

outwork

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Preventing upper extremity MSDs: What the latest research says

IWH systematic review recommends workplace-based resistance training to help prevent and manage upper extremity musculoskeletal symptoms and disorders

Allowing workers to do resistance training on the job is a recommended way for workplaces to help prevent and manage upper extremity musculoskeletal disorders (MSDs). That's one of the key findings coming out of a recent systematic review conducted by an Institute for Work & Health (IWH) team.

The team emphasized that strong research evidence such as this is only part of evidence-based practice, which also incorporates the knowledge and experience of practitioners (e.g. occupational health and safety professionals) and end users (e.g. workers).

"We are not saying that workplaces should rush to implement resistance training," says Emma Irvin, head of IWH's systematic review program and one of the lead investigators of this project. "However, we are suggesting that OHS practitioners consider it in their arsenal of prevention practices when it comes to upper extremity MSDs."

Resistance training refers to exercises that cause the muscles to contract against an external resistance (e.g. dumbbells, rubber

exercise tubing, own body weight, etc.) with the expectation of increases in muscle strength, tone, mass and/or endurance.

"The studies on the effectiveness of resistance programs that we included in our review varied in the level of detail provided," says Irvin. "In those that supplied specifics, the resistance programs ranged from 20 minutes to one hour per week, spread across one or multiple days per week, with and without the involvement of a physiotherapist."

Stakeholders help craft practical messages

Done in partnership with stakeholders, including Ontario's health and safety associations, this systematic review updates a 2008 review conducted by IWH that focused on the effectiveness of workplace intervention programs on preventing MSDs in the arm, shoulder and hand, in both office and non-office settings.

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NIOSH director to deliver this year's Alf Nachemson Memorial Lecture

Join us on Wednesday, November 19, 2014, for our annual Alf Nachemson Memorial Lecture, to be delivered this year by **Dr. Paul Schulte**, director of the National Institute for Occupational Safety and Health (NIOSH)'s Education and Information Division. Named after renowned orthopaedic surgeon **Dr. Alf Nachemson**, this free lecture series was established to honour his significant contribution to the use of research evidence in clinical decision-making. It has since become one of the most important networking events of the year in Ontario for policy-makers, researchers, professionals, advocates and other stakeholders in the field of work injury and disability prevention. Register at: www.iwh.on.ca/nachemson-lecture.

IWH News now brings you news from the CREs

Since 2007, every fall and spring edition of *At Work* had brought readers news from IWH's research partners, the Centre of Research Expertise for the Prevention of Musculoskeletal Disorders (CRE-MSD), the Centre for Research Expertise in Occupational Disease (CREOD) and the Occupational Cancer Research Centre (OCRC). The Institute continues to publicize research findings, tools and workshops from the three "CREs"—now via our monthly *IWH News*. You can sign up for our free e-newsletter at: www.iwh.on.ca/e-alerts.

Fall systematic review workshop now open for registration

Are you a health practitioner or a policy-maker needing to understand the methods behind the systematic reviews that come across your desk? Or are you part of a research team getting ready to do a systematic review on a practice or intervention of interest? Our systematic review workshop is for you. This fall, the workshop is offered in two modules held over five days (December 1-5). Participants can sign up for the systematic review module, the new meta-analysis module, or both. Deadline to register is November 21. Go to: www.iwh.on.ca/systematic-review-workshops.



Don't miss out on our next IWH News

Have you been getting our *IWH News* in your inbox? If not, sign up now: www.iwh.on.ca/e-alerts. Our monthly e-newsletter brings you the latest *At Work* articles, links to plenary slidecasts as well as news and announcements.

WHAT RESEARCHERS MEAN BY...

Regression to the Mean

Regression to the mean is a statistical occurrence that may result in distorted or misleading findings if not taken into account

Suppose you're the superintendent of a school district and you want to improve the math scores of the Grade 3 students in your catchment who write compulsory province-wide exams. You hire a consulting math expert to help. The consultant starts by administering a math test to find out which students are most in need.

All 1,000 Grade 3 students in your district take the test, and the consultant chooses the 50 students with the lowest scores to receive a remedial math program. Once the program is complete, the 50 students take a second test, and their scores, on average, show a healthy improvement. On this basis, you roll out the remedial program to all Grade 3 math students in the district who are performing below par.

