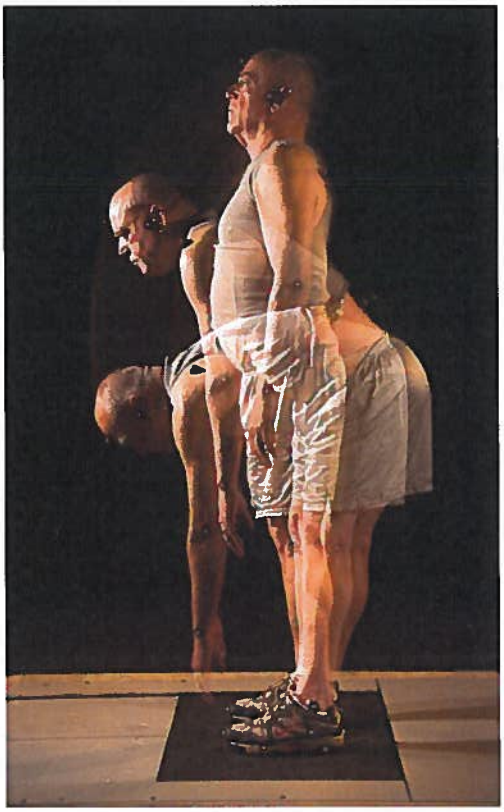
[4]Courtney, T.K., Huang, Y.H., Verma, S.K., et. al., "Factors Influencing Restaurant Worker Perception of Floor Slipperiness," *Journal of Occupational and Environmental Hygiene*, Vol. 3, No. 11, 2006

Continued next page

Center for Physical Ergonomics (CPE):

The CPE recently completed preliminary work for a biomechanical study of postural stability and balance among construction workers. The work produced some interesting insights on older workers.

The Issue: According to the U.S. Bureau of Labor Statistics (BLS) falls account for approximately 23 percent of nonfatal injuries resulting in days away from work in the construction industry (BLS, *Survey of Occupational Injuries and Illnesses*, Table 5, rev. 2009). Given this statistic, it is important to examine the underlying mechanisms that can contribute to falls among construction workers. And, with the number of construction workers aged 45-54 now having surpassed the 25-34 year age group (*The Construction Chart Book*, CPWR, 2007), age has become an increasingly relevant variable. With that in mind, CPE researchers are conducting a study examining postural stability and balance among older and younger workers.



The Study: CPE researchers examined construction workers' self-reports of postural stability and balance as workers transitioned to a standing position from eight different working postures.[1] Age was one of several factors studied. Researchers anticipated that older workers (aged 48 +) would report lower stability levels. However, they found the opposite to be true. Older workers reported higher stability levels – on average 10 percent higher – than their younger counterparts. Perceptions of higher stability were not solely a result of greater perceived ability to maintain balance, as was indicated by the fact that there was no age effect on ratings of overall balance.

What It Means: "Differences in perceptions of postural stability may be due to variations in the tasks performed or task adaptation," says the study's primary investigator, Angela DiDomenico, Ph.D., C.P.E. "Differences may also be due to the healthy worker effect, since older workers who remain employed in construction beyond a certain age, tend to be the healthy survivors of their age and industry group (see p. 5, Group 1: Healthy Survivors). Another possible explanation for the perception differences may be the workers' respective experience levels. "Most of the older workers we studied were also the most experienced. It is possible that their higher experience level enabled them to handle postural transitions better than their younger, less experienced counterparts," explains DiDomenico. CPE researchers are currently conducting a laboratory investigation to further explore age-related changes in postural stability and balance (photo, left).

Related Paper:

[1]DiDomenico, A., McGorry, R.W., Huang, Y.H., and Blair, M.F. "Perceptions of Postural Stability After Transitioning to Standing Among Construction Workers," *Safety Science*, in press.

Center for Behavioral Sciences (CBS):

The CBS has conducted several studies on warning symbol comprehension. Within this research area, the impact of aging on warning symbol comprehension has emerged as an important factor.

The Issue: Warning symbols are an essential element of signs, posters, and other industry safety communications used to alert workers to potential hazards. Some studies have shown that older adults have greater difficulty than younger adults

understanding warning symbols, but other studies have found no difference between the two groups. Still other studies have found better comprehension among older adults for some symbols. As the population of older workers continues to rise, it is important to determine whether age impacts warning symbol comprehension, and, if so, what are the best ways to maximize warning effectiveness for an aging workforce.

