from Research to Reality

Obesity in the Workplace

Weighing the Associated Risks

LIBERTY MUTUAL RESEARCH INSTITUTE FOR SAFETY

SCIENTIFIC UPDATE

Liberty Mutual
RESEARCH INSTITUTE FOR SAFETY

Letter from the Director

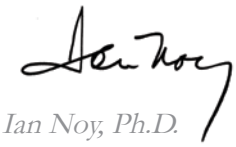
Dear Readers

Since the 1960s, the number of U.S. adults whose body mass index (BMI) falls into the obese range has more than doubled. Although the word obesity is typically thought to imply extreme weight, in truth, clinical obesity (defined as BMI > 30) is not always readily apparent. Whether perceptible or not, the fact that obesity increases the risk of health issues such as hypertension, type 2 diabetes, and heart disease is fairly well established.

This issue of Scientific Update focuses on obesity in the context of work-related injury and return to work. While research in these areas is relatively new, it is an important first step toward increasing employer awareness of concomitant issues and identifying potential ways of addressing them. We hope the initial findings from our research are informative and that the article on employer-based wellness programs provides tangible strategies for promoting health and wellness at work.

The present issue also highlights some recent news from the Institute. We are very pleased to welcome two new researchers: Elyssa Besen, Ph.D., has joined our Center for Disability Research, and Jan Hartvigsen, Ph.D., of the University of Southern Denmark is our first Guest Scientist. Finally, with our colleagues at the Institute of Human Factors and Ergonomics, we recently announced the 2013 Liberty Mutual Award winners for the best paper published in the journal Ergonomics *in 2012.*

We invite you to read more about these developments and as always, we welcome your feedback.



Ian Noy, Ph.D.
Vice President and Director

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Obesity in the Workplace

Public Health Issue Challenges Employers

Obesity is a public health concern affecting populations in Europe, North America and, increasingly, in developing countries. In the U.S., the prevalence of adult obesity more than doubled between 1980 and 2010. Today, more than one third of the nation's adults have a body mass index (BMI) of 30 or greater, meeting the clinical definition of obesity. Studies show that a BMI greater than 30 significantly increases risks for certain health conditions including hypertension, type 2 diabetes, and heart disease. These risks are prompting increased national attention to this issue in the form of awareness campaigns and public health programs.

Although obesity is primarily a matter of public health, it also has workplace implications. "Obesity is a well-established trend in both the general population and the employed population," explains Theodore Courtney, MS, CSP, director of the Liberty Mutual Research Institute for Safety's Center for Injury Epidemiology (CIE). "It is important to understand where this population health trend leads in terms of overall health and safety, and to reflect on what businesses can do to help address the situation."

According to a 2008 report, U.S. employers spend more than $200 billion annually on account of obesity-related health conditions.[1] "Employers bear a large share of employee healthcare and disability costs, so anything that impacts people's health is important to them," says Courtney, who maintains that employers are increasingly looking for ways to address weight-related health concerns that extend beyond traditional insurance-based health maintenance programs. In some cases, companies are taking an active role in their employees' health by establishing workplace programs that promote health and fitness.

To better understand how obesity impacts the workplace, the Liberty Mutual Research Institute for Safety has initiated research in this area. Most recently, the Institute's CIE conducted a study to determine whether obesity is associated with on-the-job injury risk (see p. 4). This study is one of the first to look at this question from a broad, industry-wide perspective. Other studies include an investigation of the impact of BMI and sleep duration on injury risk (see p. 5) and a study of how BMI affects low back pain recovery and return to work (see p. 6).

These studies aim to improve understanding and awareness of the impact of obesity in the workplace and help to provide strategic reseach direction. "A better understanding of obesity and its workplace implications can help employers find ways to respond to this growing health concern," asserts Courtney. "Employer response to the obesity issue can potentially benefit both the organization itself, as well as the individual employees in terms of better health and longevity."

1. *Overweight and Obesity: Implications for Workplace Health and Safety and Workers' Compensation; Australian Safety and Compensation Council; August 2008 (secondary source).*

Does Obesity Contribute to Work-Related Injury?

