



Swedish Agency for Work  
Environment Expertise

# Psychosocial Work Environment: Health and Well-being – two systematic reviews

PSYCHOSOCIAL WORK ENVIRONMENT: HEALTH AND WELL-BEING  
– TWO SYSTEMATIC REVIEWS

Government commission to compile knowledge about factors that  
engender healthy and well-functioning workplaces A2018/01349/ARM  
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**Psychosocial Work  
Environment:  
Health and Well-being  
– two systematic reviews**

**This report is written by:**

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# Foreword

In June 2018, the Swedish government commissioned the Swedish Agency for Work Environment Expertise to compile knowledge about factors that engender healthy and well-functioning workplaces (A2018/01349/ARM). According to the commission, a special focus was to be placed on the organizational and social work environment. To carry out the commission, the Agency assigned a number of researchers from different universities and research institutions to prepare literature reviews in four areas: the physical work environment, focusing particularly on workload ergonomics; leadership; work organization; and the psychosocial work environment.

In the present report we present the compilation of knowledge about the psychosocial work environment. The compilation was prepared by Dr Per Lytsy, MD, PhD and Dr Emilie Friberg, PhD, at Karolinska Institutet. At the Agency's behest, Prof. Gunnar Bergström at Gävle University and Karolinska Institutet carried out quality assurance of the literature review, and Malin Almstedt Jansson, librarian at Gävle University, assisted our external experts in defining and gathering scientific supporting documentation for the literature review.

The authors of the literature review entitled the Psychosocial Work Environment: Health and Well-being conducted two systematic literature reviews of systematic reviews that, on an overall level, present results from association or intervention studies on psychosocial work environment factors and health. The results show not only that there are many systematic reviews in this area, but also that few systematic literature reviews include questions and conclusions that describe the psychosocial work environment in terms of healthy or protective factors. The authors also observe that one and the same association can be described as either a risk factor or a protective factor; consequently, the results reflect the questions and perspectives that have predominated in the research to date.

The authors of the literature review chose their own theoretical and methodological points of departure and are responsible for the results and the conclusions presented in the literature review.

I would like to express my deep gratitude to our external researchers, our quality assurance reviewer and our colleagues at the Agency who contributed to the preparation of this valuable literature review.

The literature review is published on the Agency's website and in the printed Literature reviews series.



Nader Ahmadi  
Director-General

## Our process model for systematic reviews

To support the researchers in their preparation of this literature review, the Swedish Agency for Work Environment Expertise developed a system for the systematic creation of literature compilations in its area of responsibility. It contains systems of preparation, literature search, relevance assessment, quality assurance and the presentation of studies and results. It also includes the Agency's process management and university library support, as well as external quality assurance.

At the Swedish Agency for Work Environment Expertise, Nadja Grees and, subsequently, Annette Nylund supervised the preparation of the literature review. Susanne Lind administrated the process, while a communications team consisting of Pernilla Bjärne, Sverre Lundqvist, Liv Nilsson, Joakim Silfverberg and Camilla Wengelin managed the text preparation, layout, accessibility considerations and planning of webinars and podcasts.

# Summary

This report contains two systematic literature reviews that bring together existing knowledge in the form of previously published systematic reviews. The report is intended to provide knowledge in relation to the question of what creates healthy, vital workplaces. The two systematic reviews compile the existing research on the factors in psychosocial work-environment contexts. The first contains compiled knowledge from association studies, that is, research about associations between psychosocial work environment factors and health outcomes for individuals and for organizations. The second review contains compiled knowledge about the effects of psychosocial workplace interventions, typically based on experimental research.

The results show that there is a significant amount of compiled research on associations between psychosocial work-environment factors in the form of work-related stress and mental or physical health issues. There is also compiled knowledge about associations between work conflicts or bullying and the development of mental health issues in particular. Only a few systematic literature reviews have expressly investigated and described findings assuming that psychosocial work-environment factors can be protective, or health-promoting, factors.

Regarding compiled research on interventions designed to influence the psychosocial work environment and create well-functioning workplaces, there is a great deal of compiled knowledge showing the effects of various stress reduction and stress management programmes. Most interventions are designed either to improve the participants' health by influencing their work situation and thus reducing their stress, or to increase the participants' ability to cope with their stress. There is also compiled knowledge about other types of generally health-promoting interventions designed to increase well-being, reduce or ma-

nage mental health issues, or improve sleep.

