Title registration for a review proposal:
Safety Interventions for the Prevention of Accidents in the Work Place.

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TITLE OF THE REVIEW

Safety Interventions for the prevention of Accidents in the Work Place

BACKGROUND

Briefly describe and define the problem

Estimates of accidents at work show that such accidents result in over 300,000 annual worker deaths worldwide and cause even more cases of disability (Concha-Barrientos, Nelson, Fingerhut, Driscoll, & Leigh, 2005). In the European Union these fatalities amount to nearly 5000 cases alone annually, with a much higher number of disability cases each year (Eurostat, 2004b). In addition to human costs these deaths and injuries also constitute an economic burden to society (Eurostat, 2004a). Although the risks of an accident at work have been reduced over the last 20-30 years, the number of accidents remains unacceptably high, and therefore they receive much attention from a wide spectrum of policy and decision-makers. Nonetheless, we still lack knowledge as to which interventions and programs are the most efficient in reducing accidents in the workplace.
Over the last 10-15 years the safety science literature has emphasized the multidimensional characteristics of risks to workers, and the understanding of how to prevent accidents at the workplace (Reason, 2004; Lund & Aarø, 2004). This development is referred to as the “third age of safety” (Hale & Hovden, 1998). Whereas accidents previously were seen from a technical, legal or human factors perspective, in recent years cultural and organisational factors have become important additional perspectives included in safety intervention programs in the workplace (Spangenberg, 2010; Grote, 2007).

Safety interventions for the prevention of accidents at work are thus characterised as a complex process, which usually integrates a number of components (e.g., safety campaigns, safety training, legislation or machines guarding). Research has emphasised the importance of integrating these various components in order to achieve a high level of safety at work (Gaugstello 1993; DeJoy, 2005). A review of safety intervention programs by Lund and Aarø (2004) concludes that the largest effect is obtained by a combination of attitudinal, behavioural and structural approaches (multi-faceted interventions).

Systematic reviews of safety interventions in the workplace are, however, limited in number, not up to date, not comprehensive, and in particular reviews include interventions covering different levels and components are lacking (Lund et al., 2004; Cooper, 2007). The effectiveness of preventing accidents at work remains unclear (Lipscomb 2003), despite earlier attempts to summarize the effectiveness of safety interventions. Previous reviews looked at one type of injury, for example, eye injuries (Bonnie & Leslie, 2000; Lipscomb, 2000), or one type of prevention measure (Tuncel, Lotlikar, Salem, & Daraiseh, 2006; Cameron & Duff, 2007), or focused on the prevention of one type of event, for example, falling (Hsiao & Simeonov, 2001; Rivara & Thompson, 2000), or focused on one industry, for example agriculture or construction industry (Lisa & Risto, 2000; Marika et al., 2008; Rautiainen et al., 2008).

This systematic review will summarize the most up to date scientific evidence on the effectiveness of the main types of safety interventions to prevent accidents at work, i.e., modifications of attitudes, behaviour, climate or structural approaches. (Lund et al., 2004). The present systematic review will thus fill the gap in the extant knowledge on the effectiveness of safety interventions for prevention of accidents in the workplace.
**Briefly describe and define the population**

In this review accidents at work are understood as accidents causing physical harm (injury) to people in the work place, and thus leave out accidents in leisure, traffic and third parties accidents related to work, e.g., hospital patients, clients, pedestrians and the public in general. Both public and private work places, and employees from all sections, including self-employed, are included. The review includes fatal and nonfatal accidents at work.

We use the following definition of an accident in the work place:

An accident in the work place is defined as "*a discrete occurrence in the course of work which leads to physical harm*" (European Commission, 2001, p. 12). This includes cases of acute poisoning and willful acts of other persons but excludes deliberate self-inflicted injuries and accidents on the way to and from work (commuting accidents). The phrase "*in the course of work*" means whilst engaged in an occupational activity or during the time spent at work, including cases of road traffic accidents during the course of work (European Commission, 2001 p. 13).

This review excludes accidents causing mental harm, i.e., PTSD (post traumatic stress disorder) and other types of mental harm.

**Briefly describe and define the intervention**

This review will only include primary safety intervention programs. Secondary and tertiary interventions, e.g., on-site injury treatment, rehabilitation and return to work programs will be excluded. Public safety campaigns directed at the general population and community-based safety interventions will also be excluded from the review, as they are not primarily implemented at workplaces.

The focus of this review is on interventions that are intended to affect risks and safety at work, which can have consequences for occurrence of accidents causing physical harm (injury) to people at work, and in turn have consequences in terms of disability, absence, days lost, and cost.
In this review we define safety interventions as measures deliberately applied to decrease the frequency or severity of accidental injuries in the workplace. A safety intervention may consist of a single component such as a safety campaign within the workplace aimed at changing attitudes, or safety training aimed at changing behaviour or it can consist of a combination of such components, involving safety climate, attitudinal, behavioural or structural components.