When the board-wide exam takes place later that year, you're disappointed. The students' scores are not much better than they were the previous year—and they certainly didn't improve to the degree you expected based upon the results of the 50 poorest performing students.

What went wrong? You might want to consider the possibility of a statistical phenomenon called **regression to the mean**.

Regression to the mean refers to the tendency of results that are extreme by chance on first measurement—i.e. extremely higher or lower than average—to move closer to the average when measured a second time. Results subject to regression to the mean are those that can be influenced by an element of chance. When chance or fluke gives rise to extreme scores, it's unlikely those extreme scores will be repeated on a second try.

In our school district, for example, the kids who scored the poorest on the first math test likely included some who normally know the answers but, by chance, did not that day. Perhaps they were tired, sick, distracted, etc. These kids were going to do better on the second test whether they received the remedial program or not, bringing up the average score among the 50 poorest performers.

You can see why researchers have to consider regression to the mean when they are studying the effectiveness of a program or treatment. If they don't, they may wrongly conclude that their intervention is responsible for an improvement when, in fact, regression to the mean is at play. This is especially the case when program effectiveness is based on measurements of people or organizations at the extremes—the unhealthiest, the safest, the oldest, the smartest, the poorest performing, the least educated, the largest, etc. The ones on the low extremes are all likely to do better the second time around, and those on the top are likely to do worse—even without the intervention.

Researchers can take a number of steps to account for regression to the mean and avoid making incorrect conclusions. The best way is to remove the effect of regression to the mean during the design stage by conducting a randomized controlled trial (RCT). Because an RCT randomly assigns study participants to a study group (which receives the program or treatment) or a control group (which does not), the change in the control group provides an estimate of the change caused by regression to the mean (as well as any placebo effect). Any extra improvement or decline in the study group compared to the control group (as long as it is statistically significant) can be attributed to the effect of the program or treatment.

Researchers can also take multiple baseline measurements when selecting people or organizations to be part of a study group. They can then select participants based on the average of their multiple measurements, not just on a single test.

Scientists can also identify and account for regression to the mean when analyzing their results. This involves complicated statistical calculations too difficult to describe here.

Regression toward the mean is a statistical occurrence that can get in the way and distort researchers' measurements. That's why it has to be taken into account, in the design of the study or in the analysis of findings.

Risk of work injury linked to night, evening shifts still high after switching to days

IWH study finds those who move into or out of shift work face the highest risks of work-related injury

Tammy loves helping troubled youth, but working nights and weekends at a group home for youth had been hard on her family. The job meant missing out on home-work time with her son, family outings on weekends, not to mention regular sleep.

That's why she can't be happier to get a day job at the school board. She sees it as a chance to broaden her skills and improve well-being in her home life.

Trading in shift work for a nine-to-five job may mean a better quality of life for



Dr. Imelda Wong

Tammy and her family. But it doesn't necessarily mean a lower risk of work-related illness and injury, a recent study has found. Instead, Tammy's risk of work-related injury may even increase shortly after she

changes her work schedule into days, according to the study by Dr. Imelda Wong at the Institute for Work & Health (IWH).

Evidence shows that people working evening, night or rotating shifts face a higher risk of work-related injury than those who work days. But Wong's study, published in the September issue of the *Scandinavian Journal of Work, Environment & Health* (doi:10.5271/sjweh.3454), now shows that the highest risks are faced by those who change from day jobs into shift work, as well as those who, like Tammy, change out of shift work into days. (Note that these findings refer to permanent or indefinite shift changes, not to rotating shifts.)

"This is surprising because we expected that moving into a daytime job may improve sleep and create a better work-life balance, thereby reducing the risk of work-related injury," says Wong, a Mustard post-doctoral

fellow at IWH and lead author of the study. "But we found that people who switch from nights to days are still two-and-a-half times as likely to get injured as those who have always worked days."

Six-year follow-up surveys

The researchers used Statistics Canada's Survey of Labour and Income Dynamics, which examines the labour market activity of Canadians. A representative sample of Canadians is surveyed annually over six years, and with the permission of the respondents, income information is gathered from tax forms. The information contains work-related details such as occupation, type of shift worked, weekly hours and number of workers in the establishment.

For this study, Wong used data from three survey periods from 1999 to 2004, 2002 to 2007, and 2005 to 2010. Work injury was defined in two ways: receipt of workers' compensation, or a reported work-injury absence for more than seven days.

