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Work disability puts people at risk of premature death, study finds

Innovative 19-year follow-up study from IWH finds people with permanent impairment face higher risk of early death—especially those injured in younger years

Serious work-related injuries can raise the risk of mortality even for those who initially survive the incident. According to a new study by the Institute for Work & Health (IWH), people who are permanently impaired by work-related injury face a greater risk of dying early—a risk that remains more than a decade after the injury.

What's more, counter to the expectation that young workers can more easily recover from a work-related injury, the study finds the highest jump in mortality risks are those faced by people who are permanently impaired following a work injury in their younger years.

"For both men and women with a permanent work-related impairment, a crucial factor that predicts whether they die early is what we call 'work disability'—the difficulty they face staying in the labour market," says IWH Associate Scientist Dr. Heather Scott-Marshall, who led the study published in the September/October 2014 issue of the *Canadian Journal of Public Health*. Work disability, she explains, stems from the physical, psychological and emotional difficulties individuals experience coping with,



Dr. Heather Scott-Marshall or adapting to, an acquired impairment. These difficulties can affect their sense of self and create problems with social role functioning—e.g. how they fulfil their roles as a worker, spouse, parent and so on.

"This, in turn, can affect their ability to re-enter the labour market after an injury and may compromise long-term employment success," says Scott-Marshall. Other key factors contributing to work disability include stigma and discrimination against workers with impairment, which have





IWH measurement expert joins executive of world body on rheumatology outcomes

Institute for Work & Health (IWH) scientist **Dr. Dorcas Beaton** has been named to the executive of Outcome Measures in Rheumatology, also known as OMERACT. It's a consensus-based world organization that strives to improve and standardize the measurement and interpretation of outcomes in rheumatology research. Beaton is also one of the leads on a working group that, last spring, succeeded in obtaining OMERACT endorsement of a set of measures to assess work productivity among people with rheumatic diseases. She will be involved in organizing and hosting OMERACT's next biannual meeting in 2016 in Whistler, B.C.

Applications now being accepted for Syme fellowships on work and health

Applications are being accepted for the 2015 S. Leonard Syme Fellowships until April 30. Open to young researchers at the master's or doctoral level who intend to study work and health, the awards are typically worth \$5,000 and occasionally \$15,000 for a major fellowship. Preference is given to candidates whose research interests include the social determinants of health and illness at work, workplace interventions to improve health, or measurement issues associated with either of these two areas. For more information, go to: www.iwh.on.ca/syme.

Spring 2015 systematic review workshop to be held May 6-8 in Toronto

Learn how to plan and conduct a systematic review, how to interpret results and how to communicate findings. The Spring 2015 edition of this popular three-day workshop is now open for registration. For more detail and sign-up information, go to: www.iwh.on.ca/systematic-review-workshops.

Institute to host world conference on musculoskeletal research

It's a little more than a year before IWH plays host to several hundred musculoskeletal disorders experts from around the globe. PREMUS 2016, the 9th International Conference on the Prevention of Workrelated Musculoskeletal Disorders, will be held June 20-23, 2016 in Toronto. To receive updates on the conference, sign up at: www.iwh.on.ca/premus2016.

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...

Psychometrics

Research on psychometrics examines the properties of a measure to ensure it's accurate, consistent and sensitive to change

If you've ever taken part in a questionnaire a political poll, a customer satisfaction survey or a research study—you might not have given much thought to the types of question you were asked, how they were worded or how many there were. But researchers spend a great deal of time thinking about and creating the questions used in a study. In fact, this is an entire field of research called **psychometrics.**

Psychometrics is the field of study that looks at the design, delivery and interpretation of tests that measure human responses. Typically, these tests measure our knowledge or abilities (e.g. an IQ test), our personality and behaviour (e.g. whether we're more introverted or extroverted) or our attitudes and beliefs (e.g. how we feel about our level of health or the support we get in our workplace).

In health research, for example, psychometric testing is used to create measures that assess pain, fatigue, distress, anxiety, alertness, mobility, agility—the list goes on. In organizational research, psychometric testing is used to create measures that assess worker, supervisor and organizational experiences and behaviours, such as job satisfaction, perceived job characteristics (e.g. job control, work overload), organizational commitment, job stress, job roles, work-family balance/conflict, leadership styles, person-organization fit, and so on.