The CIE Investigates

Research Focus

Many scientific studies have shown a clear link between obesity and an increased risk of cardiovascular diseases, type 2 diabetes, and other adverse health conditions. Some studies have also suggested that obesity may be a risk factor for work-related injury. On the whole, however, early studies examining the association between obesity and workplace injury have produced inconclusive results.

In 2007, researchers from Johns Hopkins Bloomberg School of Public Health published a review of the scientific literature for studies on obesity and the risk of non-fatal occupational injuries. The resulting paper, entitled "Obesity and workplace traumatic injury: Does the science support the link?" (*Injury Prevention*, Vol. 13, pp. 297–302, 2007) concluded that, although obese employees were slightly more likely to be injured than non-obese employees, many of the estimates produced by the studies were not statistically significant. The authors cited a need for more robust research on the topic. "Studies are needed that use large diverse samples, advanced statistical methods, and control for potential confounders," noted the review.

The Research Institute's Center for Injury Epidemiology (CIE) has set out to meet this need. Most recently, CIE researchers used nationally representative survey data to evaluate the association between obesity and work-related injury, following the same individuals over time. Another epidemiological study looked at cross-sectional national data to explore the potential influence of a person's body mass index (BMI) and sleep duration on the odds of him/her having a work-related injury. Each of these studies provided new insights to better inform researchers and businesses on the scope and impact of obesity in the workplace.

Assessing Obesity and Work-Related Injury Risk

To more accurately assess the relationship between obesity and work-related injuries, CIE Research Scientist Tin-Chi Lin, Ph.D., examined data from the National Longitudinal Survey of Youth (NLSY79)[1] using robust statistical methods. "The NLSY79 is a longitudinal cohort survey. In other words, it follows a representative set of individuals over time, collecting data from these same individuals annually or semi-annually," explains Dr. Lin. For the study, CIE researchers analyzed the 12-year subset of NLSY79 data containing a workplace injury module (1988–2000).

Researchers hypothesized that obesity contributes to work-related injury. "We know that, in general, excessive weight gain can result in health issues that can affect human performance. Therefore, we hypothesized that obesity would have an association with work-related injury," says Dr. Lin, the study's principal investigator. "Prior studies of obesity and workplace risk focused on a single industry, and the results may not be generalizable to the entire workforce. To address this issue, our study drew from data representing the entire U.S. workforce," explains Dr. Lin.

Researchers applied logistic regression models to analyze the NLSY79 dataset. Obesity was measured as BMI (defined

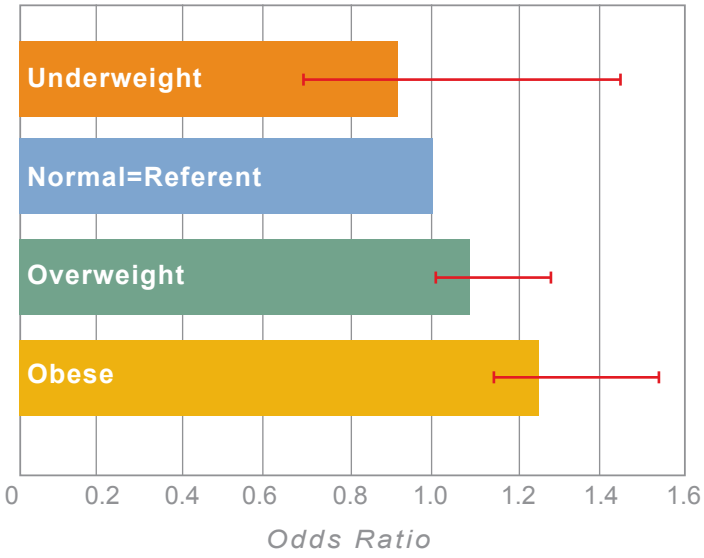
1. *The National Longitudinal Survey of Youth 1979 (NLSY79) is a nationally representative sample of 12,686 men and women who were between 14 and 21 years of age when they were first surveyed in 1979. This cohort has been surveyed annually since their enrollment, and changes over time tracked by the NLSY. Although a primary focus of the NLSY79 survey is labor force behavior, the survey's content is considerably broader, allowing other research topics to be explored.*

