

Is it worthwhile investing in health and safety programs?

Before employers invest in workplace health and safety interventions, they want to know the financial implications of their investment. The goal of this review was to explore whether such interventions are worthwhile from an economic point of view. To find an answer, we conducted a systematic review of studies of workplace-based health and safety interventions that also had an economic analysis.

An economic evaluation is a study in which a researcher or decision-maker assesses the costs and consequences of a particular intervention and its relevant alternatives. In general, most studies of occupational health and safety (OHS) programs do not undertake an economic evaluation.

Our review sought to answer the following question:

What is the credible evidence that incremental investment in health and safety is worth undertaking?

How was the review conducted?

Our review team searched five journal databases to find research studies. Initially, we identified 12,903 articles. We then looked at these articles to see which findings would help answer the review question. After this stage, 67 articles remained.

Our review included studies of interventions in both primary and secondary prevention. "Primary prevention" refers to interventions focused on reducing and preventing work-related injuries and illnesses before they occur. "Secondary prevention" describes interventions

Key messages

There is strong evidence supporting the economic benefits of:

- disability management programs carried out in multiple sectors
- ergonomic programs and other interventions to prevent musculoskeletal disorders (MSD) in the manufacturing and warehousing sector.

There is moderate evidence supporting the economic benefits of:

- ergonomic and other MSD prevention programs in the following sectors: health care, transportation, and administrative and support services.

that aim to reduce and prevent disability in workers who already have a work-related illness or injury.

Within these 67 articles, 72 different interventions were evaluated. We did a quality assessment of the evaluations of these 72 interventions. The reviewers gathered key information from each study, such as the type of program, health effects and financial impact.

As part of the review, we also consulted with stakeholders who had an interest in the topic. The stakeholders helped us refine the review question and organize our findings in a way that would be more useful in practice.

We reported our findings based on the evidence found in medium and high quality studies. The higher the quality of the study, the greater the confidence we have that the findings are due to the OHS program, and not to chance.

We used the following criteria to describe the level of evidence:

Level of evidence	Criteria
Strong	Three high quality studies agree on the same findings.
Moderate	Two high quality studies agree. OR Two medium quality studies and one high quality study agree.
Limited	There is one high quality study. OR Two medium and/or high quality studies agree.
Mixed	Findings from medium and high quality studies are contradictory.
Insufficient	There are no high quality studies, only one medium quality study, and/or any number of low quality studies.

Note: for more details, please see the full report.

What were the main findings?

There were many types of OHS programs in different industries. Our stakeholders helped us to organize these diverse findings in a way that was relevant: by industry and by type of intervention. The interventions took place in the following industries:

- health care and social services – 25 studies
- manufacturing and warehousing – 16 studies
- administrative support services – eight studies
- interventions undertaken in multiple sectors – seven studies
- transportation – three studies
- public administration – four studies
- mining and oil/gas extraction – three studies
- accommodation and food – two studies
- retail trade; education; information and culture; utilities – one study each.

There were six types of interventions:

- ergonomic and other musculoskeletal (soft-tissue) disorder prevention programs

- occupational disease prevention programs
- disability management programs
- multi-faceted programs, which included two or more types of interventions
- health promotion programs
- programs to reduce violence in the workplace.

Some studies focused on primary prevention, others on secondary prevention, and others on both. The most common type of intervention was ergonomic and other MSD prevention programs, followed by disability management programs.

Certain types of interventions were more frequent in certain sectors. For example, ergonomics interventions were the most common type in manufacturing and warehousing, with nine studies. In health care, both occupational disease prevention and ergonomic interventions were common, with five and 11 studies respectively.

The interventions ranged in scale and intensity. Some were labour or time intensive, such as participatory ergonomics teams or exercise programs. Others were capital intensive, such as the introduction of patient lifts in hospitals.

The main economic outcome or result that was considered in these studies was workers' compensation expenses. These expenses included wage replacement for workers and health-care expenses. We also found that most studies took the perspective of the employer. This means that only the costs and outcomes that applied to the firm or employer were considered in the analysis.