Psychometrics uses mathematics and statistics, as well as lots of input from individuals to whom the measure is given, to ensure a measure works the way it's intended to. It makes certain the questions asked cover a range of possible perspectives and that they get enough detail without becoming too repetitive. It ensures the questions asked give rise to results that are valid, reliable and responsive.

Psychometrics assesses a tool's **validity** by looking for evidence that indicates the tool measures what we think it should. For example, we might think a measure asking people about how important physical activity is to them is only valid if those individuals who say physical activity matters actually exercise more than those people who say physical activity doesn't matter. We might think it isn't valid if there are important aspects of physical activity that the questionnaire fails to include. That would be a question about content validity, just one of many different types of validity to consider.

A tool is assessed for its reliability by determining if people give consistent answers to questions when asked those same questions under similar circumstances. For example, in developing a measure on the commuting difficulties workers face, you would run statistical analyses to find out if the questions given to the same group of workers on different occasions (but close in time) produce roughly the same results. That's an example of testretest reliability. Some measures ask others to rate or evaluate another person's physical or psychological behaviours or health. A measure would be considered reliable if different observers score the same way. That's an example of inter-rater reliability.

And then there's the question of the tool's **responsiveness**. Psychometrics looks at its ability to measure meaningful change. That is, if a person's situation, skills or beliefs change, is the tool sensitive enough to detect this change, and how much change has to take place before the measure will detect it? For example, if a new workplace wellness program is introduced and the program is effective, can we capture changes using a health measure? What about if the change is small—is this just random error or is it meaningful and "real"?

There's a great deal to be discussed when creating, applying and evaluating the many different measures used in research. Hopefully, this summary gives you an appreciation of the effort that researchers put into designing a questionnaire.

To learn more about **reliability and validity**, as well as other terms used in research, see the full list of What Researchers Mean By... columns at www.iwh.on.ca/wrmb.

Premium rates, work demands play role in whether injuries involve time loss

IWH study finds the distinction between lost-time and no-lost-time claims goes beyond injury severity

In many workers' compensation systems, injury claims tend to fall into two categories: lost-time claims and no-lost-time claims. And the perception generally is that injuries resulting in time off work are more severe than no-lost-time injuries.

For example, one might expect all workers who twist and dislocate their knee after falling from a work platform to need time off work (i.e. lost-time claims), no matter where they are employed. One might also expect workers who superficially cut their fingers while unpacking boxes to be back at work the next day after getting some medical attention (i.e. no-lost-time claims), again no matter where they are employed.

But a new study by the Institute for Work & Health (IWH), based on data from Ontario's Workplace Safety and Insurance Board (WSIB), finds that it's more than just the type or nature of the injury that plays a role in whether an injury ends up being a lost-time or no-lost-time claim. Two workplace characteristics also seem to play a role: the physical demands of the job, and the workers' compensation premium rate paid by the employer.

That is, in a group of workers who all suffer roughly the same severity of injury—e.g. who dislocate their knee after a fall from a platform—those whose jobs aren't as physically demanding or whose employers pay high workers' compensation premiums are more likely to be back at work the next day.

On one level, this could be a good news story, says Dr. Peter Smith, an IWH scientist and the lead author of the study. As he explains, premium rates in Ontario are "experience rated" in order to encourage injury prevention and early and safe work returns in the event of injury. "This study suggests that premium rates are effective in terms of the second objective of getting people back to work," he says.

On another level, Smith points out we don't know how workers are being brought back to work or what practices firms are using to minimize time loss. "There are good ways, such as modified duties and work accommodation," says Smith. "But there are also bad ways, such as claims management and claims suppression. Currently, we have no way of knowing what's going on, and we really should."

Smith's study, "The relationship between worker, occupational and workplace characteristics and whether an injury requires time off work: a matched case-control analysis in Ontario, Canada," has been published online ahead of print in January 2015 by the *American Journal of Industrial Medicine* (doi:10.1002/ajim.22420).

