

# outwork

## IN THIS ISSUE

2 / What researchers mean by... bootstrapping

3 / One year's new cases of mesothelioma and lung cancer due to asbestos cost \$2.35B

4 / Many questions need examining to establish effects of legalized cannabis on work safety

6 / Young adults with chronic conditions often struggle to access workplace supports

7 / Workers with disabilities report greater hazard exposure and lower protection

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## Standing too long at work carries twice the risk of heart disease as sitting too long

IWH study followed 7,300 workers for 12 years to compare the risks of heart disease among occupations that involve mostly standing, mostly sitting, or a mix of postures

Workers who stand on the job most of the time are at greater risk of heart disease than workers who predominantly sit.

According to a study conducted by the Institute for Work & Health (IWH) and the Institute for Clinical Evaluative Sciences (ICES), people who primarily stand on the job are twice as likely as people who primarily sit on the job to have a heart attack or congestive heart failure. That's even after taking into account a wide range of personal, health and work factors.

"Workplaces have been hearing a lot lately about the health effects of prolonged sitting on the job," says IWH Senior Scientist Dr. Peter Smith, who led the study. "Our results suggest that workplaces also need to pay attention to the health effects of prolonged standing, and target their prevention programs accordingly."

The study has been published as an open access article in the *American Journal of Epidemiology* (doi: 10.1093/aje/kwx298).

The study followed 7,300 Ontario workers, aged 35-74, for 12 years. All were initially free of heart disease. These workers were respondents to the 2003 Canadian Community Health Survey (CCHS), a Statistics Canada survey that collected information on personal factors, health conditions, health behaviours and work conditions. It also collected job title information, which the research team used—along with job exposure information in the Human Resources and Skills Development Canada Career Handbook—to estimate respondents' body postures at work. The team then categorized respondents into four categories, according to the predominant body postures they used in their jobs.

Among the respondents included in the study, nine per cent were estimated to predominantly stand at work. The people in this category worked as salespeople, cooks, food servers, bank tellers, machinists and tool operators, among others.

continued on page 8



## Dr. Monica Bienefeld joins IWH as new director of Knowledge Transfer and Exchange

The Institute for Work & Health (IWH) welcomes **Dr. Monica Bienefeld**, who joins the executive team in her new role as director of Knowledge Transfer and Exchange (KTE). Bienefeld, also appointed an associate scientist at IWH, is an epidemiologist with more than 15 years of professional experience in public health, most recently with Ontario's Ministry of Health and Long-Term Care and, before that, with Toronto Public Health. Her areas of interest include assessing and communicating the quality of scientific evidence and promoting the use of evidence in population health policy development and decision-making.

Bienefeld steps into a role vacated with the retirement of **Dr. Ron Saunders**, who joined the Institute in 2008. During his tenure as director of KTE and senior scientist at IWH, Saunders has helped strengthen the integrated KTE model, which provides for multiple types of engagement with stakeholders throughout the course of a research project. He has also played a key role in expanding and deepening IWH's relationships with its stakeholder networks. These include the employer and labour networks, which he established, and the Prevention Knowledge Exchange Group (PKEG), which he has nurtured into a lively gathering of Ontario's prevention system representatives to exchange information about research and practice.

## Institute's 2016 Annual Report highlights stories of workplace change

The impact of IWH research on workplaces is the theme of the Institute's 2016 Annual Report. It features stories of five workplaces that have used IWH research to better their occupational health and safety or return-to-work programming. The annual report also describes IWH research projects conducted in 2016 to support workplace change. It can be downloaded at: [www.iwh.on.ca/annual-report](http://www.iwh.on.ca/annual-report).

## IWH's plenary series gets a new name in 2018

Starting in 2018, IWH's plenary series will be named **IWH Speaker Series: New and emerging research in work and health**. Since 2008, the Institute has hosted the public lecture series where work and health researchers from IWH, across Canada and around the world share findings from a research project. These free hour-long lectures are usually held at 11 a.m. Tuesdays at the Institute (481 University Ave., Toronto, Ontario). People who can't attend in person can watch the presentation via a live stream. A schedule of upcoming presentations can be viewed at: [www.iwh.on.ca/events](http://www.iwh.on.ca/events).