Much of the existing compiled knowledge indicates that the psychosocial work environment is important for the individual and that it is possible, through active workplace interventions, to promote employee health.

## Aim

In the report, the significance of the psychosocial work environment is investigated with two questions: The first question considers what existing knowledge is available in the form of relevant, well-conducted systematic reviews concerning the associations between psychosocial work-environment factors and various health-related outcomes for individual employees and for the organization. The second question considers what existing knowledge is available in the form of relevant, well-conducted systematic reviews that have investigated the effects of workplace interventions designed to influence the psychosocial work environment and health-related outcomes for the employees and for the organization. The inclusion of systematic reviews that have looked at actual workplace situations (that is, associations between psychosocial work-environment factors and health) and active interventions carried out at workplaces (effects of workplace interventions) provide a more comprehensive view of the total knowledge base as regards what has been studied in relation to the question of what creates healthy, well-functioning workplaces.

## Method

Both questions have been answered through searching and compiling existing knowledge in the form of systematic literature reviews. The search for systematic reviews was carried

out in three electronic databases. Systematic reviews that were deemed relevant and of good or moderate quality were included, while those deemed of low quality were excluded. The results of the systematic reviews included are also presented descriptively and organised by theme, creating an overview of the research that has been carried out and compiled on psychosocial work-environment factors and related interventions.

## Question 1. Results from association studies

A total of 42 relevant, well-conducted systematic literature reviews were included for the question concerning associations between psychosocial work-environment factors and different health-related outcomes for the employees and for the organization. Only a few systematic reviews had formulated their question or presented parts of their results in a way that psychosocial work-environment factors were expressed as healthy or protective factors. The absolute majority of the systematic reviews included had studied associations between psychosocial work-environment factors and the risk of developing health issues or consequences of health issues, such as long-term sick leave. The types of psychosocial work environment factors studied were primarily different types of strain resulting from stress (high demands, low control, low support, low compensation, injustice, social climate, etc.), and conflict and bullying. About half of the systematic reviews included had

studied associations between various aspects of the psychosocial work environment and mental health issues (primarily stress-related conditions, depression, anxiety and sleep problems), and the other half had studied associations between physical health issues (primarily cardiovascular disease, musculoskeletal complaints, and pain). Most of the systematic reviews based their results and conclusions on studies of employees in general; however, five systematic reviews focused on healthcare and veterinary care personnel, while one or two focused on workers in industry, police and correctional care, and occupational groups involved in disaster relief and rescue operations. Only one systematic review investigated associations between the psychosocial work environment and outcomes on the organizational level.

## Question 2. Results from intervention studies

Altogether, 44 relevant, well-conducted systematic literature reviews were included for the question concerning the effects of workplace interventions, that is, interventions intended to influence the psychosocial work environment and health-related outcome for employees and for the organization. The types of interventions conducted involved mainly different forms of stress-reduction or stress-management programmes, or different forms of health-promoting programmes, either targeting certain health issues specifically or more general in nature. There were

**Number of systematic literature reviews of association studies, by type of psychosocial exposure and outcome**

Type of psychosocial exposure	Type of outcome			
	Mental health, sleep, cognition	Physical health	Work-related outcome (individual)	Work-related outcome (organization)
Stress	19	19	5	1
Bullying	6	1		



also accounts of interventions to counter bullying, or to promote social support, work efficiency enhancement and the psychosocial climate at the workplace. A very large quantity of outcome measures were identified, and several of the authors of the included systematic reviews described having had difficulty finding comparable outcome measures in the primary studies. The large majority of outcome measures concerned mental or general health; however, stress- and work-related measures (on the individual or organizational level) also occurred frequently. The majority of the included systematic literature reviews reported several outcomes.

While a large proportion of the systematic literature reviews included interventions aimed at a general group of working people, many were carried out on healthcare workers specifically. Other occupational groups involved in the systematic reviews were police and correctional officers, and teachers. In the systematic reviews, effects were found from different types of stress-reducing interventions for stress, well-being and sleep. Reviews that analysed the effect of interven-

tions designed to influence the dimensions of demand and control found favourable health effects. Several of the systematic reviews presented greater intervention effects if the intervention had been implemented on multiple levels in the workplace – such as both the individual and the organizational levels – simultaneously.