Wong's analysis looked at four categories of workers: those who only work days; those changing from days to non-standard shifts; those changing from shifts to days; and those working non-standard shifts the entire time. (People whose shifts changed routinely, as part of rotating-shift arrangements, were treated as non-standard shift workers.)

Results show that people who changed shift schedules and people who worked shifts shared many similar characteristics that are generally associated with greater injury risk (such as age, income, schooling level, etc.). But even after taking these factors into account, Wong found greater risks for a work-related injury linked to working shifts at any one point.

Compared to day workers, long-term non-standard shift workers were 1.5 times more likely to be injured. However, the risks were even greater for those changing work schedules, whether to or from shift work.

Those changing from day shifts into non-standard shifts were 2.6 times more likely to get hurt due to work; those changing into day shifts were 2.4 times more likely.

It's still too early to say why the risk of sustaining work injury among shift workers remains high even after they change into daytime work. The data used in this study did not have any information that would help shed some light on that question.

"It's an interesting and concerning finding. At this time we can only speculate on what may be contributing to an elevated risk for those who switch from nights to days," says Wong. "Still, I think this study tells us we need health and safety policies and programs for people who have made a change in shift schedules. It's important to pay attention to health and injury risks even after someone has stopped working nights and moved into days."

Comparing risks between men and women

The study also looked at whether men and women face the same risks linked to shift work. It found women working long-term in non-standard shifts (i.e. nights, evenings and rotating shifts) face a significantly higher risk of work-related injury than men.

"We don't know if this is due to differences between men and women in terms of health, work conditions, job duties, home-life responsibilities such as caregiving, household chores, or other factors," says Wong. "We certainly need more research to find out what might be behind these sex and gender differences."

These findings suggest the need for greater safety measures to protect shift workers, in line with the International Labour Office (ILO)'s Night Work Convention, says Jon Messenger, a team leader at the ILO's Conditions of Work and Equality Department.

The findings, he adds, suggest "the need for these measures to be gender-sensitive, given that these greater risks could be due to gender-related factors such as women's greater total work burden arising from unpaid household work." ■

Success stories offer new guidance to organizations on path of OHS change

Breakthrough change model finds external influence, new OHS knowledge, health and safety champion among catalysts for sustained change

Much has been written about the distinguishing features of workplaces that have a strong health and safety record. But what distinguishes workplaces that turn around a poor occupational health and safety (OHS) performance? What can their success stories tell us about the critical factors for breakthrough change?

That was the focus of research behind the development of a new resource from the Institute for Work & Health (IWH), a series of case studies that illustrates a research-based model of the breakthrough change process. “We know that people like to learn through stories, and they prefer to read about workplaces similar to theirs,” says Dr. Lynda Robson, a scientist at the Institute and lead researcher on the project.

“We hope these case studies will inspire others to make large improvement in their workplaces and give guidance on what might help the process,” adds Robson. She suggests workplaces use these case studies as the basis for discussions and brainstorming among management teams, OHS departments and joint health and safety committees about ways to make large and sustainable improvements in health and safety.

In this research, Robson took a novel approach by starting with an outcome of interest—large improvement in OHS performance—and then seeking the story behind that improvement. What did the workplace do? Why? Who was involved?

She ended up taking a close look at four workplaces: a discount grocery franchise, a plastics manufacturer, a metal product manufacturing plant and a community agency operating several group homes. (For more on how the research was conducted, see the Spring 2014 and Fall 2012 issues of *At Work*.) From the accounts put together of the process of change at each organization, Robson and her team identified

common key factors to build a model of breakthrough change (see next page).

Four common factors initiate change

Although the details may differ, the process of change at all four workplaces began when the same key elements were in place. As shown in the model, the critical factors at this initiation phase are: (1) external influence; (2) organizational motivation; (3) new OHS knowledge; and (4) a knowledge transformation leader.

External influence, in the four case studies, ranged from intervention by the provincial labour department to a shift in customer demand. At the group home agency, for example, a health and safety association consultant’s offer of assistance



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helped management recognize that the agency’s OHS performance was subpar and needed to improve, as part of its pursuit of excellence. At the grocery store, the light went on when franchise owner John heard of a serious injury involving a young worker at another grocery store. That incident prompted John to reflect on the number of young people he was employing at his own store and the risks they faced. He realized

he needed to get a health and safety program up and running, and that he had to bring in outside help to do so.