WHAT RESEARCHERS MEAN BY...

# bootstrapping

## Bootstrapping is a statistical technique for determining how confident we can be in the findings of a study

"Pick yourself up by your bootstraps." You've heard the saying. Though it's actually impossible to lift yourself off the ground by pulling up on your boots, the phrase is a metaphor for getting out of a difficult situation by your own efforts.

The statistical term **bootstrapping** is named from this saying. It refers to a technique that offers a seemingly impossible solution to a statistical problem.

When scientists want to know something about a large population (e.g. average height, frequency of symptoms), they cannot measure or ask every individual in the population. Instead, they will randomly **sample** a smaller group of people and use the measurements of this smaller group to estimate an answer to the research question. They will also determine how confident they can be that their findings (in the sample) represent the true value of the statistic (e.g. average, frequency) in the population from which the sample was taken. Often, researchers use proven mathematical formulas to determine these **confidence levels**.

But sometimes mathematical formulas won't work or don't exist to determine confidence levels. This is where bootstrapping comes in. It allows researchers to calculate confidence levels or other measures of accuracy using the sample itself—by resampling over and over again from the original sample.

Let's take a hypothetical example. Say you want to know how well workers in Ontario are functioning three months after they hurt their back at work (100 pts = full functional abilities, 0 pts = no functional ability). You can't survey all 7,000 workers who sustained a low-back injury during a given year, so you take a random sample of 400 of these workers. You learn that their average (mean) functional level at three months is 73 pts.

If no formula was available, how confident could you be that 73 pts was the mean functional level at three months among all workers in Ontario who had a low-back injury that year? You could repeat your sampling many times and use all the samples to create your confidence interval. However, this would be time-consuming, expensive and, potentially, not even feasible.

So you turn to bootstrapping, where you conduct your resampling within your one real sample. If you were doing bootstrapping manually—and you wouldn't; bootstrapping is only possible because of the power of computers—you would do something like this (with a nod to *Biostatistics for Dummies* for providing the outline of this manual process).

1. Write the level of function of each of the 400 workers sampled on a piece of paper and put all 400 in a brown paper bag.
  2. Reach in and pull out one of the pieces of paper. Record the level (69 pts) and put the paper back in the bag.
  3. Reach in again, pull out a piece of paper, record the level (74 pts) and return the paper to the bag.
  4. Repeat this another 398 times until you have recorded 400 levels, each time returning the paper to the bag. This is called **sampling with replacement**.
  5. Based on these 400 values, calculate the mean functional level. Because the paper is returned to the bag each time, some may be selected more than once and some not at all. As a result, this new mean will be slightly different.
  6. Now, repeat steps two through five 1,000 times, writing down the mean of each new sample of 400 values.
  7. Take the 1,000 means you calculated and order them from smallest to largest. Remove the smallest and largest 2.5 per cent (25 means). The smallest and largest remaining numbers—maybe 69.4 and 76.2—are the lower and upper 95 per cent confidence limits around your original sample estimate of 73 pts. This means that 95 times out of 100, this interval covers the true population mean.
- So when researchers say they performed bootstrapping, you know they ran the data from their original sample through a software program that resampled it over and over, as described above. Researchers do this to determine how confident they can be that the findings from their original sample truly reflect what would have been found if they had been able to study all the people in the population.

# One year's new cases of mesothelioma and lung cancer due to asbestos cost \$2.35B

## IWH's new estimate of economic burden higher than earlier figure

One year's newly diagnosed cases of mesothelioma and lung cancer due to work-related asbestos exposures cost Canadians \$2.35 billion—up from an earlier estimate of \$1.9 billion.

This is according to a study led by Institute for Work & Health (IWH) Senior Scientist Dr. Emile Tompa, a health economist who assessed the costs to Canadian society of cases newly diagnosed in 2011.