The Study: CBS scientists conducted a study of warning symbol comprehension among younger (aged 18-35) and older (aged 50-65) workers both before and after training.[1] The research examined three main questions:

1. Are there age-related differences in warning symbol comprehension?
2. To what extent is prior exposure (i.e., familiarity) necessary to understand different warning symbols?
3. Can training compensate for age-related differences in warning symbol comprehension?

The researchers observed significant age-related differences in comprehension for 15 of the 31 symbols presented. In every instance, the older group demonstrated poorer comprehension than the younger group. The researchers also found that participants' familiarity ratings for the symbols were significantly correlated with comprehension performance. Training improved comprehension for both age groups, but did not eliminate performance differences. The findings suggest that older adults' performance depends somewhat on the extent to which the warning symbol is capable of triggering appropriate, context-specific information, or "cueing knowledge."

What It Means: "The jury is still out on the impact of age on warning symbol comprehension," says behavioral scientist Mary Lesch, PhD. "However, the fact that older adults had more difficulty understanding and learning some, but not all, of the symbols suggests that symbol characteristics may play a significant role in comprehension. Also, some comprehension measures such as verbal fluency may be sensitive to age-related changes that are independent of symbol comprehension."

CBS researchers continue to study age-related differences in warning symbol comprehension, with the goal of providing guidance in "designing out" potentially hazardous misunderstandings by older workers.

Related Paper:

[1]Lesch, M.F., "Age-Related Effects on Warning Symbol Comprehension," *Proceedings of the Human Factors and Ergonomics Society 48th Annual Meeting*, 2004

SAMPLE OF WARNING SYMBOLS AND PATTERN OF RESULTS: OLDER VS. YOUNGER

Well understood before and after training by both age groups[1]

Poorly understood by both age groups before training, but age-related difference after training (younger improved; older did not)[2]

Age-related difference before training, but no age difference after training[3]

Symbol meaning, left to right:
[1]crush hazard, entanglement hazard, [2]pinch point, biohazard, [3]cancer-causing substance, slip hazard

Research Collaborators Delve Deeper into Job-Lock Phenomenon

Job lock is a phenomenon in which a worker is unable to leave his or her job because the loss of income, health insurance, or other benefits would create an intolerable hardship. Many questions have surfaced since the Center for Disability Research (CDR) identified job-locked older workers as a prominent and potentially high-risk group. Among them: What is the extent and nature of job lock among older American workers? What factors impact work and injury outcomes among job-locked older workers? What are the potential opportunities for improving injury and disability risks and outcomes for this group of workers?

Scientists James W. Grosch, Ph.D., of the National Institute for Occupational Safety and Health and post-doctoral fellow Ross Wilkie, Ph.D., of Keele University (United Kingdom) are currently working with CDR researchers to answer these and other questions.

As the Research Institute's 2007 Visiting Scholar, Dr. Grosch spent three months analyzing older worker data from the Health and Retirement Study, the CDR's older worker field study, and Liberty Mutual claims. The analyses were part of a larger project focusing on the health and safety needs of high-risk workers – including job-locked older workers – which continues today.

"The CDR field study found that job lock predicted some negative health outcomes among older workers," says Grosch, who maintains that this finding takes on increased significance in today's down economy, as more people find it necessary to work past retirement age for health insurance and other financial reasons. "We need to increase our understanding of what causes job lock among older workers and find ways to address their particular health, safety, and return-to-work needs."

Over the next several months, Grosch will delve more deeply into the job-locked older worker phenomenon using new data from the University of Michigan Health and Retirement Study (HRS). This longitudinal study, sponsored by the National Institute on Aging, surveys more than 22,000 Americans over the age of 50 every two years to gain information on aging Americans' physical and mental health, insurance coverage, financial status, family support systems, labor market status, and retirement planning. In 2008, prompted by the CDR field

> "The data ... will allow us to estimate what percentage of older workers experience job lock, and what percentage experience it because they need the money versus the health insurance."

James W. Grosch, Ph.D.
National Institute for Occupational Safety and Health

study findings, the HRS added items on job lock that will help researchers better understand the factors contributing to this phenomenon.

"This new HRS survey data is critical because it will allow us to estimate what percentage of older workers experience job lock, and what percentage experience it because they need the money versus the health insurance," says Grosch. "We will also be able to follow the job-locked workers into the future, evaluating their health, work activities, and issues related to disability."