A new source of OHS knowledge was another critical factor setting change in motion. In the case of the grocery store, the external consultant not only helped develop the health and safety manual as well as health and safety forms, she also rejuvenated the JHSC by providing members with information on legislative requirements and other OHS news in the industry.

Another important factor was an OHS champion, called a knowledge transformation leader in the model. This champion was an important component in all four case studies. Whether the person had the title of human resources manager, health and safety

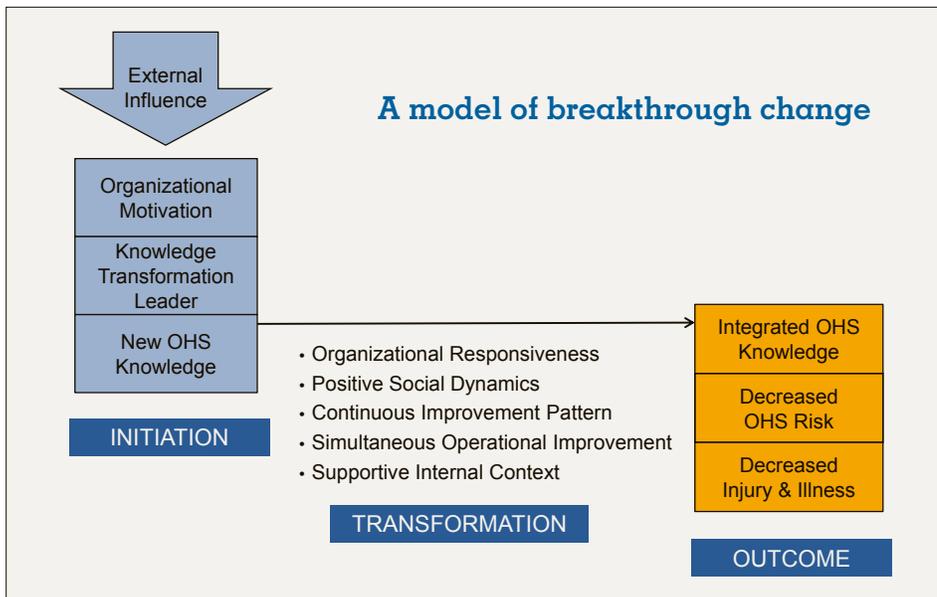
co-ordinator or owner, his or her contribution was remarkably similar. He or she orchestrated the transformation of OHS knowledge from being external to the organization to being integrated into the organization as new policies, structures, procedures and practices for both managers and workers.

“To bring about this change, the knowledge transformation leaders used their strong skills in both administration and

dealing with people,” says Robson.

“This skill set is something senior managers might want to keep in mind if selecting a person to drive improvement in OHS in their workplace—whether hiring a new employee or assigning new responsibilities to a current employee,” she adds.

(For more about the role of the health and safety champion in breakthrough change, see the Spring 2014 issue of *At Work*.)



The breakthrough change model identifies key factors at three phases of change. For an explanation of these factors, go to www.iwh.on.ca/btc_case_study_series

Integrating new OHS knowledge

Once the process of change had been initiated, several factors came into play to help the organizations integrate new OHS knowledge in practices and policies. As seen in the model, the factors include:

(1) organizational responsiveness to worker OHS concerns; (2) positive social and psychological dynamics; (3) a continuous improvement pattern; (4) simultaneous operational improvement; and (5) a supportive internal context.

The most remarkable among these was positive social dynamics, which the team saw right across all four case studies. There were stories of good rapport, strong collaboration, individual development and empowerment. “The concept of positive social and psychological dynamics was not on our radar going into the study, but it emerged strongly from the research data,” says Robson. “For example, people talked about the joint health and safety committee developing the right energy.”

Another common factor was responsiveness to the OHS concerns of employees. In the case of the metal

products manufacturer, for example, the new health and safety co-ordinator made a point, soon after she joined, of finding out from workers what health and safety issues concerned them. She quickly acted on those issues and, in doing so, helped create a virtuous cycle of people speaking up more and expecting more on OHS issues. A similar phenomenon was seen at the plastics manufacturer, where the maintenance department acted quickly on workers’ concerns, becoming a “catalyst” for further participatory change.