The study is the first to estimate the costs to society of illnesses associated with work-related asbestos exposures, including secondhand or “para-occupational” exposures (e.g. a family member's exposure to fibres brought home on work clothing).

The study, conducted with funding from the Canadian Cancer Society, was published July 2017 as an open access article in the *Journal of Occupational and Environmental Medicine* (doi: 10.1136/oemed-2016-104173). Earlier reports and presentations about this study estimated the economic burden from one year to be \$1.9 billion. The new estimate is higher because it includes the value of activities in the home (known as “home production”). This addition to the estimate was requested by the article's peer reviewers.

### 2,331 new cases in 2011

Tompa and his team looked at the estimated total lifetime costs of 427 cases of mesothelioma newly diagnosed in 2011, as well as 1,904 cases of lung cancer newly diagnosed in the same year, for a total of 2,331 new cases in 2011. These were all cases attributed to occupational and para-occupational exposures to asbestos.

The researchers considered costs in three areas: direct costs (e.g. health-care and family/community caregiver time), indirect costs (e.g. productivity losses associated with work in the paid labour market and unpaid work in home production) and quality-of-life costs (e.g. pain, suffering and loss of enjoyment of life).

Updated estimates are displayed in the tables to the right. Table 1 shows the economic burden of mesothelioma, and Table 2 shows the economic burden of asbestos-related lung cancer. (In these tables, “fringe benefits” in paid work, estimated at 14 per cent of wages, include items such as dental care, extended health care, disability and employment insurance, and retirement benefits. “Home production” pertains to the value of an individual's contribution to the upkeep of his or her home. “Friction costs” refer to costs associated with employee turnover, including search expenses, management time for interviews, and reduced productivity of new hires during the training period.) ■

## BURDEN OF MESOTHELIOMA AND LUNG CANCERS DUE TO WORK-RELATED EXPOSURES TO ASBESTOS

The tables below show the economic burden of mesothelioma and lung cancer due to occupational and para-occupational (i.e. secondhand) exposures to asbestos. The cases were diagnosed in 2011. All figures are in 2011 Canadian dollars.

Table 1: Costs of mesothelioma

Based on 427 cases in 2011	All cases	Per case
<b>Total health-care costs</b>	<b>\$23,212,416</b>	<b>\$54,393</b>
Health-care sector treatment costs	\$17,130,994	\$40,143
Out-of-pocket costs	\$6,081,422	\$14,251
<b>Total productivity and output costs</b>	<b>\$117,844,178</b>	<b>\$276,143</b>
Wage and salary costs	\$26,501,873	\$62,102
Fringe benefit costs	\$3,710,262	\$8,694
Home production costs	\$87,632,043	\$205,347
<b>Total friction costs</b>	<b>\$2,360,170</b>	<b>\$5,531</b>
<b>Total informal care-giving costs</b>	<b>\$5,790,544</b>	<b>\$13,569</b>
<b>Total insurance administrative costs</b>	<b>\$36,886,993</b>	<b>\$86,437</b>
Health-care administration costs	\$2,574,720	\$6,033
Workers' compensation administration costs	\$34,312,273	\$80,404
<b>Total health-related quality of life costs</b>	<b>\$296,303,160</b>	<b>\$694,325</b>
<b>Overall total costs</b>	<b>\$482,397,461</b>	<b>\$1,130,398</b>