A safety intervention may run for a shorter or longer period of time or represent a permanent change, as for example new regulations or legislation. A safety intervention program can be initiated at the workplace by the employer or the employees, or initiated from outside the workplace by public authorities, social partners or other stakeholders. However the intervention must take place and be aimed at improving safety in the workplace or during work.

**Outcomes: What are the intended effects of the intervention?**

*The primary outcome measures include:*

- Occurrence of work accidents causing harm to people.
- Number of lost working days, cases of work disability, and disability retirement
- Other outcomes related to the occurrence of work accidents measured as, e.g., time-to-event data (e.g., periods without work injuries followed by a work injury), or proxy outcome measures representing the occurrence of work accidents.

All sources of work injury data, including self-report, will be eligible.

*The secondary outcomes include:*

- Changes in behaviour and workplace risks (risk factors)
- Changes in attitudes, norms, climate, and culture (process factors).

All sources of data for risks and process variables will be included.
**OBJECTIVES**

The objective of this review is to assess the effectiveness of Safety Interventions in Preventing Accidents at Work (SIPAW):

- Compare safety interventions to no treatment, treatment as usual or alternative intervention.
- If possible examine (constituent) components of safety interventions which appear to enhance the effectiveness of Safety interventions in preventing accidents at the workplace.
- Point out needs for future safety intervention research.

**METHODOLOGY**

What types of studies designs are to be included and excluded?

**Types of studies eligible for inclusion**

We will include randomized controlled trials (RCTs), quasi-randomized controlled trials (QRCTs, i.e., participants are allocated by means such as alternate allocation, person’s birth date, the date of the week or month, case number or alphabetical), and non-randomized controlled trial (NRCT, i.e. participants are allocated by other actions controlled by the researcher).

We consider that random allocation is not feasible for all types of safety interventions in this field, e.g., legislative changes, and thus the non-randomized study designs (NRS, i.e., the allocation is not controlled by the researcher) will also be eligible for inclusion in the review (Lipscomb, 2005). The NRS-designs include observational studies, as, e.g., interrupted times series, or comparison of two or more groups of participants. Participants are allocated by means such as time differences, location differences, decision makers, policy rules or participant preferences.

The before-and-after design without control is a type of non-experimental design that is commonly used in safety science studies. Although it suffers from many threats to internal validity, it can provide preliminary evidence for intervention effectiveness, in particular when it is supplemented with complementary information (Robson, Shannon, Goldenhar & Hale, 2001). The design is most useful in demonstrating effects in short-term interventions, but less useful for evaluating longer term interventions, due to increased risks and threats to internal validity.
RCTs and quasi experimental designs (QED) will be analyzed separately. Before-and-after studies without a control group as well as case-reference and retrospective cohort studies will also be included in the review but they will not be included in the meta-analysis. We will describe and present these studies in the results section. The review will not include other reviews.

The comparison conditions are either a non-intervention group, a comparison group or groups with an alternative intervention. This does not apply to before-after studies without control and observational studies (including interrupted time series), where the comparison group could be the general working population or another relevant comparison group.

Narrative analyses of theoretical or conceptual model, safety intervention components, and fidelity of intervention will also be included, based on a systematic extraction and summary of key elements of the included studies. Finally, the review will discuss which safety intervention components appear to be most successful in enhancing the effectiveness of safety interventions at work.

**Methods of Synthesis**

We will conduct meta-analysis, where possible and appropriate. We will also conduct narrative analysis on process information.

**REFERENCES**


**SOURCES OF SUPPORT**

**Internal funding:**
None

**External funding:**
The review has received a grant of 1 Million Dkr. (134.000 €) from the Danish Work Environment Research Fund (Grant project number: 48-2010-09).

**DECLARATIONS OF INTEREST**

None known.

**REQUEST SUPPORT**

Do you need support in any of these areas (methodology, statistics, systematic searches, field expertise, review manager etc.?)

We might need a review manager (sparring).
**AUTHOR(S) REVIEW TEAM**

**Lead reviewer:**
The lead author is the person who develops and co-ordinates the review team, discusses and assigns roles for individual members of the review team, liaises with the editorial base and takes responsibility for the on-going updates of the review

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ROLES AND RESPONSIBILITIES

Please give brief description of content and methodological expertise within the review team. The recommended optimal review team composition includes at least one person on the review team who has content expertise, at least one person who has methodological expertise and at least one person who has statistical expertise. It is also recommended to have one person with information retrieval expertise.

Who is responsible for the below areas? Please list their names:

• Content: JDY, PKI, HJL, MTÖ, FWG, KNI, KRA, JLU, DZO
• Systematic review methods: JLU, JDY, OOL, FWG, KJM, KRA, HJL, SSP
• Statistical analysis: OOL, HJL, KNI, DZO, KJM
• Information retrieval: PKI, JDY and librarian, Elizabeth Bengtsen

PRELIMINARY TIMEFRAME

Approximate date for submission of Draft Protocol (please note this should be no longer than six months after title approval. If the protocol is not submitted by then, the review area may be opened up for other reviewers):

Title registration approval date: July 15, 2011