As Grosch works with the HRS data, post-doctoral research fellow Ross Wilkie, Ph.D., is working to analyze follow-up data from the CDR older worker field study. Currently supported by a grant from the Research Councils of the United Kingdom (RCUK), Wilkie holds a doctorate in population epidemiology from Keele University. His research focuses on older adults and musculoskeletal disorders, particularly osteoarthritis.

Wilkie, who began a six-month fellowship at the Research Institute in July, is examining the follow-up data provided by nearly 1,500 older workers as part of the CDR older worker study. "We are interested in comparing post-injury work outcomes in job-locked versus non-job-locked older workers," explains Wilkie. Preliminary findings suggest that job-locked older workers have more work problems prior to injury, as well as at six weeks and one year after an injury.

Ultimately, the analyses aim to identify factors which may explain the increased risk experienced by job-locked older workers. To do this, researchers will apply multilevel modeling to study participants' self-reported demographic, health, and workplace data. The information gained will enhance the potential for existing workforce evaluations, ergonomic interventions, return-to-work strategies, and wellness programs aimed at addressing older workers' safety needs (see p. 13 article). "Gaining a greater understanding of the factors that can lead to problems at work," Wilkie explains, "is the first stage in proposing targets and interventions aimed at maintaining work ability, participation, and safety of older adults."

> "Gaining a greater understanding of the factors that lead to problems at work is the first stage in proposing targets and interventions aimed at maintaining work ability, participation, and safety of older adults."

Ross Wilkie, Ph.D.
Keele University

Keeping Older Workers Safe, Healthy, and Productive on the Job

Older workers are vital to the success of many companies. Their experience and broad skill sets are increasingly valuable, especially in a downsizing economy where fewer workers are doing the work of more people. According to Liberty Mutual Technical Consultant Astra Townley, M.S., A.R.M., C.S.P., C.P.D.M, companies have much to gain by promoting the health, safety, and overall well-being of this increasingly important and growing group of workers. "Companies that take a proactive approach to meet the unique needs of older workers can improve their safety and health outcomes," says Townley. But how do companies tackle such a task – especially in light of findings suggesting high variability in the physical capacities and employment circumstances of older workers? Meeting the needs of the aging workforce is a process that requires knowledge, flexibility, accommodation, and an emphasis on wellness strategies.

Step 1: Evaluate your aging workforce and analyze age-related loss trends.

As a first step, companies should evaluate whether or not they have an aging workforce. While definitions of "older worker" vary (see p. 2), Townley suggests that companies with 50 percent or more workers above 55 years of age should evaluate the frequency and severity of injuries among that group.

"Although BLS data indicates that older workers (aged 55+) are injured less frequently than their younger counterparts, studies show that when injury does occur, recovery tends to take longer. That is why it's important to identify age-related loss trends and determine which types of injuries are occurring among older workers, and what is causing these injuries," says Townley. "The information gained can help companies determine the best controls to put into place."

Step 2: Implement ergonomic controls for leading loss areas.

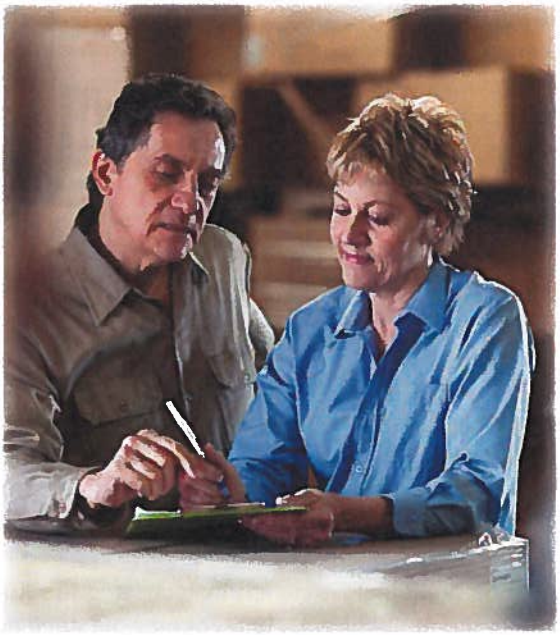
Ergonomics is about fitting the job to the worker. As people age there are physiological changes – such as decreased strength and flexibility – that may impact the way they perform certain jobs. As a result, employees in their 60s may have different ergonomic needs from those in their 40s, and different again from those in their 20s.

"We know that ergonomic needs are likely to change with jobs involving high physical demand, such as manual materials handling," explains Townley. "An employee who could transport a 50-pound box easily in his/her 20s might need a cart to move the same weight in his/her 40s or 50s. It is important that companies provide the appropriate controls to properly fit the job to the employee and to realize that these controls might vary over time, as age and corresponding physical abilities change."