## Conclusions

There was a fair amount of compiled research on both psychosocial work-environment factors and their links to well-being and to mental and physical health issues, as well as on workplace interventions that examined the effects of psychosocial workplace interventions. Particularly prominent was the compiled research on stress and bullying, and on stress-reduction and stress-management interventions. Few of the association studies looked at the significance of psychosocial workplace factors expressed as health-promoting or protective factors. Interventions, on the other hand, are “by

**Number of systematic literature reviews on effects of psychosocial workplace interventions, by type of intervention and outcome**

Type of intervention	Type of outcome				
	General health, physical health	Stress and mindfulness	Work-related outcome (individual)	Work-related outcome (organization)	
Stress management/ reduction	13	6	9	4	5
Bullying				1	1
Social support			1	3	3
Work efficiency enhancement, adaptations	2	4		2	2
Health, mental health, well-being, and return to work (RTW)	11	6	1	4	4
Psychosocial climate		3	1	1	2

nature” to a larger extent studying “positive” outcomes, such as improvements in various health outcomes. Much of the knowledge that exists indicates that the psychosocial

work environment is significant for individuals and that through active workplace interventions it is possible to promote the health of individuals and of organizations.

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# 1. Introduction and aim

This report was prepared within the framework of a government commission to the Swedish Agency for Work Environment Expertise to compile knowledge about factors that engender healthy, well-functioning workplaces (Ref. No. A2018/01349/ARM).

The report's aim is to provide a general overview of existing knowledge on associations between psychosocial workplace factors and the health and well-being of individuals and organizations, and to compile existing knowledge on the effects of psychosocial workplace interventions.

The report contains the results of two separately conducted systematic literature reviews investigating two closely related issues. One of these sought to establish what knowledge exists on associations between the psychosocial work environment and the health and well-being of individuals and of organizations. The other sought to establish what knowledge exists about the effects of psychosocial workplace interventions designed to improve some aspect of individual or organizational health.

Investigating two closely related issues – actual workplace circumstances (i.e., associations between psychosocial work-environment factors and health), and the effects of active interventions (effects of workplace interventions) – yields a more comprehensive view of the total knowledge base of what has been studied in relation to the question of what creates workplaces that foster healthy, contented employees.

In this context, “knowledge” refers to published systematic literature reviews deemed to be of sufficient quality that investigated a specific issue by compiling the results of several primary studies. The authors of a systematic review may draw different conclusions. These might be that there is knowledge on a particular issue and that is presented as

a conclusion. This conclusion could be, for example, that there is an association between a certain workplace factor and a particular health outcome, or that there is a particular effect of a psychosocial workplace intervention. It is also possible to reach the conclusion that one can, with some certainty, establish that there is no association or effect.

Sometimes, the underlying scientific data of a systematic review is insufficient for drawing any conclusion in relation to the question posed. This could be because the number of primary studies is too small, or the quality of such primary studies is considered inadequate. In such cases there is a scientific knowledge gap. Since new primary studies are emerging all the time, conclusions from systematic reviews need to be updated, particularly if formulated knowledge gaps are based on older systematic reviews.

The present report does not present a conclusive synthesis of the current research situation. That was not the aim of these systematic literature reviews nor would it have been possible to do in a comprehensive way, as the various included reviews investigated a range of different research questions. The systematic reviews that we found and that we included are considered to have been well conducted and relevant to the topic of the systematic reviews. We have not evidence-graded the results of the included systematic reviews or assessed how transferable their conclusions are to a Swedish context.

## Aim

The aim of the project involves two questions:

1. What systematic literature reviews exist that have investigated associations between psychosocial work-environment factors and health/well-being?

1. What systematic literature reviews exist that have investigated the effects of psychosocial workplace interventions?

The report was prepared in accordance with an established transparent scientific method. In addition, the aim was to ensure that the description given by the report of methods and results would be accessible not only for researchers but also for others, such as decision-makers and employers.