We found enough evidence to make the following conclusions:

Health care and social services

In the health-care sector, there is **moderate evidence** that **ergonomic and other MSD prevention programs** are worth undertaking for economic reasons. There were 11 studies in this category. Four were of medium quality, and the rest were of low quality. Most of these studies looked at the use of mechanical ceiling lifts. These lifts are used to move and transfer patients as a way of preventing

injuries in health-care workers. Some studies examined other approaches to reducing back injuries, such as lifting teams, ergonomic training on techniques to move and transfer patients manually, or exercise programs to increase back strength.

Also in the health-care sector, we identified five **occupational disease prevention interventions**. Three were of medium quality and two were of low quality. One type of intervention was needle-stick injury prevention programs. The other was the replacement of powdered latex gloves with powder-free gloves. There is **moderate to limited** evidence that such interventions are worth undertaking for their financial merits.

Administrative and support services

We identified eight studies of **ergonomic and other MSD prevention programs** in the administrative and support services sector. Two evaluations were of high quality, one was of medium quality, and five were of low quality. This translates into **moderate evidence** that such programs are worth undertaking based on their financial merits. The benefits may be due to a decline in how often injuries occur or how severe they are. This ultimately results in reduced costs and productivity improvements.

Manufacturing and warehousing

There is **strong evidence** that **ergonomic and other MSD prevention programs** are worth undertaking in the manufacturing and warehousing sector. There were nine interventions in this category. Three were of high quality, two were of medium quality, and the rest were of low quality.

Also in this sector, there is **limited to mixed evidence** of negative findings for **multi-faceted programs**. There were a total of four interventions, with two of medium quality, and two of low quality.

Transportation

The last area with evidence was **ergonomic and other MSD prevention programs** in the transportation sector. There is **moderate evidence**

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 research question
- develop a search strategy and search the research literature
- select studies that are relevant to the research 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 research question and frame our findings, we rely on feedback from non-research audiences who are interested in specific topics.

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.

that such interventions result in improved economic returns. In this category there were three interventions. One was of high quality, and two were of medium quality. Interestingly, each was undertaken in a different country, namely the United States, the Netherlands and Australia.

Multiple Sectors

There is **strong evidence** that **disability management programs** carried out in multiple sectors are worth undertaking based on economic analyses. There were five such interventions in total. Four were of high quality, and one was of low quality. All the high quality studies were evaluated from the perspective of an insurer, such

as a compensation board, or other system-level organizations. So in any given study, the interventions took place in more than one sector, and the results apply to multiple sectors.

What was missing in the studies?

In conducting this systematic review we found that there were often critical pieces of information missing in studies as well as inappropriate assumptions. For example, many assumptions were made about the size of health and financial effects of particular programs without sufficient statistical analysis to validate them.

The main lessons for future researchers in this area are:

- ensure that an evaluation considers all possible health outcomes, their probabilities and the expenses associated with them;
- rather than making unfounded assumptions, consider filling information gaps with data from published studies of high quality;
- consider all the core aspects of a comprehensive economic evaluation and include these details when writing about an evaluation;
- recognize that an economic analysis is a vital part of evaluating health and safety interventions, and should not be treated as a sidebar issue.

Conclusions

Our main goal in this systematic review was to understand the evidence on the costs and consequences associated with workplace health and safety programs. We have been able to directly respond to our review question. There is:

- (1) strong evidence supporting disability management interventions undertaken in multiple sectors by an insurer, government agency or other system-level organization
- (2) strong evidence supporting ergonomic and other MSD prevention interventions in the manufacturing and warehousing sector

(3) moderate evidence supporting ergonomic and other MSD prevention interventions in the administrative and support sector

(4) moderate evidence supporting ergonomic and other MSD prevention interventions in the health-care sector

(5) moderate evidence supporting ergonomic and other MSD prevention interventions in the transportation sector

(6) moderate to limited evidence supporting occupational disease prevention interventions in the health-care sector

(7) limited to mixed evidence of negative findings for multi-faceted interventions in the manufacturing and warehousing sector.

This review is unique in that it is the first to examine this topic in a systematic and comprehensive fashion. It begins to fill the current gap in the research on the financial merits of OHS programs. It also provides insight into which sectors and types of interventions need to include economic evaluations in future studies.

These findings are based on the report *A systematic review of OHS interventions with economic evaluations* by Emile Tompa, Roman Dolinski, Claire de Oliveira and Emma Irvin.

The full report is available at:

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

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