Some workplace factors played a role

To conduct the study, Smith and his research team collected data on a random sample of about 7,000 WSIB no-lost-time claims. The team then matched each no-lost-time claim with up to four WSIB lost-time claims that were similar in terms of type of injury (with 43 categories to choose from), event leading to injury (from 17 choices), the part of the body injured (18 choices) and the year of injury. This allowed the researchers to look for differences in worker characteristics or workplace characteristics that might help explain why essentially the same type and severity of injury could result in either a no-lost-time or lost-time claim.

Notable, and sometimes surprising, differences and similarities were found between the two groups. Among them:

- **Physical workload mattered**. This finding supports what one would expect, that it would be harder to work the day after an injury if the work is physically demanding.
- Age and time on the job didn't matter. Though one might expect that workers who are young or new to the job would be less likely to take time off work after an injury, there was no evidence of this in the findings.

- Employer size didn't matter. One might expect large employers to be more likely to report no-lost-time claims on the grounds that they are perhaps more able to accommodate injured workers. However, large employers were not more likely to report no-lost-time claims.
- **Premium rate mattered**. The study compared claims from employers in the top third of rate groups with the highest premiums against those in the bottom third. Employers paying more in premium rates were less likely to have lost-time claims.

"Given that workplaces with higher premium rates are usually those with higher hazards and injury rates, it's surprising that injured workers in these firms were less likely to take time off in comparison with workers in firms that pay low premium rates," says Smith.

"We don't know why that would be the case. Is it due to a workplace culture or policies and practices that people are less likely to take time off after an injury? If practices, are they practices such as work accommodation or claims management and claims suppression?"

Better data needed

One recommendation Smith makes after this study is for the WSIB and its counterparts elsewhere to rethink their approach of classifying claims as either no-lost-time or lost-time. If the distinctions between two types of claims are not as clear-cut as they once might have been, then the categories are not as useful in painting a picture of how well workplaces are performing in primary prevention, says Smith.

"We should collect information that tell us whether no-lost-time claims are for relatively minor injuries, or injuries that require periods of modified or alternate duties," he adds.

"Differentiating between these two types of no-lost-time claims will let us know if firms are preventing serious injuries from occurring, or just preventing absences following an injury."

Employer supports improve function and productivity of workers with arthritis

Institute for Work & Health study finds not everyone needs accommodation, and that different accommodations meet the needs of different individuals

It's often a struggle for people with arthritis to manage their health condition and not let it interfere with work. Although symptoms of pain and stiffness are often intermittent and treatment options have improved, the chronic condition can result in missed meetings, late starts, and unproductive or missed days when flare-ups occur. Without workplace support, a diagnosis of arthritis can even end up forcing people out of a job.

However, a new study about workplace supports for people with arthritis suggests that many affected workers don't feel they need frequent help.

The study, conducted by the Institute for Work & Health (IWH), also finds that the benefits and accommodations needed ranging from extended health benefits to flexible working hours—are often already being offered by employers. Further, people who are able to access them often report better outcomes at work. That can mean less job disruption, greater ability to concentrate on tasks and fewer changes to work hours.

"Our study suggests that providing benefits and accommodations to workers with arthritis improves work participation," says Dr. Monique Gignac, an IWH senior scientist and lead author of the study. "It also suggests that providing such support is unlikely to drain company resources."

Workers surveyed

The study, entitled "Availability, need and use of work accommodation and policies," has been accepted for publication in the journal *Arthritis Care and Research*. It's the first to look in detail at what workers with arthritis need in terms of benefits and accommodations at work, what is available and what is actually used.

Even more tellingly, the study provides a glimpse into whether the need, availability

and use of specific supports may actually help people do their work.

The study involved interviews with 219 working individuals who were 25 years or older, living in Ontario or British Columbia, and had a diagnosis of osteoarthritis or



inflammatory arthritis. The sample contained a broad range of individuals in terms of the types of jobs and industries they worked in. The participants also varied in their health conditions; though all had arthritis, some experienced no disability whereas others experienced a fair amount of pain, fatigue and functional limitations. The study asked participants about their access to and use of benefits (i.e. extended health benefits and short-term leave) and accommodations (i.e. flex-time, modified schedules, equipment adaptations and work-at-home opportunities).