The “internal context” of the workplace was important too. In all cases, senior management supported the OHS improvement, even though the senior managers were not usually involved in a hands-on way. As well, management-employee relations were generally good. Another factor was the concurrent effort at these workplaces on operational improvement—for example, by adopting “lean” manufacturing methods.

A final factor was the pattern of continuous improvement seen in all cases. These workplaces had an attitude of “what’s next?” and continued to make changes over time.

For example, after the grocery owner got his program off the ground, he continued to have the external consultant meet quarterly to pass on new information to the JHSC. At the plastics manufacturer, new objectives were set each year, some similar to previous years and others reflecting further innovations on OHS.

A ‘good resource’ for leaders

Though noting that this model is built on a small sample of four case studies, Robson has found that it resonates with the OHS practitioners she has spoken to. For Candice Brown, safety and injury management advisor at the British Columbia Construction Safety Alliance, a safety association funded by the province’s construction industry, the capsules are “a good resource for someone in a leadership position, or health and safety professional, to take to the management team.”

“They outline very nicely the process and benefits of change, and seeing that process in stories really helps in building a business case to enable initiation of change,” she says.

“They are also a good learning tool for leaders, to help them think through: How will we initiate change? What steps do we need to take? How will we motivate and engage people in all levels of the organization to make any changes successful?”

Robson is now exploring further how breakthrough change takes place, by looking at workplaces that were similar to the four cases before their breakthrough change, but did not undergo large and sustained improvements in OHS.

“We are finding that the factors of initiation and transformation from the breakthrough model are not present to the same extent in these comparison cases,” she says.

To download the case study capsules, go to: www.iwh.on.ca/btc_case_study_series. This project was also the subject of a plenary held in May 2014, a slidecast of which has been posted on IWH’s webpage and YouTube channel: www.iwh.on.ca/plenaries/2014-may-13. ■

Health-care use remains higher for two years among workers with job-related concussions

Two-year study finds health-care use by workers with mild traumatic brain injury not back at pre-injury level

People who sustain head injuries such as concussions might not take long to get back to work, but that doesn't necessarily mean they're quick to recover. According to a new study, workers who report a mild traumatic brain injury still need additional medical attention two years after the initial injury.

The study, published earlier this year in the *Archives of Physical Medicine and Rehabilitation*, looked at how much health-care services a cohort of Ontario workers accessed after they made workers' compensation claims for a mild-traumatic brain injury (MTBI).

"We found that health-care utilization did not return back to baseline levels two years after the initial injury," says study lead author Dr. Vicki Kristman, an associate scientist at the Institute for Work & Health (IWH) and assistant professor in the Department of Health Sciences at Lakehead University.

"We know from past research that recovery from mild traumatic brain injury is generally quite quick, and people are usually back to work within a couple of weeks," adds Kristman. "We had thought that when most people returned to work, they weren't using health-care services anymore. So this was a surprise."

One in 10 off work for up to two years

Mild traumatic brain injury is a common type of injury resulting from falls and traffic collisions. According to an earlier study by Kristman, about six out of every 1,000 lost-time claims made to Ontario's workers' compensation agency, the Workplace Safety and Insurance Board (WSIB), are for MTBI. The vast majority (87 per cent) of MTBI lost-time claims are for one-time periods of missed work, with the median length being 11 days. However, in five per cent of the cases, the time off due to injury lasts up to two years.

In this latest study, the team found that, as expected, health-care use peaked in

the first four weeks post-injury, to 400 per cent higher than the level of health-care use before the injury. Between the fifth and the 12th week after a claim has been filed, the health-care usage is about 180 per cent higher than it was prior to the injury.

By the end of the two-year study period, health-care use was still about 10-per-cent higher than before the injury—though mostly due to the needs of a small subset of workers. The increased use of medical services was most notable among those workers who had accessed health-care services the least before they were injured. These infrequent users of health care (pre-injury) experienced a 125-per-cent increase in medical visits and treatments two years after getting hurt with MTBI.

Learning from OHIP and claims data

To conduct the study, the researchers gathered data from the WSIB and the Ontario Health Insurance Plan (OHIP). They compiled a sample of all who made a workers' compensation lost-time claim for MTBI in 1997 and 1998 (but excluding anyone who had made a MBTI claim prior to that two-year period). Also, claimants whose OHIP data could not be retrieved were excluded. The final sample included 728 workers.