> “The study findings…indicated that obesity was associated with a 25 percent higher risk of work-related injury, independent of all other relevant factors, such as age, work hours, and occupational hazards.”

as weight divided by the square of height, or kg/m^2) and was based on self-reported height and weight. In accordance with the U.S. Centers for Disease Control criteria, a BMI of 18.4 or less was considered underweight; 18.5 to 24.9 was regarded as healthy weight; 25.0 to 29.9 was considered overweight, and 30 or greater was considered obese.

The study findings, published in the *Scandinavian Journal of Work, Environment, and Health* (Vol. 39, No. 3, pp. 268–275, 2013) indicated that obesity was associated with a 25 percent higher risk of work-related injury, independent of all other relevant factors, such as age, work hours, and occupational hazards. In their introductory remarks to the issue, the journal’s editors noted that the study provided “compelling evidence” that obesity increases the risk of occupational injuries.

Estimated Risk of Work-Related Injury by Workers’ Weight Category



“Although we found obesity to be associated with increased odds of occupational injury (see chart above), more research is needed to identify the mechanisms by which excessive body weight contributes to workplace injury, how obesity interacts with other occupational hazards, and which of these interactions may increase work-related injury risk,” notes Dr. Lin. He adds, “The more we can inform employers about these underlying injury mechanisms, the better they will be able to help reduce high BMI-related injuries.”

Effects of BMI and Sleep Duration on Injury Risk

As part of other Institute efforts to understand the impact of sleep and work patterns on safety, CIE researchers examined how sleep duration and BMI affect injury risk. “In the literature, shorter sleep durations and higher BMIs have generally been associated with increased work-related injury risk; however, we did not know whether these two risk factors acted independently as risk factors or if they were they interactive, with one factor modifying the effect of the other,” explains CIE Principal Research Scientist, David Lombardi, Ph.D.

To address this question, researchers examined seven years of pooled data (2004–2010) from the U.S. National Health Interview Survey (an annual survey that captures the injury experience of a representative sample of U.S. workers). The dataset included information on both sleep duration and BMI from more than 100,000 employed adult male and female participants. The study team estimated annualized work-related injury rates across three BMI categories: healthy weight, overweight, and obese, as well as usual daily sleep duration (<6, 6–6.99, 7–7.99, 8–8.99, and ≥9 hours). Researchers then examined the interaction between daily sleep duration and BMI, while controlling for weekly working hours, age, gender, race/ethnicity, education, type of pay (hourly vs. salaried), industry, and occupation.

The study’s findings, published in *Chronobiology International* (Vol. 29, No. 5, pp. 556–564, 2012), showed no significant work-injury risk resulting from the interaction between usual daily sleep duration and BMI. Rather, these two variables proved to be independent risk factors for a work-related injury. In regards to BMI, the adjusted injury risk was 1.34 times higher for the obese category compared with the healthy-weight category. Overweight people were at greater risk, but not to a statistically significant degree. (See chart p. 6)

These results suggest that reduced sleep contributes to increases in work-related injury risk, regardless of a worker’s body mass; and obesity increases work-injury risk, regardless of usual daily sleep duration. “Both sleep duration and BMI were shown to have a significant independent effect on injury risk,” notes Dr. Lombardi, the study’s principal investigator. “The good news is that both sleep and weight are potentially modifiable risk factors for injury, but it is important to recognize that, when both risk factors are present, each needs to