Table 2: Costs of asbestos-related lung cancer

Based on 1,904 new cases in 2011	All cases	Per case
<b>Total health-care costs</b>	<b>\$81,831,543</b>	<b>\$42,974</b>
Health-care sector treatment costs	\$46,154,063	\$24,238
Out-of-pocket costs	\$35,677,480	\$18,736
<b>Total productivity and output costs</b>	<b>\$498,309,077</b>	<b>\$261,690</b>
Wage and salary costs	\$126,275,066	\$66,314
Fringe benefit costs	\$15,507,464	\$8,144
Home production costs	\$356,562,546	\$187,232
<b>Total friction costs</b>	<b>\$10,542,816</b>	<b>\$5,537</b>
<b>Total informal care-giving costs</b>	<b>\$32,857,086</b>	<b>\$17,255</b>
<b>Total insurance administrative costs</b>	<b>\$21,201,183</b>	<b>\$11,134</b>
Health-care administration costs	\$7,627,244	\$4,005
Workers' compensation administration costs	\$13,573,939	\$7,128
<b>Total health-related quality of life costs</b>	<b>\$1,224,370,103</b>	<b>\$642,986</b>
<b>Overall total costs</b>	<b>\$1,869,111,809</b>	<b>\$981,576</b>

# Many questions need examining to establish effects of legalized cannabis on work safety

## Co-authors of pending systematic review on central nervous system agents outline what we know — and don't — about OHS implications of legalized cannabis

The Canadian federal government has committed to making recreational marijuana legal by July 1, 2018. As that date approaches, many workplaces are concerned about the implications this change may have for occupational health and safety (OHS).

At the Institute for Work & Health (IWH), Scientist Dr. Andrea Furlan and Post-Doctoral Fellow Dr. Nancy Carnide have been examining the research literature to learn more about potential implications. Their search of the literature is the first step in a systematic review they are conducting on the effects of various central nervous system agents, including marijuana, on workplace injuries, deaths and near misses.

Although the systematic review is still underway—and findings are not yet available—Furlan and Carnide have agreed to share what they know from the literature in a Q&A with *At Work*.

**Q:** Recreational marijuana has become legal in some U.S. jurisdictions in recent years: Colorado, Alaska, D.C., Oregon and Washington. What research has been done on whether marijuana use increases in the workplace following such legalization?

**A:** As far as we are aware, no published studies to date have examined the impact of recreational marijuana legalization on the workplace. The only data we have seen is from a report released this year by a large private drug-testing company in the U.S. It found that the rates of positive cannabis tests in Washington and Colorado in 2016 outpaced the national average for the first time since the two states legalized cannabis in 2012. But these rates were based on the number of tests conducted. Also, they do not necessarily reflect increased use or impairment in the workplace.

**Q:** What research has been done on the impact of marijuana use on workplace health and safety?

**A:** Several studies have examined the impact of marijuana use on a number of workplace outcomes, but with mixed results. Some have found associations between marijuana use in the workforce and work absenteeism, reduced productivity, job turnover, disciplinary measures, workplace accidents and injuries, unemployment and interpersonal conflict. However, other studies have not found any evidence of such associations. Overall, the evidence to date is quite inconsistent.

Earlier this year, the National Academies Press, a publishing body of the National Academy of Sciences in the U.S., published a major report on the health effects of marijuana use. One of the areas they examined was the effect of marijuana on injuries and accidents, including injuries and fatalities in the workplace setting. Based on six main studies, this review did not find enough evidence to either support or refute a statistical link between marijuana use and occupational injuries or accidents.

**Q:** Have there been any studies on marijuana use and safety-sensitive jobs?

**A:** There are very few studies on marijuana and safety-sensitive situations at work. Most of the studies are about driving, which are then extrapolated to work settings. And even in driving, the research is in its

infancy. There's not a lot of consensus. Researchers know marijuana use impairs driving, but they don't know much about *how* it impairs driving. What is consistent in the few studies out there is that reaction time is slower, so people also drive slower.

Also, it's not clear to what extent you can extrapolate driving to work situations. Driving is a learned activity that many people do almost on auto-pilot. Drivers' brains are often multi-tasking; many people are talking or doing a secondary task while behind the wheel. That kind of activity may be similar to some work situations, but not to others.

What you'll find more in workplace settings are post-accident investigations where the people involved are tested to see if they were under the influence of marijuana or other drugs. These are done on a case-by-case basis, and the problem with relying on these investigations is that the accidents may have happened even if the workers had not been under the influence.