The researchers relied on both WSIB and OHIP records to gather data on the dates and types of health-care services that the injured workers accessed. (To protect confidentiality, the Ontario Ministry of Health and Long Term Care provided OHIP data with all identifying information removed.) The team then compiled a database of all health-care services used by the claimants in the year before the injury, which served as the baseline level for comparison purposes, as well as in the two years after.

Comparing the types of medical services accessed before and after the head injury,

the study found a sharp rise in radiological and neurological services in the first four weeks (a rise of more than 900 per cent). By the six-month mark, the researchers saw a drop in the use of hospital services, as well as services by physiotherapists, chiropractors and general practitioners. That suggested to the research team that treatment ended within six months of the injury for most patients.

In the second year after the claim was filed, the types of medical services accessed the most were related to three types of problems: accidents, poisoning and violence; diseases of the nervous system; and mental disorders. "Research has shown increased likelihood of depression after a concussion, so that could be behind the data for mental disorders," says Kristman. "But that's a hypothesis. We don't know the actual reason for the health use."

When comparing with the baseline, however, the team saw the biggest increases in demand were related to mental disorders, tumours and circulatory system diseases. Given that the latter types of treatments aren't generally associated with MTBI, Kristman thinks part of the rise in health-care usage is due to other health problems being detected during the course of treatment for the brain injury.

"We saw increased health-care use for things like cancer, as well as a greater increase in health-care use among people who weren't seeing a doctor a lot before the injury. What those two findings suggest to us is that the brain injury caused people to see doctors, and that was when other problems were diagnosed," says Kristman.

For managers, return-to-work coordinators and other workplace parties, Kristman says her overall message is this: "Your workers may be back at work quickly after a mild brain injury, but some may have ongoing health issues that they need to monitor."

The study was published in the March 2014 issue of the *Archives of Physical Medicine and Rehabilitation*. To read it, search for doi:10.1016/j.apmr.2013.08.296. ■

IWH to explore how work affects health of women and men differently

New research chair explores role of gender and sex in work injury risk, recovery, chronic disease outcomes

The labour force provides especially fertile ground for exploring gender and sex differences related to health, says Dr. Peter Smith. For one thing, the 11 most gender-segregated occupations in Canada—from construction trades to child-care and administrative support—are the same today as they were 25 years ago.

This is despite the fact that the Canadian labour market added over 2.7 million women and 1.7 million men over this time period.

Smith, a scientist at the Institute for Work & Health (IWH), shared this fact with the some 100 people who attended the launch in mid-October of his five-year research chair in gender, work and health. His chair, one of nine recently awarded by the Institute

of Gender and Health at the Canadian Institutes of Health Research (CIHR), is exploring how women and men differ with respect to risk of work injury, returning to work after an injury, and the relationship between job stress and chronic disease.

Although previous research has recommended guidelines on how to include gender and sex in work and health research, occupational health and safety (OHS) studies “have a history of exclusion,” Smith says.

He points to a study of OHS journal articles that found 30 per cent studied men only, seven per cent studied women only, and 11 per cent did not mention gender or sex at all when describing those studied. Among the remaining 50 per cent that studied both, 42 per cent did not examine the link between sex or gender and outcomes.

What’s more, the terms “gender” and “sex” are often used inconsistently. Smith cites another review of articles in

gender and health journals that found only five per cent defined either “sex” or “gender,” and 38 per cent used the terms interchangeably.

“It’s very important that we define these terms because they describe two very different mechanisms that might



Photo: Curtis Lantinga

produce differences in our OHS findings and, in turn, our policy and intervention responses,” says Smith. “Sex” refers to biological attributes including physical features, genes, hormones and anatomy. “Gender” refers to the socially constructed roles, relationships and behaviours of men, women and gender-diverse people that influence how people perceive themselves and others.

Exploring three OHS areas

During the five-year program, Smith is looking at gender and sex with respect to three OHS issues in particular.

(1) **Risk of work injury.** To take just one of many examples, Statistics Canada surveys show that men have about twice the rate of self-reported work injury as women, but when it comes to repetitive strain injuries (RSIs) only, women have a slightly elevated risk compared to men.

(2) **Recovery and return to work.** Women generally take longer to return to work. One review of prolonged disability among women with musculoskeletal disorders pointed to their more complex work situations, more complex injuries that are harder to describe to health-care professionals, and differing family and social roles.