## Reading instructions

The structure and presentation of the present report conforms to an established structure consisting of a background, method description, results presentation and discussion, conclusions, and recommendations. The background and method sections present the reasoning behind the questions posed, the details of how the questions have been delimited and what requirements have been imposed to assess whether an article should be included or excluded.

The results section presents the identified articles. The included systematic reviews are summarized in result tables and in text. The results for the first question are presented first, followed by the results for the second question. The discussion section is divided first into a discussion of results, followed by a discussion of method, the latter containing a discussion of methodological problems and how they have been handled. Following conclusions and general recommendations are appendices, for those readers who wish to know more. These contain tables with information extracted from the individual systematic reviews included in the two compilations, as well as lists of the articles that were read in full but excluded.

Readers who are primarily interested in the results of the systematic reviews are advised to go directly to the results section (Section 3) and the conclusions (Section 5). Wherever possible, we have endeavoured to ensure that the texts can be read independently.

## Background

### Concerning health-promoting and protective factors, and risk factors: the salutogenic and the pathogenic perspectives

It is well known that the work environment is significant for both the health and well-being of the employees and the health and productivity of the company or organization. The commission that the Swedish Agency for Work Environment Expertise received from the Swedish government was to compile knowledge about factors that engender healthy, vital workplaces; that is, knowledge of what promotes healthy, satisfied personnel and sustainable and well-functioning organizations. Accordingly, the description of the assignment stressed the “salutogenic perspective”; that is, an approach that focuses on factors that lead to and sustain health, rather than precipitate illness. Based on this perspective, different aspects and factors in the work environment can be protective or health-promoting factors – promoting both the individual’s health and the organization’s well-being and goals. The traditional perspective, however, has long been that of the pathogenic (illness-precipitating) perspective; that is, an approach that investigates different factors’ associations to and significance for the development of health issues and illness in the individual. This approach investigates work-environment factors that are to be considered risk factors contributing to the development or maintaining of health issues. Research on workplace interventions – that is, interventions designed to influence the work environment or work content – have, on the other hand, in the absolute majority of cases, the explicit aim of improving something, which is closer to the salutogenic perspective. Effects of intervention studies are also measured to a considerably greater extent in the form of factors or outcomes that pertain to health and well-being – such as job satisfaction, improved health or lower sickness absence.

Scientifically there is no sharp distinction between the salutogenic and the pathogenic perspectives. Associations between work-environment factors and health and illness can be described as both health-promoting and risk factors. The presence of certain factors promotes health, while the absence of said factors promotes the development of health issues and sickness. How associations between work-environment factors or effects of workplace interventions are described is also a consequence of the question that a research intends to investigate and how the information that is analysed is defined and measured. In other words, it is possible to describe one and the same association as a risk factor if we have shown that high psychosocial work-environment stress co-varies with some adverse health outcome, and as a health-promoting factor if we have shown that low psychosocial work-environment stress co-varies with some favourable health outcome, such as the absence of illness or sick leave. The concept of “risk factor” is well established in medical research. A risk factor predicts, that is, provides information about, future health conditions, such as health issues or sickness. There are causal risk factors, which cause or contribute to future health issues, and non-causal risk factors, which provide information about future health issues but are not part of the causative chain. For the concept of “health-promoting factor”, no analogous terminology has been established. We have chosen to consider a health-promoting factor as corresponding to a risk factor; that is, a health-promoting factor is a factor that predicts a favourable health outcome without further specifying whether or not the health-promoting factor is a part of the causative chain.

In this report we have included research regardless of whether it takes a salutogenic or a pathogenic approach. The results, therefore, will reflect the manner in which researchers approached the question and presented the results in already published research.

## The concept of “psychosocial”: established scientific models

Common to the two questions investigated in the present report is the psychosocial work environment. The concept of “psychosocial” refers to an approach whereby individuals are considered simultaneously from a psychological and a social perspective. People have different experiences and psychological backgrounds, and in a social context, such as at a workplace, individuals will react and have various attitudes to things and events happening around them. The interaction between a workplace and the tasks performed there, and individuals’ own personalities and those of their colleagues, creates a psychosocial work environment. It is common to distinguish between the psychosocial work environment and the physical work environment. The Swedish Work Environment Authority’s Regulations on promoting a healthy work environment talk about the organizational and social aspects of the work environment, rather than the psychosocial work environment (20). The Regulations state that managers and supervisors should know how to prevent unhealthy workloads and victimization. The distinction between organizational factors and psychosocial aspects is not self-evident.