These kinds of cases tend to be more publicized, but you need rigorous research with control groups to determine whether the frequency of accidents is actually higher among those using these drugs than among those who are not. And just because people test positive for tetrahydrocannabinol (THC) in their urine does not necessarily mean that they're impaired. That's the other problem that we have.

**Q:** Can you explain why it's so difficult to develop a test of impairment?

**A:** Part of the problem is that marijuana remains in the system for quite some time beyond the actual time of impairment. So someone can use marijuana on Friday night and come into work on Monday no longer impaired, yet test positive for marijuana use. There is no consensus as of yet on the levels of THC detected in fluids that indicate acute impairment.

The question of impairment also depends on how marijuana is ingested. Nowadays, people can use marijuana in many different ways. They can smoke it or vape it—in



Dr. Andrea Furlan



Photo ©iStockphotos/RoxanaGonzalez

other words, ingest it via the lungs. Or they can ingest it via the digestive system, by swallowing edible cannabis oil in capsules or eating brownies with the oil baked in, for example. The effects of edible cannabis are slower to kick in and last longer than the effects of cannabis that has been inhaled. But we don't even know the degree of impairment when people ingest edibles, never mind how long the impairment lasts.

Keep in mind that, in the world of alcohol research, where they've now established the blood-alcohol content considered too impaired to drive, people started doing research 50 years ago. To even develop a roadside test for marijuana akin to a roadside test for alcohol, you would need to know what areas of the brain are affected by marijuana. They might not be the same parts of the brain that are impaired under the influence of alcohol, or opioids, or benzodiazepine (sleeping pills).

**Q:** From a workplace health and safety perspective, what differences are there between medical marijuana use and recreational marijuana use?

**A:** Marijuana is made up of over 70 cannabinoids. THC and cannabidiol (CBD) are the main ones researched. THC is the cannabinoid responsible for the impairing, psychoactive effects—the “high” felt after consuming marijuana – while CBD produces no psychoactive effects. Typically, recreational users of marijuana will seek euphoria and opt for marijuana containing a higher THC percentage. Medical users are generally using marijuana for therapeutic purposes and may be less inclined to consume to get high. Having said that, the THC concentration in medical cannabis in Canada can vary anywhere from one per cent up to 25

per cent, and it is up to individual patients to decide which strain and concentration works best for their condition.

Another difference is that people who use cannabis for medical purposes may need to use it every day, and many times during the day. As a result, they may develop a tolerance to the effects on their attention, concentration, reaction and so on. On the other hand, people who use marijuana for medical purposes may over time develop a liking for the euphoric effects of marijuana. It's not always easy to distinguish usage patterns between



Dr. Nancy Carnide

people who use cannabis for medical purposes and those who use it for recreational purposes. Any difference in workplace safety risks between recreational and medical users hasn't been studied as far as we know.

**Q:** You've been reviewing and assessing the quality of existing studies on this topic for a systematic review. What questions have researchers been able to answer, and what are they tackling next on this topic?

**A:** As mentioned earlier, several studies have examined the relationship between cannabis use and various workplace outcomes, with inconsistent results.

Some of the inconsistency in the findings may be due to differences in study methodologies and difficulties in conducting this type of research. Some study designs preclude the ability to assess cause and effect in the relationship. Another common design limitation is the lack of a control group.

Other issues include insufficient sample size of cannabis users, failure to account for confounding factors (other factors that may influence outcomes), and a lack of consideration of the timing of use and impairment in relation to outcomes such as accidents and injuries.

While a great deal of concern exists in the workplace community around the effects of cannabis, particularly with the impending legalization, we need high-quality observational studies to be able to better answer questions about its effects on work, including its effects on health and safety.

At a more basic level, we have limited data on the extent of cannabis use and impairment among workers, and this is true in both the U.S. and Canada. The best estimates we have in Canada reflect overall use, which includes use away from work and, therefore, may be of limited relevance to OHS. We know virtually nothing about the current magnitude of workplace cannabis use —i.e. use during work, on breaks and in the hours prior to beginning a work shift.