Overall, only a small proportion reported not being offered any benefits or accommodations (5.5 per cent). That's a positive indication of the level of support that Canadian workplaces are already providing (see Table 1 below). Also noteworthy is that one quarter to nearly two thirds of respondents said they didn't need various types of benefits or accommodation for their arthritis—a sign that not everyone with arthritis finds the condition disabling.

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TABLE 1: NEED, AVAILABILITY AND USE OF BENEFITS AND ACCOMMODATIONS

The IWH study asked 219 workers with arthritis about the workplace benefits and accommodations they needed and used. The table below indicates for each type of support the percentage of participants who did not need it, who needed and used it, or who needed but did not use it—often because the support was not available.

Benefits and job accommodation	Not needed (%)	Needed and used (%)	Needed and not used (%)
Extended health benefits	25.1	50.2	24.1
Short-term leave	64.8	26.0	9.1
Flexible hours/flex-time	48.0	41.1	11.0
Modified schedules	61.2	24.7	14.2
Special equipment	49.8	41.6	8.7
Work-at-home arrangements	64.8	25.6	9.6

TABLE 2: THE LINK BETWEEN WORKPLACE SUPPORTS AND WORK OUTCOMES

The IWH study of 219 workers with arthritis analyzed the link between the use of benefits and accommodations and several work outcomes. The \checkmark s in the table below indicate programs that were linked with statistically significant better outcomes, when comparing people who needed and used the programs to people who needed but didn't use them.

This study used several different ways to measure how participants' health conditions affected their work. These were:

• Workplace Activity Limitations questionnaire: a 12-item survey asking about the difficulty people had with a range of tasks (e.g. getting to or from work, sitting for long periods, concentrating, keeping up with the pace of work).

- Job disruption: a 10-item questionnaire about job disruptions in the previous six months (from arriving late and leaving early to inability to make meetings or work desired shifts).
- **Productivity loss**: a question asking whether participants experienced productivity loss in the previous six months, scoring 1 for not at all to 5 for a great deal.
- **Absenteeism**: a question asking participants whether they had absences due to arthritis in the past six months (including time off for appointments).
- Reduced hours: a question asking participants whether they had permanently reduced their working hours due to arthritis (yes or no).

	Less workplace activity limitations	Fewer job disruptions	Less loss of productivity	Less absenteeism	Less likelihood to reduce hours
Extended health benefits	✓		✓		✓
Short-term leave	✓	 Image: A second s	✓		\checkmark
Flex time		✓			
Modified schedules	✓	✓	✓		
Special equipment					\checkmark
Work-at-home arrangements		1	1		\checkmark

Gignac's team found that no single benefit or accommodation was seen by everyone as the best. "A menu of policies and accommodations is going to be more useful in the long run," says Gignac. "Each of these supports may be helpful at least some of the time. There's not one benefit or accommodation where we can say, 'Well, employers shouldn't bother with that."

The greatest gap between need and availability was in extended health coverage, in which employer-paid health-care programs offer services not usually available through provincial health-care plans, such as physiotherapy, massage and some additional drug coverage. This benefit was the one needed by the largest proportion of respondents (three out of four), but also the one not used by the largest share (one in four) because it was not available.

Improved work outcomes

Looking at the characteristics of respondents who said they needed and used benefits, the team found no difference in terms of age, gender, job tenure or parttime/full-time status. However, college- or university-educated respondents were more likely to use benefits and accommodations, as were those who had told supervisors about their arthritis.

In general, people who worked in the sales and service sector or the trades, transportation and equipment operation sector had fewer benefits and accommodations available to them than people in other industries.

The study also analyzed the work outcomes of people who used their workplace supports compared to those who said they would have liked to use supports but they were unavailable. The study found different benefits and accommodations were related to positive workplace outcomes in different ways (see Table 2). Among the notable findings were:

- While most people didn't need short-term leave, those who needed it and used it reported fewer work limitations, job disruptions, productivity losses and reduced hours, compared to people who needed short-term leave but didn't use it.
- Supports such as special equipment, work-at-home arrangements, extended health benefits and short-term leave were associated with people less likely to reduce their working hours.
- Flexible hours were related to fewer job disruptions but made little difference to other types of outcomes.
- People who needed and used work-athome arrangements reported less job disruption, productivity loss and reduced hours compared to those who would have liked these arrangements but couldn't use them, largely because they were unavailable. What's more, using work-at-home arrangements seemed to put people on par with healthier participants who reported not needing these arrangements. "When people with disabling arthritis

were able to work at home, it appears their work productivity levels were just the same as people with arthritis who said 'I'm fine,''' says Gignac.