Other age-related changes, such as impairments in balance, reaction times, and vision, may also make some older workers more prone to slips and falls.

The research shows that older workers (aged 55+) sustain slip and fall-related injuries at higher rates than younger workers, and that these types of injuries are typically more severe and involve longer recovery. "All companies, but especially companies employing older workers, should do everything they can to minimize slips and falls," says Townley. She notes that a company can take proactive measures such as assessing flooring material safety, enforcing footwear requirements, improving lighting (especially in stairwells and hallways), and instituting better and more frequent floor cleaning protocols.

Step 3: Strengthen return-to-work practices.



Companies that accommodate injured employees, and offer flexibility in terms of job location, assigned work tasks, and work hours, can get workers back on the job faster and decrease the costs associated with disabling injuries. In addition, a solid return-to-work program shows that employers care about and value their employees. "This might be especially important to job-locked workers," notes Townley.

Some good practices include identifying in advance how jobs can be modified, having a return-to-work policy statement and coordinator, and providing training for all managers, supervisors, and employees on the return-to-work program and policies.

Step 4. Implement a wellness program.

"With the 'graying of the workforce,' preventing worker injuries is more important that ever," says Townley, who recommends companies take a long-term view toward improving and maintaining the health of workers. Doing so can help offset the development of serious health conditions (i.e., chronic illnesses) that can hinder employment. "An effective and comprehensive company wellness program can be an important means for helping to improve safety outcomes and can also have positive effects on morale, employee loyalty, and productivity. "

A company wellness program can include programs aimed at proper nutrition and weight management, stress management, and smoking cessation. "These types of programs may be especially important for workers who are at risk for developing chronic illnesses," notes Townley. "Such workers may be exposed to higher risk of injury, and potentially also disability, by showing up at work in poor health."

There is increasing evidence that, to be effective, wellness initiatives need top management support and involvement, substantial commitment of resources, organizational changes, appropriate incentives and supports, and employee involvement in the program's design and execution. "A program that combines all of these factors can change the way employees feel not only physically, but also psychologically, and can go a long way to providing a healthier and more productive workforce," concludes Townley.

NEWS

WINNING RESEARCH MITIGATES OCCUPATIONAL HEALTH HAZARDS OF WOMEN FARMERS IN INDIA

Suman Singh, Ph.D., from Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan, India, received the 2009 International Ergonomics Association (IEA)/Liberty Mutual Medal in Occupational Safety and Ergonomics for her field investigation of women farmers in India. The winning research paper, "Mitigating Occupational Health Hazards of Women Farmers Through Educational and Technological Interventions," discusses the empowerment of women farmers in India to help improve occupational safety and work efficiency in agriculture and animal husbandry. Dr. Singh accepted the award in August 2009 at the 17th Triennial Congress of the IEA in Beijing, China.

The research used an innovative participatory approach to making agriculture and animal husbandry less labor-intensive and to teach women how to lessen occupational health hazards. By introducing improved equipment and safety tools, which increased the farmers' work efficiency and safety, the interventions considerably reduced physical drudgery. The findings from this investigation helped researchers create a model for mitigating occupational health hazards that may ultimately improve the quality of life of rural women working in agriculture.

IEA President David Caple presents the Liberty Mutual Medal to Suman Singh at the 17th Triennial Congress of the IEA.

"The selection committee was impressed with the systems approach used in the project," says IEA President David C. Caple, M.S., C.P.E. The researchers combined ergonomic design or redesign of equipment with the development and application of a training program involving participatory, field-level skill training and repeated field demonstrations in the proper use of the improved farm instruments. "The impact of the study is far reaching with its direct benefit to more than 4,000 women, and potentially, to many more farm workers beyond the scope of the project."

"It is an honor to receive this award," says Singh. "I would like to thank Liberty Mutual and the IEA. The honor has boosted my motivation to work with added vigor to help empower farm women technologically."

The Liberty Mutual Research Institute and the IEA present the annual Medal to recognize outstanding original research leading to the reduction of work-related injuries and/or the advancement of theory, understanding, and development of occupational safety research. The Medal is awarded to the authors of an original scientific paper that meets criteria for innovation and impact. The most prestigious award of its kind in the field of occupational ergonomics and safety, it carries a stipend of $10,000. An international review committee, established by the IEA, selects the winning contribution from among applicants worldwide.

Contact Dr. Singh at sumanfrm@rediffmail.com or sumanfrm@gmail.com for further information.