Other research shows women and men are treated differently by health-care providers, potentially affecting recovery. For example, in a study of patients with knee arthritis (not necessarily work-related), doctors were 2.5 times more likely to recommend surgery for men than women. The study suggests this could be due to differences in how they describe their symptoms (with women using a more narrative style and men a more direct style) or to stereotypes about how men and women deal with pain or the amount of support they have at home post-surgery.

(3) **Psychosocial work environment and chronic disease.** This research stream builds on Smith’s previous findings showing an association between low job control and an elevated risk of hypertension among men but not women, and an association between low job control and an elevated risk of diabetes among women, but not men. “This is interesting, because we think of the factors causally related to hypertension and diabetes as being similar among men and women but, in this case, it doesn’t look like they are,” says Smith.

Smith is going to dig deeper into all three issues. “There is much to untangle in the link between sex/gender and vulnerability to workplace injuries, return-to-work outcomes and the effect of psychosocial factors on chronic conditions,” he says.

To get involved in this research program—as an OHS workplace or policy stakeholder (e.g. research advisor, study participant), research trainee, student or fellow researcher—please contact Smith at psmith@iwh.on.ca. To listen to his full presentation, go to: www.iwh.on.ca/plenaries/2014-oct-14. 📌

AT WORK

At Work is published by:
Institute for Work & Health
Editor: Uyen Vu
Layout: Uyen Vu, Jan Dvorak
Contributor: Cindy Moser
Web & Design Coordinator: Jan Dvorak
Communications Manager: Cindy Moser
Director, KTE: Ron Saunders
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Issue #78 / Fall 2014 / ISSN # 1261-5148
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The Institute for Work & Health operates with the support of the Province of Ontario. The views expressed in this publication are those of the Institute and do not necessarily reflect those of the Province of Ontario.

Review update finds improved quality

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“Compared to the 2008 review, we found a higher proportion of high quality studies in the literature,” says Irvin. “That higher proportion covered 29 different intervention categories, up from 19 in the last review, and allowed us to make practical recommendations on a number of them.”

With respect to preventing and managing upper extremity MSDs, the 2014 review found:

- strong evidence of a positive effect for workplace-based resistance exercise training programs;
- moderate evidence of a positive effect for stretching exercise programs (including yoga), workstation forearm supports and vibration feedback on mouse use with computers; and
- moderate evidence of no effect for job stress management training, electromyographic (EMG) biofeedback (sensor pads that measure activity level in muscles), and workstation adjustments with minimal worker involvement.

“The finding about doing workstation adjustments alone not being effective is consistent across a number of our reviews,” says Irvin. “In speaking with stakeholders, they concurred that workstation adjustments alone, without engaging the worker,

cannot be expected to have a strong impact on upper extremity MSDs.”

The findings led the review team, in consultation with stakeholders, to craft a few practical messages for those involved in MSD prevention in workplaces (see box below).

How the systematic review was done

Systematic reviews set out to review and synthesize all that the research literature to date has to say on a given question. Designed to be replicable, they’re carried out according to clear and transparent methods, starting with a research question that states key parameters from the outset.

To conduct this systematic review, the team searched six databases and combed through almost 10,000 studies to filter the ones that met inclusion criteria for relevance and quality. It ended up synthesizing 61 studies, including the studies from the 2008 review, and weighing the quality of the relevant studies along 18 different domains. “One of the ‘good news’ messages coming out of this review is that well-designed studies are possible,” says Irvin.

For more information about the findings of the systematic review, go to: www.iwh.on.ca/plenaries/2014-jun-03.

EVIDENCE-BASED SUGGESTIONS FOR PREVENTING UPPER EXTREMITY MSDs IN THE WORKPLACE

Based on a rigorous systematic review process and discussions about the findings with numerous stakeholder groups, the review team offers the following advice:

Recommendation

(a strong level of research evidence makes this a recommended workplace practice)

- Implementing a workplace-based resistance training exercise program can help prevent and manage upper extremity musculoskeletal symptoms and disorders.

Practice considerations

(a moderate level of evidence makes the application of these practices in the workplace worth considering)

- Workplaces should consider implementing stretching exercise programs (including yoga), workstation forearm supports and vibration feedback on mouse use, if applicable to the work context.
- Workplaces should consider seeking alternatives to job stress management, EMG biofeedback and workstation adjustments alone (i.e. with minimal worker involvement) because these programs appear to have no effect on upper extremity MSDs.