Also, an important area of occupational health research not often considered in the context of legalization is the potential health impact on workers involved in the production of cannabis. Some researchers in Washington State are beginning to look at this, with an initial focus on the effects of UV radiation.

Finally, one of the key avenues for future research will be to identify an accurate measure of impairment for use in workplaces. This is something that the workplace community is particularly keen to see.

*Furlan and Carnide expect to finish their systematic review in the summer of 2018. Watch for their findings in an upcoming issue of At Work. ■*

# Young adults with chronic conditions often struggle to access workplace supports

## Study of people with arthritis finds younger workers face distinct challenges requesting accommodation

Young people who have potentially disabling chronic health conditions need the same types of workplace supports as older people with these conditions. But due to their age and their status in the workforce, they face distinct barriers to accessing these supports, according to a new study by the Institute for Work & Health (IWH).

The study, led by IWH Associate Scientist Dr. Arif Jetha, probed for similarities and differences in the workplace needs of people with arthritis at different ages and stages of their careers. Published in September 2017 in *Arthritis Care & Research* (doi: 10.1080/09638288.2017.1378387), the study found young workers with arthritis faced difficulties in accessing workplace supports for a number of reasons.

For one, having arthritis at a young age made it difficult for some study participants to reveal their condition to supervisors and co-workers. Some young study participants said they faced disbelief among co-workers who thought arthritis only affected older people. Many participants said they feared jeopardizing their career advancement if they disclosed their condition, especially as they had little job tenure. Also, many of the young participants worked in part-time, short-term contracts where benefits and accommodations were simply not available.

“This study suggests that, on the one hand, workplaces don’t have to offer young workers with arthritis different workplace supports. The same supports can meet the needs of people with arthritis across different ages,” says Jetha.

“On the other hand, workplaces might want to pay special attention to young people and people who are new to their jobs, as they may perceive more barriers to accessing those supports and, therefore, be more susceptible to work disability.”

To conduct this study, Jetha and his team recruited 45 individuals who were working

or had worked in the previous 12 months. Twenty-five were older than 55 years, and seven were between 18 and 34 years old. The participants had inflammatory arthritis, osteoarthritis or other rheumatic disease diagnoses—conditions that have similar effects on people’s work activity limitations.

The researchers used focus groups as well as one-on-one interviews, plus a follow-up questionnaire, to elicit participants’ experiences finding and keeping a job. They also asked about the formal and informal workplace resources the participants needed, whether these resources were available, and whether the participants used these resources. Participants were also probed on how their work experiences and work-support needs changed over the course of their lives.

The team found people at different ages needed similar types of accommodation and workplace supports for their arthritis. Scheduling flexibility was top of the list. Due to the episodic and unpredictable nature of the condition, participants said they benefited from policies that allowed them to arrive late or leave early, take frequent breaks, work from home, or otherwise modify their schedules as symptoms flared.

Other needed workplace supports were medical and drug benefits, changes to the physical work environment, job modifications, and supportive work environments where employees who have accommodation needs find help and empathy when faced with challenges.

### Work supports not a first recourse

Also common across different age groups was a reluctance to turn to workplace accommodation as a first recourse. Instead, participants reported changing and adapting their lives outside work as a strategy to stay in their jobs. Some reported reducing

their social roles and cutting out social activities to sleep and preserve their energy for work. Many said they preferred making these adjustments over having to disclose their health needs at work and request support.

However, the study found young people faced an additional barrier when it came to the issue of disclosure: lack of public awareness. Some young study participants said they were often met with disbelief. As one young study participant described it: “I think there’s always the misconception that people don’t get impairments until later in life, and so [having an impairment when you’re young] can always be something very difficult either to convey to your employer or to your colleagues [who think] maybe you’re getting special treatment or you’re just a big complainer.”

Job tenure and work status also played a role. The short-term, entry-level jobs in which many young participants worked were characterized as offering few resources and little support. While few young participants had worked in their jobs for more than two years, those who had done so reported more support and greater access to workplace resources that helped them sustain their employment.