INSTITUTE PLAYS KEY ROLE IN INTERNATIONAL LOW BACK FORUM

In June, a capacity crowd of more than 170 scientists from 18 countries participated in the Tenth International Forum on Primary Care Research on Low Back Pain at the Harvard University School of Public Health. This year's Forum brought together leading researchers in the fields of primary care, occupational health and safety, physical therapy, occupational therapy, osteopathy, chiropractics, and epidemiology. The program included four keynote speakers, 140 scientific presentations, and intensive workshops that were designed to share the latest concepts, methods, and results in low back pain diagnosis, evaluation, treatment, and work disability prevention. A number of peer-reviewed scientific papers will result from the program.

"This is the premier meeting for researchers involved in low back pain and primary care," says Glenn S. Pransky, M.D., M.Occ.H., director of the Research Institute's Center for Disability Research. "Two years ago, the international organizing committee selected the Center for Disability Research to take the lead in developing and organizing the meeting in Boston. We focused the main themes on activity, participation, and return-to-work outcomes. We are delighted with the success of this year's event and are honored that we could play such a large role in putting it together."

POST-DOCTORAL FELLOWSHIP AVAILABLE

The Research Institute, in collaboration with research partners at the Harvard School of Public Health and the University of Massachusetts at Lowell, is pleased to announce opportunities for post-doctoral fellowships in occupational injury and disability research.

The full-time, benefited positions will last for an initial period of one year, with potential for up to two additional years. The selected fellows will conduct ergonomics, occupational safety, occupational injury epidemiology, or disability and return to work research in close collaboration with Institute research scientists and their respective partner institution. Responsibilities will include data collection and analysis, publication in the peer-reviewed literature, participation in seminars and work groups, and collaboration on research grant applications.

The successful applicant will have a doctoral degree in epidemiology, safety research, ergonomics, behavioral science, medicine or a related field. Candidates must have less than five years post-doctoral experience, a demonstrated record of individual research initiative, strong analytic skills, and potential to become an independent academic researcher within two to three years.

"This is a terrific opportunity for recent doctoral graduates to develop their research careers," says Research Institute Director Y. Ian Noy. "The program enhances our research and helps promote the field of occupational safety. It is also a key element in building collaborative relationships with leading academic institutions in areas of mutual interest."

The application deadline for the collaborative program with the Harvard School of Public Health is October 1, 2009, and applications for the program with University of Massachusetts at Lowell must be submitted by November 1, 2009. For more information, please visit our website at http://www.liberty-mutualgroup.com/researchinstitute, and follow the collaborative program link.

DISTINGUISHED JOURNALS APPOINT INSTITUTE RESEARCHERS

Accident Analysis and Prevention, a top-tier journal in the safety field, recently appointed Yueng-Hsiang (Emily) Huang, Ph.D., (left) as associate editor. The journal covers areas that relate to accidental injury and damage, including the pre-injury and immediate post-injury phases. Published papers deal with medical, legal, economic, educational, behavioral, theoretical, or empirical aspects of transportation and other work site accidents. Huang will have oversight of articles submitted on safety-related topics, such as safety climate and culture.

William J. Horrey, Ph.D., (left) was named associate editor of *Human Factors*, the premier publication of the Human Factors and Ergonomics Society. The peer-reviewed journal contributes to the understanding of the interactions between people and machines, systems, and environments. Articles encompass basic and applied research, quantitative and qualitative approaches to theory, and state-of-the-art reviews covering all aspects of the human-system interface.

PUBLICATIONS

Horrey, W.J., Lesch, M.F., and Garabet, A., "Dissociation Between Driving Performance and Drivers' Subjective Estimates of Performance and Workload in Dual-Task Conditions," *Journal of Safety Research*, Vol. 40, pp. 7-12, 2009

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Marucci-Wellman, H., Leamon, T.B., Binh, T.T.T., Diep, N.B., Wegman, D.H., and Kriebel, D., "A Survey of Work-Related Injury in a Rapidly Industrializing Commune in Vietnam," *International Journal of Occupational and Environmental Health*, Vol. 15, No. 1, pp. 1-8, 2009

Robertson, M.M., Amick, B.A., DeRango, K., Rooney, T., Bazzani, L., Palacios, N., Harrist, R. and Moore, A., "The Effects of an Office Ergonomics Training and Chair Intervention on Worker Knowledge, Behavior and Musculoskeletal Risk," *Applied Ergonomics*, Vol. 40, No. 1, pp. 124-135, 2009