In this report we have taken a highly inclusive approach to what psychosocial work-environment factors or psychosocial workplace interventions are. It has to be something that could affect the individual psychologically or socially and it has to be workplace-related. The psychosocial work environment is the environment in which the individual is active and expected to perform his or her employment duties. However, we have not included studies investigating the effects of different forms of workplace organization or different leadership styles, even if such aspects could conceivably influence the psychosocial work environment. The exception is systematic reviews that, within the framework of their question, included studies investigating specific leadership or support interventions within the framework of a limited intervention.

In studies investigating the work environment and its effects on health and well-being, researchers typically employ scientific models. Such models usually describe a theoretical framework based on notions of how a certain environmental aspect or other exposure could influence work and health-related outcomes. A number of scientific models considering different aspects of the psychosocial work environment were developed several decades ago and have been investigated in hundreds of studies. One of these is the demand–control model (Demand–Control Model, Karasek & Theorell) (21, 22). The model is based on the premise that the emotional demands placed on an employee are balanced by the decision latitude – that is the control and ability to make decisions that the employee also has. High levels of demands in combination with little decision latitude results in a tense work situation with higher risk of health issues. The model has subsequently been supplemented with a further dimension, namely, social support (23, 24), considered as being able to buffer the effects of high levels of demands in a workplace.

Another well-established model is the effort–reward imbalance model (Effort–Reward Imbalance Model, Siegrist) (25, 26). This model is based on the idea that there has to be balance in the work situation, such that a person’s effort is counterbalanced by salary and by individual and social recognition.

Common to these models is the idea that high levels of demands are not necessarily negative for the individual and for employee health, if the demands are counterbalanced by other factors, such as the ability to make decisions, support, recognition and compensation.

Yet another proposed model is the job demands–resources model (Job Demands–Resources Model, Bakker) (27), which is an attempt to combine aspects of the above-named models into a more flexible model.

Other known psychosocial stresses include victimization, sexual harassment and bullying, which can affect individuals or several persons in a social group. Harassment and bullying can be subtle – or more obvious, through so-

cial exclusion, insulting comments, pestering, and in extreme cases, violence or threats of violence. The psychosocial work environment can be affected by harassment by individuals in management or leadership positions or by colleagues. Harassment and other psychosocial stresses can also come from the target group or the customers or clientele with which the organizations are involved.

Another relevant model is the organizational justice model (Organizational Justice, Greenberg) concerns individuals in a work environment who perceive the company or the organization as fair in various respects. It can influence both job satisfaction and job performance (28, 29).

In this report we have chosen to include research on known and named scientific models of stress and other psychosocial difficulties in working life. We have also chosen to include research that investigates psychosocial exposures that are measured as individual factors – that is, that are outside the framework of established models. As mentioned above, however, we have imposed certain delimitations. Even if the organization and leadership styles of a particular operation can directly and indirectly affect the psychosocial work environment to a great extent, studies of associations/effects between organization and leadership and different outcomes have not been included. Nor have we included articles that have studied associations between the physical work environment, such as working position, workload or ergonomics and health, even though it is possible that the psychosocial work environment can be considered a partial component of or mechanism in these relationships. These delimitations were imposed partly for reasons of time and resources and partly because the importance of leadership, work organization and the physical work environment are studied in separate projects within the framework of the larger government commission on Healthy and Well-Functioning Workplaces that is being carried out by the Swedish Agency for Work Environment Expertise.



## The psychosocial work environment as exposure and as outcome

In scientific studies of associations between factors, such as scientific studies of effects of interventions, the concepts of “factors”, “interventions” and “outcomes” are defined in advance. It is important to do this in systematic reviews as well – such as the two that are part of the present report – partly because it determines how the database searches will be done and partly because it guides the assessment of whether the references and articles found are relevant to the question. How the search and the inclusion were carried out is described in detail in the method section.

