

Are workplace prevention programs effective?

Injury/illness prevention and loss control programs (IPCs) are carried out in workplaces for several reasons: they protect workers, meet regulatory requirements, reduce the negative effects of injuries and manage costs. Employers establish *prevention programs* proactively to reduce the frequency of injuries. *Loss control programs* are put in place to reduce the costs and disability associated with injuries. IPCs include three P's – work **practices** among employees, **policies** developed by employers and **programs** required by regulation.

Employers can select from a variety of workplace IPCs. Their choices are often guided by regulatory needs and product marketing, rather than by scientific evidence that shows which programs actually work. There has been a great deal of research on IPCs, and it can be a challenge for employers to keep up with the results.

To help employers and labour groups make decisions on programs out of this large volume of research, the Institute for Work & Health conducted a systematic review on IPCs. The review included studies that looked at the effectiveness of IPCs on reducing workplace injuries, in terms of their frequency and/or severity.

At the start of the review, we consulted with practitioners, policy-makers and other stakeholders on the review questions. These same stakeholders were invited back later to provide feedback about the review results, to ensure they were framed in a way that would be useful to employers. Overall, stakeholders from 14 organizations in Ontario, Canada and Texas, U.S.A. participated.

Key messages

There is strong evidence supporting the effectiveness of disability management/return-to-work programs.

We recommend the development of multi-component disability management programs, using an approach that involves the health-care provider, company supervisors and workers, and workers' compensation carriers.

There is moderate evidence supporting the effectiveness of:

- workstation adjustments with ergonomic training
- supervisor practices to support safety
- exercise programs.

There is moderate evidence showing that workstation adjustments or ergonomic training, done on their own, have no effects.

In workplaces, a practice to consider is combining workstation adjustments and ergonomic training.

The reviewers studied the following question:

Are injury/illness prevention and loss control programs effective in reducing workplace injury/illnesses and/or workers' compensation claims?

How was the review conducted?

Our review team searched six databases to find studies on IPCs. Search terms were identified in three broad areas: injury/illness prevention and loss control programs, worker or work setting and injury/illness outcomes.

Initially we identified 12,393 articles. From these articles, 72 were found to be relevant and would

help answer the review question. These articles were assessed on the quality of the scientific methods that the researchers used. The higher the quality of the methods, the higher the confidence we have that the results reported were due to the program, and not to something else happening in the workplace. At this stage, 53 articles were rated to be of medium or high quality, and they were moved to the next phase of review. From these studies, only 46 did appropriate statistical testing, and only the results from these studies were analyzed further.

We used the following criteria to describe the overall level of evidence for a program:

Level of evidence	Minimum quality	Minimum quantity	Consistency
Strong	High ($\geq 85\%$)	≥ 3 studies	All high quality studies have consistent findings.
Moderate	Medium (50-84%)	≥ 2 studies	Majority of medium quality studies have consistent findings.
Mixed	Medium (50-84%)	≥ 2 studies	Medium and better quality studies have inconsistent findings.
Partial	Low (0-49%)	≥ 2 studies	Majority of low quality studies have consistent findings.
Insufficient		The above criteria are not met	

What were the main findings?

There was a great deal of diversity in where the studies were done and who participated. More than half of the studies were conducted in North America. Office settings and data entry jobs were the most common industry and job function studied. Policy and program interventions tended to have more participants, and were carried out for a longer period of time.

The programs were evaluated for their effects on injuries, illnesses and workers' compensation claims/costs. Ten studies reported on controlling injuries and/or costs by evaluating return to work, days lost, number of claims or costs of claims.

Eight studies reported on injury rates, while 25 studies reported on symptoms or pain. The program and policy studies typically focused on injury or claim rates while the "practice" interventions looked at pain or symptoms.

Eight studies focused on **return-to-work/disability management programs**. Two of these were high quality and six were medium quality. The high quality studies examined graded activity and rehabilitation. The medium quality studies included therapy, early intervention, and disability case management and RTW policies. Because they consistently found positive effects, there is a strong level of evidence for RTW/DM programs on controlling injuries/illnesses and workers' compensation claims.

Supervisor practices were examined in two studies, both of medium quality. In one study, which involved a workshop on supervisor practices, there was a reduction in injury/illness and workers' compensation claims. The second study provided training, questionnaires and feedback, and resulted in fewer minor injuries. There is a moderate level of evidence supporting the finding that supervisor practices have a positive effect on reducing injuries.

Three studies looked at **workstation adjustments and ergonomic training**. All showed positive effects. One study was considered high quality, and two were of medium quality. The studies all provided ergonomic adjustments to participants' offices and training focused on ergonomics. There is a moderate level of evidence that workstation adjustments and training have a positive effect on reducing injuries.

However, **workstation adjustments alone** showed no effect. The same was true of **ergonomic training alone**. In each category, there is a moderate level of evidence showing that either approach on its own has no effects on injuries.

Exercise interventions were the focus of three medium quality studies. One study was of a workplace program with a home exercise regimen

that was tracked at work. The other two studies were on physical fitness training in the workplace. Two studies showed positive effects on reducing injuries, indicating a moderate level of evidence for exercise.