Although it looks like none of the accommodations examined were associated with reduced absenteeism, that may have been due to how absenteeism was measured. It was a yes or no question asking respondents whether they were absent at any time in the previous six months due to arthritis.

If respondents were absent for just one day, that shouldn't necessarily be seen as undesirable, says Gignac. "People with arthritis often tell us that to manage their disease, they need occasional absences for treatment and ongoing medical monitoring and tests. We need to better understand this 'good' absenteeism because it may help people remain working in the long term."

Because symptoms of arthritis tend to "flare" (i.e. come and go), Gignac notes that many people will not use benefits and accommodations all of the time, but having these policies available can make an important difference.

"There are things employers can do to help, and they're not things that employers have to design from scratch," says Gignac.

"A lot of these things are policies or practices that companies are doing for other employees, especially as people age and start to have health problems. But what we're finding is they can make a difference for people with arthritis as well."

Nachemson lecturer shared lessons from 20 years of tracking impact at NIOSH

Lecture by Dr. Paul Schulte examined efforts to measure impact at U.S. federal research agency

In the world of occupational health and safety research, much effort has been made in the last 20 years to evaluate the impact of research on workplace practices. While progress has been made, there are challenges remaining, and a clear understanding of the link between research findings and social or economic outcomes is still under-developed.

This is according to the director of education and information at the United States National Institute for Occupational Safety and Health (NIOSH), who was speaking at a lecture hosted by the Institute for Work & Health (IWH) in Toronto last November.

"We all know that it is difficult to assess the impact of guidance and research," said Dr. Paul Schulte, speaking at the 2014 Alf Nachemson Memorial Lecture. "There's a large gap between the conduct of research and the management of workplaces. Intervening factors—jurisdictional, social, legal, political factors—make it challenging at times for research evidence to be transferred into the decision-making of employers."

The annual lecture series was established in 2002 to examine the use of research evidence in decision-making. It's named after the late Dr. Alf Nachemson, a renowned Swedish orthopaedic surgeon and a founding member of IWH's Scientific Advisory Committee.

In his lecture, Schulte said that when NIOSH was first formed in the 1970s as the U.S. federal research agency tackling workrelated illness and injuries, little thought was put into how the agency would measure its impact.

"The hazards were too big. Impact assessment was not a priority; doing something about the hazards was the priority," he explained. And as seen in the decline over two decades of falling death and injury rates in the workplace, this intuitive approach to reducing exposure to hazards was the right approach—up to a certain point.

But improvements eventually slowed, giving rise to questions about the continued impact of NIOSH research and guidance on the more persistent hazards. The backdrop to this growing interest in impact was a shift in thinking about the relationship between science and society (with greater focus put on the application and utility of science), a recognition that knowledge is itself an asset that needs to be managed, and growing pressure on all federal departments and agencies to account for decisions on where to allocate funds.

Partnering with research users

Schulte outlined a number of initiatives taken within NIOSH over the years to measure impact. One initiative introduced in 2004, called "Research to Practice," placed a focus on knowledge transfer.

"We have to translate the findings of our science into practice. We have to be able to move people to action with our research," said Schulte. This thinking, he added, is so ingrained at NIOSH that researchers now try to obtain input from stakeholders before starting on a research study. "We ask, 'What are the problems you face?' We try to fashion the research to address that problem. And, consequently, when we are finished, we expect there will be stakeholders who use that research."

Another important internal initiative is called the National Occupational Research Agenda (NORA), which places partnerships with stakeholders at the very foundation of a research program. "It was based on the realization that no one agency could address all the occupational safety and health problems. There weren't enough resources. We had to partner around priorities that everyone could agree on," said Schulte.