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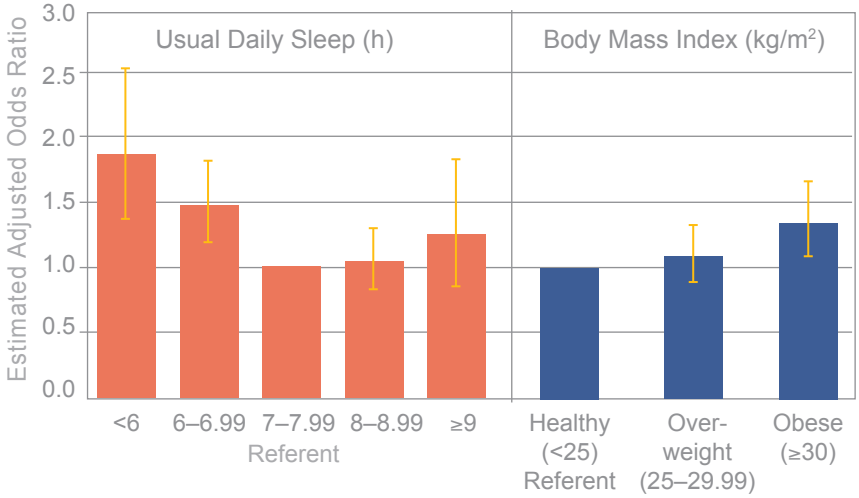
Estimated Risk of Work-Related Injury for Usual Daily Sleep and Body Mass Index



be addressed. You can't just correct one, and assume that all the risk will disappear."

"To date we have conducted two nationally representative studies using different population data sets. Both studies have shown that obesity significantly elevates the risk of injury when controlling for other factors," recaps CIE Director, Theodore Courtney, MS, CSP. Recognizing that future research is needed to identify the specific mechanisms that drive this association, Courtney notes that the current findings do support the need for action to help reduce obesity-related risk. "While we don't yet have definitive answers, workplace strategies that help foster healthy choices with respect to diet and exercise certainly can't hurt," concludes Courtney.

Does Obesity Impact Low Back Pain Recovery and Return to Work?

In 2012, the Center for Disability Research (CDR) studied the association between body mass index (BMI) and low back pain recovery and return to work. With collaborators at the Harvard School of Public Health, CDR researchers looked at how BMI affected pain reduction, resumption of daily function, and return to work among 607 patients (197 female, 410 male) seeking treatment for acute low back pain at one of eight occupational health clinics. "Several recent publications had shown higher workers compensation cost and disability duration for workers with elevated BMI, so we wanted to find out whether this effect could be observed in short-term recovery from work-related acute low back pain," explains William Shaw, Ph.D., the study's principal investigator.

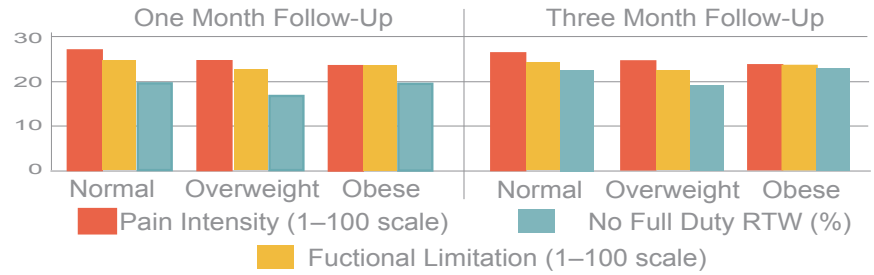
At the first clinic visit, participants completed a self-assessment survey with questions on psychosocial and workplace disability risk factors, as well as basic health and demographic information. Follow-up questionnaires at one and three months after the reported date of injury provided researchers with further information on changes in pain intensity, functional limitation, work status, and use of clinic- or home-based therapies during the post-injury period.

For the data analysis, researchers categorized participants into one of three categories: healthy weight (BMI18.5–24.9), overweight (BMI 25.0–29.9), or obese (BMI ≥30). They estimated the effects of BMI on low back pain recovery by comparing the groups' follow-up outcome measures, and calculated the main effects with and without controlling for possible confounding factors (such as age, income). Initial pain intensity, age, and BMI were modeled as continuous variables in tests of possible interactions.

The findings, published in the *Journal of Occupational and Environmental Medicine* (Vol. 54, No. 2, pp. 192–197, 2012), showed no significant differences in pain outcomes, functional limitation, or return to work as a function of BMI.