Shaw, W.S., van der Windt, D.A., Main, C.J., Loisel, P., Linton, S.J., and the "Decade of the Flags" Working Group, "Early Patient Screening and Intervention to Address Individual-Level Occupational Factors ("Blue Flags") in Back Disability," *Journal of Occupational Rehabilitation*, Vol. 19, No. 1, pp 64-80, 2009

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Young, A.E. and Murphy, G.C., "Employment Status Following Spinal Cord Injury (1992-2005): A Review With Implications for Interpretation, Evaluation, Further Research, and Clinical Practice," *International Journal of Rehabilitation Research*, Vol. 32, No. 1, pp. 1-11, 2009

CONFERENCES

Institute of Industrial Engineers Annual Conference and Expo: May 30 - June 3, Miami, FL: Gender Differences in Psychophysically-Determined Physiological Responses During Dynamic Pushing – R.V. Maikala, Ph.D.

XXI Annual International Occupational Ergonomics and Safety Conference: June 11-12, Dallas, TX: Preventing Slips at the Bases of Portable Ladders – W.R. Chang, Ph.D.

19th Conference of the International Society for Posture and Gait Research: June 21 - 25, Bologna, Italy: Gait During Continuous Walking: Impact of Friction, Surface Condition, and Perception – C.C. Chang, Ph.D., C.P.E.

XXII Congress of the International Society of Biomechanics: July 5 - 9, Cape Town, South Africa: The Relationship of Borg CR10 Ratings of Perceived Exertion to Grip Force During Hand Tool Tasks – R.W. McGorry, M.S., P.T.

35th International Forum on Traffic Records and Highway Safety Information Systems: July 12, Phoenix, AZ: Human Factors in Motor Vehicle Crashes – Y.I. Noy, Ph.D.

19th International Symposium on Shiftwork and Working Time: August 2 - 6, San Servolo Island, Venezia, Italy: Daily Sleep, Weekly Working Hours, and Risk of Work-Related Injury: U.S. National Health Interview Survey (2004-2007) – D.A. Lombardi, Ph.D.

IEA 2009 - 17th World Congress on Ergonomics: August 9-14, Beijing, China: An Objective Determination of a Slip with the PIAST – W.R. Chang, Ph.D. • Using the Theory of Planned Behavior to Examine Pedestrians' Road-Crossing Intentions in China – W.J. Horrey, Ph.D. • Effects of Torque Exposure, Pace, and Work:Rest Ratio on Grip Force in Repetitive Powered Hand Tool Operation – J.H. Lin, Ph.D., C.P.E. • Effects of Office Ergonomic Training and Workstation Design on the Musculoskeletal and Visual Symptoms of Office Workers: A Longitudinal Controlled Laboratory Experiment – M.M. Robertson, Ph.D., C.P.E.

Annual Meeting of the American Society of Biomechanics: August 26-29, State College, PA: Magnitude of Potential Vulnerability to Balance Control After a Transition to Standing – A. DiDomenico, Ph.D., C.P.E.

Workers Compensation Data Use Workshop: September 22-23, Washington, DC: Workers Compensation Data Utilization in Injury Prevention Research at the Liberty Mutual Research Institute for Safety – T.K. Courtney, M.S., C.S.P. • Methodological Challenges in the Liberty Mutual Workplace Safety Index: Towards a Future Model – H. Marucci-Wellman, M.S., Sc.D.

53rd Annual Meeting of the Human Factors and Ergonomics Society: October 19-23, San Antonio, TX: Perceptions of Stability Upon Standing from Working Postures Used in the Construction Industry – A. DiDomenico, Ph.D., C.P.E. • Impact of Feedback on Drivers' Attitudes Towards Driving While Distracted: A Study in China – M.F. Lesch, Ph.D. • One-Handed Pull Strength Capacity for the Male Population – J.H. Lin, Ph.D., C.P.E.

137th American Public Health Association Annual Meeting and Exposition: November 7-11, Philadelphia, PA: Floor Surface, Shoe Type, Floor Cleaning and Risk of Slipping in U.S. Limited-Service Restaurant Workers– Preliminary Results from a Prospective Cohort Study – T.K. Courtney, M.S., C.S.P.

WHAT'S NEW ON THE WEB

Check out the Research Institute's new nine-minute overview video, which provides a comprehensive account of the Institute's history, mission, structure, and research programs. Visit www.libertymutualgroup.com/researchinstitute and go to the "About Us" page, then click on the play button in the image.

from Research to Reality

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