There is a mixed level of evidence – meaning there were inconsistent findings – for the following categories:

- **Policy (employer-level).** There were three studies of different policies. A back belt policy had no effects. Hearing protection had positive effects for mandatory policies and no effects for voluntary policies. Pre-employment strength testing had positive effects for musculoskeletal injuries and costs, and no effects for non-musculoskeletal injuries.
- **Data entry devices.** There were three studies of office data entry devices. A trackball had no effect on arm/hand symptoms or pain severity in two groups of study participants, and positive effects in another group, but only for the non-mousing side of the body. An alternative keyboard showed positive effects compared to a conventional keyboard. One split keyboard also showed positive effects, but two other split keyboards had no effects.
- **Arm supports.** There were two studies, with one showing positive effects and the other no effects.
- **Training (manual lifting).** Of three studies, one found no effects and one had positive effects on back pain. The third study looked at costs and found positive effects compared with no training, but had no effects compared to a daily exercise group.
- **Programs (required by regulation).** There were five studies on programs required by regulation. Logger safety training had no effect on workers' compensation claim rates. Fall protection and eye protection had positive effects on injury rates. Hearing protection and drug testing showed no effect on injury rates.

What is a systematic review?

A systematic review is a type of study. It aims to find an answer to a specific question using existing research studies. Reviewers assess many studies, select relevant, quality studies, and analyze the results. The review normally includes the following steps:

- determine the review question
- develop a search strategy and search the research literature
- select studies that are relevant to the review question
- assess the quality of the methods in these studies and select studies of sufficient quality
- systematically extract and summarize key elements of the studies
- describe results from individual studies
- combine results and report on the evidence

To help shape the review question and frame our findings, we rely on feedback from non-research audiences who are interested in the specific topic.

The Institute for Work & Health has established a dedicated group to conduct systematic reviews in workplace injury and illness prevention. Our team monitors developments in the international research literature in this field and selects timely, relevant topics for review.

We appreciate the support of the Ontario Workplace Safety and Insurance Board (WSIB) in funding this four-year Prevention Systematic Reviews initiative.

Across all types of interventions or programs, the results suggest a mixed level of evidence for the effect of injury/illness prevention and loss control programs. Taken alone, however, the RTW/DM programs – those focused on reducing the duration of injuries, injury costs and insurance costs – show a strong level of evidence for positive effects on both the duration and costs of injuries/illnesses. This finding agrees with another IWH systematic review headed by Dr. Emile Tompa. It showed that return-to-work programs have positive effects and cost benefits.

Programs that were effective, and supported by moderate and strong levels of evidence, typically focused on *multi-component programs* rather than on a specific employee practice. For instance, when workstation adjustments and ergonomic training were combined, there was moderate evidence to support a positive effect. This finding was seen in another IWH systematic review led by Dr. Benjamin Amick, which looked at preventing musculoskeletal disorders in health-care workers.

The interventions supported by a mixed level of evidence typically focused on practices or policies, and not on programs.

What were some other issues that emerged?

Programs with a mixed or moderate level of evidence should be of particular interest to researchers, funders, labour and employers participating in research. For these categories, adding one or two high quality studies could have shifted the level of evidence from mixed to moderate, or moderate to strong.

Many of the studies in the review focused on office environment studies, while other sectors were under-represented. One potential action for researchers and stakeholders would be to start a dialogue on how to complete high quality research in these sectors, which include the industrial, construction, service and transportation sectors. They could also discuss which programs, policies and practices should be studied.

Conclusions

A **strong level of evidence** was found for return-to-work/disability management programs (RTW/DM), which have a positive effect on injuries/illnesses and workers' compensation claims/costs.

A **moderate level of evidence** was found for five types of policies and practices.

- Supervisor practices have a positive effect on reducing injuries/illnesses.
- Workstation adjustments and training have a positive effect on reducing injuries/illnesses.
- Exercise has a positive effect on reducing injuries/illnesses.
- Workstation adjustment alone has no effect on reducing injuries/illnesses.
- Ergonomics training alone has no effect on reducing injuries/illnesses.

These findings are based on the report *A systematic review of injury/illness prevention and loss control (IPC) programs* by Shelley Brewer, Eden King, Benjamin C. Amick III, George Delclos, Jerome Spear, Emma Irvin, Quenby Mahood, Linda Lee, Cindy Lewis, Lois Tetrick, David Gimeno and Renee Williams.

The other reviews described in this report are:

A systematic review of OHS interventions with economic evaluations by Emile Tompa, Roman Dolinschi, Claire de Oliveira and Emma Irvin.

Interventions in health-care settings to protect musculoskeletal health: A systematic review by Benjamin C. Amick III, Jessica M. Tullar, Shelley Brewer, Quenby Mahood, Emma Irvin, Lisa Pompeii, Anna Wang, Dwayne Van Eerd, David Gimeno and Bradley Evanoff.

Full reports and summaries for all these reviews are available at:

www.iwh.on.ca/sr/systematic_review.php

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