"Some other studies have shown that high BMI may be a risk factor for more severe workplace injuries or more expensive claims. In this study, obesity did not appear to be a useful prognostic factor," states Dr. Shaw, adding that the discrepancy may arise from the fact that this study focused on uncomplicated cases of low back pain, only during the acute stage of injury, and among younger-than-average participants (mean age = 36). "Although BMI is a contributory factor to workers compensation costs overall, it does not appear to impede the ability of younger, blue-collar workers to recover from acute low back pain in the early stages of a workers compensation claim," he explains. "These findings suggest that the effect of obesity on disability is moderated by other factors."

Pain, Function, and Return to Work by Body Weight



The findings indicated that pain outcomes, functional limitation, and full-duty return to work showed no significant variation by BMI, with or without controlling for potential confounders.

Wellness in the Workplace

Employers Can Promote Healthy Habits on the Job

Living a healthy lifestyle is not a part-time venture. How then, can full-time workers—especially those who struggle with weight issues—maintain healthy habits at work? Lori Adams, RN, industry director for Liberty Mutual's Risk Quality Assessment Department, believes that today it is more important than ever for employers to support wellness in the workplace. "With rising health care costs, growing numbers of older workers, and the increasingly sedentary nature of many modern-day jobs, helping employees stay healthy on the job can have significant benefits. It's good for workers, but it's also good business practice," notes Adams.

Over the years, Adams has worked closely with employers to help reduce workplace risk. Through her risk control experiences, Adams has learned the importance of recognizing the employee as a whole person with a life that extends beyond the workday. "The person who comes to a job and works eight hours is the same person when at home. So if someone is struggling with health issues, that impacts both work and home life." For that reason, maintains Adams, the individual worker's wellness and job safety are inextricably linked.

"In many cases, people really want to improve their health by adopting healthier eating habits and by exercising more. It is important for employers to support these kinds of activities," says Adams. In recent years, employers have increasingly adopted programs to help workers stay or get healthy. Adams notes that some larger companies began implementing in-house fitness centers during the 1980s and 1990s. While acknowledging this to be a positive move in the right direction, Adams contends that this may not be the best approach to helping the majority of employees improve exercise habits. "In most cases, those employees who would use an on-site fitness center are already exercising. That doesn't mean it's not a good idea, but the employer has to be realistic. Many people are not going to be comfortable exercising in front of their co-workers," she says, noting that on-site fitness centers also fail to address the health of the growing numbers of remote workers.

"Quite frankly, I don't think there is just one answer or one approach to workforce wellness—there are many different ways companies can help workers maintain healthy habits and these must be approached wisely," maintains Adams, citing healthy food options as an example. "It is great when companies offer healthy options in on-site cafeterias and vending machines—but it is important to recognize truly healthy food choices actually offer something back for your calories. Some of those items promoted as a healthier option, such as baked potato chips or reduced-fat cookies, may give people a false sense that they're choosing a truly healthy snack. But that's not always the case. Just because an item has 40 percent fewer calories, or half the fat of a comparable item, does not make it healthy. Whole foods, such as fruits and vegetables, are the best option, but these may not appear in corporate vending machines anytime soon."

Adams contends that employer-subsidized weight loss programs may offer one of the best approaches to help foster employee wellness. Today's online venues, such as websites and social media platforms, make it convenient for people to participate in programs that promote healthy eating habits and physical activity. Such programs also provide peer-to-peer accountability and support to help people stay on track with their goals. "If nothing else, weight loss programs can teach people to really read a food label and to know which foods offer good nutrition and which do not. That is a very important aspect of healthy eating," says Adams.

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> ...employer-subsidized weight loss programs may offer one of the best approaches to help foster employee wellness. Today's online venues, such as websites and social media platforms, make it convenient for people to participate in programs that promote healthy eating habits and physical activity.

Another way employers have begun to motivate employees towards more healthy lifestyles is to hire outside firms to perform employee well-being assessments. These optional assessments, often offered by corporate health plan providers, allow firms to gather and analyze individual data to find areas where individual employees might be at risk, such as diet, activity, smoking, or stress. The firms then generate a report with helpful health advice, resources, and follow-up measures. "Sometimes firms even recommend and provide individual health coaching to help at-risk employees meet health goals," notes Adams.