Through these partnerships, called sector councils, stakeholders such as trade

associations, unions and insurance companies play a key role in helping set NIOSH priorities and goals across 10 sectors and 24 cross-sector programs. Sometimes stakeholder input is not merely overarching; it can get very specific, setting out activity goals and performance metrics. "This was one of the requests of many of the stakeholders in those sectors, and it has been a very effective means of developing programs, and communicating and translating research to practice," said Schulte.

In another impact assessment initiative, NIOSH engaged the National Academy of Sciences to conduct a review of the agency's eight major programs. This was an extensive effort, he said, but it showed that all of the programs were having significant impact.

However, Schulte noted that impact science remains in development, especially when it comes to understanding what happens between output and outcome. "The linkage between outputs and outcomes is mediated by a lot of factors. We don't control what happens at the companies, on the factory floors or in the workplaces," he said.

Schulte also acknowledged that there are limits to how far impact science can go. Citing the words of another academic on research assessment, he said research outputs enter a pool of knowledge that's fed by many sources, and the effort to track the impact of each drop in the pool can end up costing more than the cost of conducting research in the first place. But on balance, he added, the world of occupational health and safety research needs to invest more into understanding impact.

"We need to improve impact science, define it better, and figure out what kinds of capacity building, what kinds of methods or approaches we can use," said Schulte. "And it's not just so that we can say we're doing the most important things and making a difference. It's so we can make a better difference."

To see Schulte's lecture as a slidecast, go to: www.iwh.on.ca/nachemson-lecture. ■

Work-related injuries decline in Ontario but no reduction found in non-work injuries

Study of injury trends in Ontario finds divergence in work-related and non-work injury rates

Work-related injury rates in Ontario fell by 30 per cent over an eight-year period from 2004 to 2011, according to a recent study by the Institute for Work & Health (IWH). In contrast, rates of injuries caused by leisure and other non-work activities did not change.

If non-work injury rates had fallen to the same extent as work-related injury rates, the result would have been 200,000 fewer injuries a year in the province, says Dr. Cameron Mustard, a co-author on the paper led by Dr. Andrea Chambers. The study is published in the February 2015 edition of the American Journal of Public Health.

"Many of us don't realize, perhaps, that injury is a very substantial cause of death and disability in Canada," says Mustard, a senior scientist and president at IWH.

"One key message coming out of this study is that injuries are absolutely preventable. A decline of 30 per cent in work-related injuries in just eight years is evidence that prevention efforts can have an impact."

Two data sources

Injury is the leading cause of death among Canadians under the age of 45. Across all ages, injury is responsible for 10 per cent of the economic burden of illness in Canada—a burden roughly equivalent to that of cancer or to cardiovascular disease.

To chart injury trends over the eight years, the authors drew on two sets of data.



Photo ©iStockphoto.com/Maridav

Q&A ON OCCUPATIONAL VERSUS NON-OCCUPATIONAL INJURY TRENDS

Q: Could the decline in injury rates be due to workplaces not reporting injuries to the Workplace Safety and Insurance Board (WSIB)? Or could it mean the WSIB is accepting fewer claims?

A: This study did not consider workers' compensation claims. This study is based on emergency department records where clinical staff determined there was a work-related cause in the course of taking a medical history. It also uses responses to Statistics Canada's Canadian Community Health Survey, which asked people whether they experienced an injury serious enough to limit normal activity, whether the injury occurred at work, and whether the injury was serious enough to seek medical help. Respondents who answered yes to all three were included in this study.

Q: Could the decline in workplace injuries be explained by a slowdown in the economy?

A: The findings in this study show that the 2008-2009 recession did indeed have an impact, but the decline in work-related injury rates is seen well before the financial crisis. Recessions do result in lower work injury rates. There may be several reasons for this. In an economic slowdown, the first to lose their jobs are young and inexperienced workers—the very same groups of workers with the higher injury rates. Recessions also bring about a slower pace of work. For a more detailed discussion of this link, see our *Issue Briefing* on the topic: www.iwh.on.ca/briefings/business-cycle and www.iwh.on.ca/ briefings/workers-compensation-claims-and-the-recession.

One contains records of all emergency department visits, which Ontario hospitals have been required to report since 2000. The other was the Canadian Community Health Survey, a series of surveys that Statistics Canada has conducted once every two years among a representative sample of working-age adults.