Likewise, the middle-aged and older workers who had longer tenures said the time spent at their workplaces gave them an opportunity to build supportive relationships with supervisors and peers. Those who had worked less time at an organization tended to describe a less supportive workplace.

“We sometimes don’t think about challenges faced by young people who live with potentially disabling chronic health conditions, and often lack the knowledge to support them as they enter the labour market,” says Jetha.

“An important first step may be to strengthen communication practices between supervisors and young workers to enable a dialogue on employment needs and the identification of relevant support strategies.” ■

# Workers with disabilities report greater hazard exposure and lower protection

## OHS vulnerability study finds people with disabilities report inadequate policies and low empowerment

People with disabilities have a tough time getting hired, research elsewhere has shown. A new study now suggests that, when they do find jobs, they may be more vulnerable to workplace health and safety risks than their peers without disabilities.

The study, conducted by a team at the Institute for Work & Health (IWH), found workers with disabilities were more likely to be exposed to hazards at work than other workers. What's more, they were also more likely to report a combination of hazard exposure and inadequate occupational health and safety (OHS) protection.

This combination of more exposure to hazards and less adequate protection from them led the IWH research team to conclude that people with disabilities may be more vulnerable to risk of work injury. The conclusion is based upon a concept of vulnerability developed by IWH and embodied in a tool called the OHS Vulnerability Measure.

The tool assesses exposure to hazards, as well as three types of protections from these hazards: organizational policies and practices; awareness of OHS rights and responsibilities; and empowerment (to speak up about dangerous work, for example).

In the study, the team found people with disabilities were more likely to be exposed to hazards. They were also more likely to report two types of inadequate protection: inadequate OHS policies and procedures and inadequate OHS empowerment.

"To my knowledge, this is the first study to look at potential hazards and unsafe working conditions among people with disabilities," says Dr. Curtis Breslin, an IWH scientist and lead author of an article on the study that was published online in May 2017, in the journal *Disability and Rehabilitation*.

"This study supports the idea that there's some kind of sorting effect, where people

with disabilities tend to have jobs with more hazards than their peers without disabilities," says Breslin. "It's also possible that they have limited job choices, which is consistent with the data showing that the people with disabilities in our study worked more often in part-time and temporary jobs."

### A representative sample

The study was conducted as part of a larger project on the OHS Vulnerability Measure.

In April and September 2015, nearly 2,000 workers in Ontario and British Columbia completed the OHS Vulnerability Measure. This sample was weighted to resemble the age and gender profile of the labour market in the two provinces. Respondents who reported a work-related physical or mental injury or illness in the previous 12 months were excluded from the sample.



Dr. Curtis Breslin

"Excluding workers who had work injuries in the past year helps rule out the possibility that sustaining an injury influenced their report of OHS vulnerability," says Breslin. "We hypothesized that experiencing a work injury would lead to increased perceptions of vulnerability, so we wanted to err on the conservative side."

Respondents were asked whether a long-term physical or mental condition or health problem reduced the amount or kind of activity they could do at work. Based on the answers to this question, respondents were considered never activity-limited, sometimes activity-limited or often activity-limited—all referring to activity limitations at work.

More than half of the people who were sometimes or often activity-limited at work due to a long-term health condition were exposed to hazards at work (52 and 54 per cent, respectively), compared to 41 per cent of people who were never activity-limited at work by a long-term health condition.

When compared to respondents who were never activity-limited at work by a long-term health condition, people who were sometimes or often activity-limited were 66 to 70 per cent more likely to report vulnerability due to being exposed to hazards in combination with inadequate policies and procedures.

Respondents who were sometimes or often activity-limited at work due to a long-term health condition were also nearly twice as likely to be vulnerable due to hazard exposure and lack of empowerment.

### Few differences across limitation levels

Notably, the team did not see many differences in vulnerability scores when comparing people who were sometimes and people who were often activity-limited.