While subsidized weight loss programs and well-being assessment firms may not be possible for all companies, there are a variety of low-cost programs that any company, large or small, could implement to encourage wellness in the workplace. "One company I worked with set up a 'Walking to Vegas' competition. The goal was to see which team could walk as many miles as it would take to walk to Las Vegas. This kind of friendly competitive fun can really motivate people to get consistent exercise. Nearly anyone can participate, and it can help get heart rates up and bring weight down," says Adams. Other low-cost activities might include periodic company-driven communications (such as e-mails, webposts) promoting health and healthy living, nutrition and exercise tips, and even brief sessions on how to read and evaluate food labels.

"Programs that promote healthy habits can be a win-win for employers and their employees, but no single program is going to work for everyone. Different strategies are going to work for different companies and different options are going to attract different people. So you have to offer a variety of things. What's important is to find ways to inspire people to live more healthy lifestyles, at home and at work," concludes Adams.

Did you know?

More than 1000 occupational safety and health professionals responded to a recent National Safety Survey conducted by *Environment Health and Safety (EHS) Today* (August 2013). Among 15 recommended workplace safety and health improvements, survey takers called for the addition of a holistic worksite wellness program that overlaps with the home and family.

The survey also captured information on what companies are currently offering in terms of wellness initiatives (see table, right).

Does your organization offer any of the following wellness initiatives?

A formal workplace wellness program	**65.1%**
On-site medical checkups	**40.8%**
A gym or fitness facility	**40.3%**
Healthy on-site food options	**34.2%**
Nutrition education	**40.3%**
Weight-loss competitions	**43.2%**
Wellness incentives	**56.8%**

In the NEWS

Winning Paper Proposes a New Human Factors/Ergonomics Strategy

A team of eight prominent researchers and practitioners received the 2013 Liberty Mutual Award for their scientific paper "A strategy for human factors/ergonomics: Developing the discipline and profession" (*Ergonomics*, Vol. 55, No. 4, pp. 377–395, 2012). The annual award, presented by the Liberty Mutual Research Institute for Safety and the U.K. Institute for Ergonomics and Human Factors, recognizes the paper published in *Ergonomics* that best contributes to advancement of the field.

The winning paper proposes a new field strategy and two important directions for the human factors/ergonomics (HFE) discipline. The first proposed direction is to build partnerships, improve education, and intensify communication among key stakeholders (decision-makers for system design, such as managers and engineers) in order to give them a better sense of the value of HFE. The second strategic direction is to strengthen the application of high-quality HFE by promoting education of HFE specialists, ensuring high-quality HFE application standards, and encouraging HFE research excellence at universities and other organizations.

The winning team of researchers includes team leader Jan Dul, Ph.D., of the Rotterdam School of Management, Erasmus University; Ralph Bruder, Ph.D., of the Institute of Ergonomics, Technische Universität Darmstadt; Peter Buckle, Ph.D., of the Department of Surgery and Cancer, Imperial College; Pascale Carayon, Ph.D., of the Department of Industrial and Systems Engineering, University of Wisconsin-Madison; Pierre Falzon, Ph.D., of the Research Center on Work and Development, Conservatoire National des Arts et Métiers; William S. Marras, Ph.D., of the Ohio State University, Biodynamics Laboratory; John R. Wilson, Ph.D., of the Human Factors Research Group, University of Nottingham; and Bas van der Doelen, of the Department of Knowledge and Communication, BMA Ergonomics. The paper's authors consulted 71 leading academic scholars and practitioners from 31 countries to provide input on HFE. The resulting document provides practical advice, strategies, and proposed actions.

"The winning paper is an important international collaborative endeavor," says Roger Haslam, Ph.D., coordinating editor of *Ergonomics*. "It represents a paradigm shift in thinking about the future strategy and direction of human factors and ergonomics."