The first data source, the emergency department records, has been shown in an earlier IWH study be a reliable source of surveillance data on work-related health problems. The second data source has the advantage of asking identical questions about the incidence of injury since 2001. As such, it too fits the criteria for an ideal health surveillance instrument—i.e. one that collects health information consistently over time in a representative sample of the population.

Parallel declines for some injury types

For a few specific causes of injury, the researchers found parallel declines in both work-related and non-work injuries. These included injuries due to motor vehicle collisions, natural or environmental causes, and intentional self-harm. However, for all other specific causes of injury, the study found no important reduction in injuries sustained in leisure and non-work activities.

One possible reason for the diverging trends between work-related and non-workrelated injuries is the level of investment in injury prevention, suggests Mustard.

"Some estimates suggest that employers may spend as much as \$1,000 per worker per year to prevent work-related injury and illness among their employees," says Mustard. "As a society, we invest perhaps a tenth of this amount in protecting children, adults and seniors from the causes of injury in non-work settings. This low level of investment should concern us."

The study, "Diverging trends in the incidence of occupational and non-occupational injury in Ontario 2004-2011," can be accessed at doi:10.2105/AJPH.2014.302223. To see a video about the study, go to: http:// youtu.be/tc2zAi6wSw0.

AT WORK

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Higher risk of death among impaired seen most starkly after 10-year mark

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been shown to affect opportunities in the labour market.

Matching injured with 10 controls

Research shows between 18 and 28 per cent of serious injuries experienced by adults in Canada take place at work. One in 10 individuals who report a work injury experience some degree of permanent impairment.

This study by Scott-Marshall used an innovative technique to link a set of data kept by Statistics Canada with another database held by the Workplace Safety and Insurance Board, the workers' compensation agency for Ontario. It took a sample of 19,000 Ontarians whose work-related injury left them permanently impaired, and followed their outcomes for up to 19 years.

To set up a comparison or control group, the study team paired each individual in the injured sample with up to 10 other people who did not experience a work injury but shared similar characteristics such as age, sex, place of residence (region), and income level (for each of the four years before the year of injury). All identifying information was removed.

The study found the overall rate of death in men with permanent impairments was 14 per cent compared to nine per cent in the non-injured control group, representing a 55-per-cent higher risk of mortality. For women, the death rate among those with permanent impairments was six per cent compared to four per cent in non-injured controls—a 50-per-cent higher risk of mortality.

These higher risks of death persisted even after controlling for multiple factors that can bear on risk of death. After taking factors such as age, income and marital status into account, the study found that impaired women still faced an almost 30-per-cent higher risk of dying during the follow-up period compared to their non-impaired counterparts. Among impaired men, after controlling for these factors, the risk of dying was still 22-per-cent higher. Work disability was found to play a key role in this increased mortality risk. To gauge the extent of work disability among people with permanent impairments from work, the research team looked at how much they earned post-injury in relation to pre-injury earnings.

Comparing low versus high disability

The team found that women with a work-related permanent impairment who experienced no or low work disability (i.e. who earned at least 75 per cent of their pre-injury income) were 27 per cent less likely to die in the follow-up period than women with high work disability (those earning less than 25 per cent of their pre-injury income). Among men with impairments, those with no or low work disability were 38 per cent less likely to die than those with high work disability.

This higher risk of death showed up most starkly a decade or more following the injury, with the divergence in death rates between claimants and controls peaking after 13 years in women and after 15 years in men. "This suggests to us that the risk of dying from a disabling injury can persist for decades," says Scott-Marshall.

For both men and women, a disabling injury at a young age (25 to 39) meant a higher likelihood of premature death. "This again probably ties into work disability and the fact that younger people may have greater difficulty getting back to work," says Scott-Marshall.

"It could be that people at a younger age are less established in the labour market when they got injured. Or maybe the type of work they do is more physical and less easy to go back to after the injury. These are only speculations for the time being, and further research will tell us more."

Scott-Marshall's study, entitled "Longterm mortality risk in individuals with permanent work-related impairment," can be accessed at: http://journal.cpha.ca/index. php/cjph/article/view/4535.