"That tells us any level of activity limitation can be associated with greater exposure to hazards and limited access to OHS resources," says Breslin. "It may be that a moderate level of activity limitation is also less visible to others, making it difficult to accommodate. But we would need further research to test this idea."

As already noted, respondents who had experienced a work-related injury were excluded from the study. Had their responses been included, a stronger link between activity limitation and OHS vulnerability scores would have been found, says Breslin.

"What I find interesting about these findings is that they suggest individual susceptibilities such as health impairments interact with workplace OHS vulnerabilities," Breslin adds. "Changing workplace factors needs to be the primary focus, but we also need to be aware of unique individual differences that potentially require a tailored approach to injury prevention as well." ■

## AT WORK

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# Cashiers, bank tellers, machinists among jobs that involve mostly standing

continued from page 1

The 37 per cent in the second category were estimated to predominantly sit, working as truck drivers, administrative officers, clerks, secretaries, business and management professionals, etc. The third category, consisting of jobs that involved a mix of sitting, standing and walking, included teachers, nurses, couriers, motor vehicle assemblers, etc. Finally, the fourth category was made up of jobs that involved other body postures (bending, kneeling), jobs such as mechanics, material handlers, orderlies, cleaners, shippers and receivers.

The researchers linked the 2003 CCHS information to administrative health records housed at ICES to identify people who had a new case of heart disease during the next 12 years. During this period, 3.4 per cent of the study group developed heart disease—more men (4.6 per cent) than women (2.1 per cent). Without taking any other factors into account (the unadjusted risk), the risk of heart disease was higher among people whose jobs required mostly standing (6.6 per cent) than among people whose jobs involved mostly sitting (2.8 per cent). The unadjusted risk of heart disease among people who stood on the job was even slightly higher than that of people who smoked daily (5.8 per cent).

Even after adjusting for a wide range of factors—including personal (e.g. age, gender, education level, ethnicity, immigrant status, marital status), health

condition (e.g. diabetes, arthritis, hypertension, mood and anxiety disorders), health behaviour (e.g. smoking, drinking, body mass index, exercise) and work (e.g. physical demands, shift schedule)—the risk of heart disease was still twice as high among people who primarily stood on the job as among those who primarily sat.

“A combination of sitting, standing and moving on the job is likely to have the greatest benefits for heart health,” says Smith. “Workplaces need to apply this message not just to workers who predominantly sit, but also—in fact, especially—to workers who predominantly stand.”

That said, workplaces need to look beyond job activity to truly protect the cardiovascular health of workers. While jobs that involved a combination of sitting, standing and walking were shown in this study to be associated with 40 per cent lower risk of heart disease among men, these jobs didn't result in a decreased risk among women. This may be due to the fact that nurses and teachers accounted for most of the jobs held by women in the “sitting, standing and walking” category, jobs known to be stressful in different ways.

“Prevention programs that focus only on physical job activity, while ignoring other factors such as the psychosocial environment, are unlikely to lead to meaningful changes in cardiovascular risk,” Smith says. ■

## SETTING THE RECORD STRAIGHT

The study on prolonged standing and the risk of heart disease led by Dr. Peter Smith has received much media coverage since it appeared online in August 2017. While the researchers were encouraged to see this level of interest, some of the coverage and online commentary seemed to have missed the point. So, for the record, Smith and his team would like to tackle a few misconceptions:

**Misconception #1: Office workers should now be confused about whether to sit or stand, and whether sit/stand stations are a good idea.** They shouldn't be, says Smith. This study was not about office workers who have the ability to choose between sitting or standing at their desks, nor was it about the value of sit/stand workstations.

**Misconception #2: We no longer have to worry about the negative health effects of too much sitting, thanks to this study.** Not so fast, says Smith. There was nothing in this study to refute the research on the health consequences of a sedentary lifestyle.

**Misconception #3: This was just one contrarian study, so we can ignore it.** No, this is not the only study on the risks of prolonged standing at work, Smith says.

For more, read the article online: [www.iwh.on.ca/at-work](http://www.iwh.on.ca/at-work)