The award was presented at the 2013 Annual Conference of the Institute of Ergonomics and Human Factors, held in April at Robinson College, University of Cambridge (UK). "I am excited and enthusiastic about this recognition," said Dr. Dul. "It is a big reward for all the effort that we have put into formulating a common worldwide strategy for the diverse human factors and ergonomics community."

For more information on the Liberty Mutual Best Paper Award, please visit our website at www.libertymutual.com/researchinstitute.

Institute of Ergonomics and Human Factors President, Dr. Richard Graveling and 2013 Liberty Mutual Best Paper Award Winners Jan Dul, Ph.D., Peter Buckle, Ph.D., and Bas van der Doelen.

Dr. Besen

New Research Scientist Joins Center for Disability Research

The Research Institute is pleased to welcome Elyssa Besen, Ph.D., to the staff. Dr. Besen, a research scientist with the Center for Disability Research (CDR), will focus her investigations on better understanding the patterns and predictors of disability occurrence over time and ways to sustain successful return to work after disability or injury. Her research interests also include the aging workforce and its impact on worker disability.

"We're excited to have Elyssa join our staff," says CDR Director Glenn S. Pransky, M.D., M.Occ.H. "She brings unique expertise in studies of the aging workforce and valuable experience conducting employer-based research investigations."

Dr. Besen received her Ph.D. in applied developmental psychology from Boston College in 2013, and her bachelor's degree in psychology with honors from Brandeis University in 2005. Before joining the Institute, Dr. Besen worked as a research assistant for the Sloan Center on Aging and Work at Boston College, where she published articles on how the aging of the workforce affects employers.

Dr. Hartvigsen

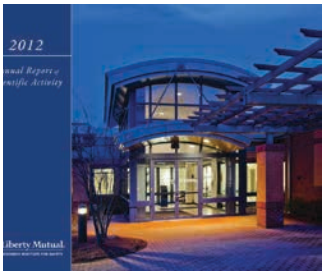
Guest Scientist to Collaborate on Low Back Pain Research

The Research Institute is pleased to welcome Jan Hartvigsen, Ph.D., as a guest research scientist. Dr. Hartvigsen is professor and head of the Research Unit for Clinical Biomechanics at the University of Southern Denmark. During his tenure, he will collaborate with Institute researchers in the areas of prognosis and early screening of low back pain.

According to CDR Research Scientist William Shaw, Ph.D., "Dr. Hartvigsen's expertise will provide a unique opportunity to combine physical and psychosocial aspects of low-back-pain treatment and to apply innovative research methods in musculoskeletal screening tool evaluation. His extensive experience in musculoskeletal epidemiology will bring real value to this research area."

At the University of Southern Denmark, Dr. Hartvigsen leads the Physical Activity and Musculoskeletal Health graduate program. He is also a senior researcher at the Nordic Institute of Chiropractic and Clinical Biomechanics. Dr. Hartvigsen focuses his research on longitudinal studies dealing with spinal and musculoskeletal pain. He has published randomized clinical trials in the areas of conservative treatment of back and neck pain, musculoskeletal chest pain, and osteoarthritis of the hip.

His original papers, reviews, and editorials/commentaries have appeared in leading international journals, including the *British Medical Journal*, *Spine*, *Osteoarthritis and Cartilage*, *Pain*, and *Occupational and Environmental Medicine*. Dr. Hartvigsen has been active on national and international task forces and health technology assessment groups in the areas of spinal pain, traumatic brain injury, and evaluation of musculoskeletal research.



Research Institute Annual Report Now Online

The Research Institute's *2012 Annual Report of Scientific Activity* is now available online. The report highlights key research projects and programs and lists the year's scientific articles and presentations. To download a PDF file or to request a hard copy, visit our website at www.libertymutualgroup.com/researchinstitute.

News and Notes

In May, the **Rachel Ray Show** featured a Research Institute driver fatigue study in a dynamic 2.5-minute segment. View the segment at: http://www.rachaelrayshow.com/show/segments/view/asleep-wheel-and-you-dont-even-know-it/ ...Each year, Research Institute directors evaluate all accepted papers from the previous year for experimental design, scope, and overall quality. This year's best paper winners included **Yueng-Hsiang Huang, Ph.D**., for "Development and validation of safety climate scales for lone workers using truck drivers as exemplar" (*Transportation Research Part F,* Vol. 17, pp. 5–19, 2013) and **Xu, Xu, Ph.D**., for "Estimating 3-D L5/S1 moments during manual lifting using a video coding system: Validity and interrater reliability" (*Human Factors*, Vol. 54, No. 6, pp. 1053–65, 2012). ...During the summer, **Dr. Huang** was invited to speak about her safety climate research at three universities: the Auckland University of Technology, the University of South Australia, and Fudan University.

Conferences

Occupational Safety and Health Data Users Workshop: May 15-16, Washington, D.C.

- The Liberty Mutual Workplace Safety Index: Leading Causes of the National Burden of Occupational Injuries – Helen Marucci-Wellman, Sc.D.

16th International Conference on Near-Infrared Spectroscopy: June 2-7, La Grande-Motte, France

- Influence of Seven-Hour Exposure to Repetitive Work on Forearm Muscle Hemodynamic Responses in Healthy Men – Rammohan V. Maikala, Ph.D.

7th International Driving Symposium on Human Factors in Driver Assessment, Training, and Vehicle Design: June 18-20, Bolton Landing, NY

- The Effects of Momentary Visual Disruption on Hazard Anticipation in Driving – Avinoam Borowsky, Ph.D.
- The Long Road Home: Driving Performance and Ocular Measurements of Drowsiness Following Night Shift-Work – William J. Horrey, Ph.D.
- Using a Layered Algorithm to Detect Driver Cognitive Distraction – Yulan Liang, Ph.D.

Conference on Epidemiology in Occupational Health: June 18-21, Utrecht, Netherlands

- Improvements to Surveillance of Work-Related Injuries in a Developing Economy: A Case Study from Vietnam • Are Multiple Job Holders at Increased Risk of Injury? Findings from the National Health Interview Survey – Helen Marucci-Wellman, Sc.D.

2nd Joint World Congress of the International Society for Posture and Gait Research and Gait and Mental Function: June 22-26, Akita, Japan

- The Effects of Floor Material, Surface Condition, and Repetition on Gait During Walking – Chien-Chi Chang, Ph.D., C.P.E.

5th Symposium on Resilience Engineering: June 24-27, Soesterberg, Netherlands

- Sociotechnical Systems Issues in Worker Safety: Implications for Managing System Tradeoffs – Lawrence J. Hettinger, Ph.D.

10th Industrial and Organizational Psychology Conference: July 3-7, Perth, Australia

- Development and Validation of Safety Climate Scales for Lone Workers (for the Trucking and Utility Industries) – Yueng-Hsiang Huang, Ph.D.

American Psychological Association 121st Annual Convention: July 31-August 4, Honolulu, HI

- The Dynamic Relationship between Organization- and Group-Level Safety Climate Perceptions: Associations with Safety Behavior for Lone Workers – Yueng-Hsiang Huang, Ph.D.
- Assessing Return-to-Work Success Following Occupational Injury – Amanda E. Young, Ph.D.

The 45th Annual Nordic Ergonomics Society Conference: August 11-14, Reykjavik, Iceland

- The Natural Power Grip Angle During Maximum Pushing Tasks – Jia-Hua Lin, Ph.D., C.P.E.
- The Effect of Grip Type and Resistance Level on Carpal Tunnel Pressure in Normal Wrists During Flexion and Extension – Raymond W. McGorry, M.S., P.T.

Publications

Ciriello, V.M., Maikala, R.V. and O'Brien, N. V. (2013) Maximal acceptable torques of six highly repetitive hand-wrist motions for male industrial workers. *Human Factors*, 55(2), 309–322.

Costa Lda, C., Koes, B.W., Pransky, G., Borkan, J., Maher, C.G. and Smeets, R.J. (2013) Primary care research priorities in low back pain: an update. *Spine* (Phila Pa 1976), 38(2), 148–156.

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