This report presents the results of two systematic literature reviews, both of which analyse and compile earlier research that has been compiled in published systematic literature reviews. One of the reviews focuses on the associations between psychosocial work environment factors and the health of the individual or the organization. The second systematic review in this report focuses on the effects of psychosocial workplace interventions. Since the concept of “psychosocial” has no single unambiguous definition or content, the search strategy was designed, in collaboration with a search specialist, on the basis of a number of terms that relate to some psychosocial component or that describe some form of intervention that could conceivably impact individuals and groups. The terms we have used are named in the method section and in the appendix giving search strategy details (Appendix 7).

As regards outcomes, we have included research that studied associations or effects on both individual work and health-related outcomes, as well as outcomes on the organizational level. Just which outcomes were studied was determined partly by the researchers who carried out the primary studies and partly by the researchers who compiled the results of the primary studies on the basis of a given question.

There is no single way to measure the psychosocial work environment; rather a

multitude of questions and instruments that measure aspects of it. Such an aspect could be, for example, job satisfaction. It would be reasonable to assume that individuals who are satisfied with their jobs have a better psychosocial work environment than individuals who are not satisfied with their jobs. Similarly, there are several estimates of employees’ satisfaction, attitudes and behaviour that could be interpreted as proxy or surrogate variables representing different aspects of the psychosocial work environment. It is worth noting that surrogate variables of this type could be both exposures and outcomes in a studied model.

Common outcomes have to do with people’s health. Health can be estimated using different types of self-assessment instruments such as quality of life, or specific aspects of physical or mental health. Other ways of measuring health are based on clinical assessments by physicians, psychologists or other experts – through diagnoses given, for example. It is also possible to investigate the consequences or effects of health and health issues, for example, as healthy presence or sick leave, early retirement or death.

Most of the outcomes mentioned are measured on the individual level, but it is also possible to measure outcomes on the organizational level — for example, in the form of productivity, staff turnover, profitability, etc.

In the two systematic reviews that are examined in this report we have chosen to include, very broadly, different types of conceivable psychosocial exposures and outcomes. When examining the results, it is important to consider what model the researchers have investigated. Using a particular stress model, for example, it is possible to investigate whether the stress in a workplace is related to the employees’ job satisfaction. In this case, the stress is to be considered as the exposure, and the outcome as the employees’ job satisfaction. Another researcher might be interested in investigating possible connections between job satisfaction as a surrogate measure of the psychosocial work environment and the

employee's mental well-being. In such a model, job satisfaction would be considered to be the exposure.

The outcomes deemed relevant are those that relate to the health of the individual. On the other hand, we did not include studies that considered different types of behaviour or lifestyles as outcomes (physical activity, diet and drinking habits, tobacco use). Nor did we consider studies in which only the outcomes of work-related injuries or violence and crime were included.

In the case of the assessment of systematic literature reviews that compiled research investigating the effect of interventions, the intervention must have occurred either at or in close proximity to the workplace. One important criterion is that the intervention must have been initiated by or have involved the employer. Studies of care interventions that are implemented within the framework of the regular healthcare system were not considered, unless they were part of a more extensive workplace intervention. This means that compiled research on interventions delivered through workplace healthcare providers was included if such interventions were considered as corresponding to intervention projects.

One challenge has been, just as with the systematic review of association studies, to define what we mean by a psychosocial workplace intervention. Ultimately it was necessary to instead consider what it is not. Such delimitations are, of course, open to question. For example, we have chosen not to include systematic reviews that only include primary studies of yoga interventions or physical activity, but have included studies about mindfulness interventions and other stress-reducing programmes if such programmes occurred at or in close proximity to the workplace.

A detailed review of the inclusion and exclusion criteria of the two systematic reviews can be found in the method section.

## Methods to investigate associations and effects

When we compile existing knowledge about psychosocial factors that create workplaces for healthy and satisfied employees and for less well-functioning workplaces, we need to consider many factors – such as the question and model that the researchers investigated and how they chose to measure the outcomes. It is also important to assess what type of research has been compiled and how it affects the reliability of the results. In work environment research it is rarely possible to conduct strictly experimental investigations – that is, implement research in which the employees are randomly assigned to different work-environment aspects. Randomized, double-blinded, placebo-controlled studies are common in medicine, and it is that type of study that provides best confidence when research wishes to make conclusions about cause and effect – that is, draw the conclusion that a certain exposure will give rise to a certain outcome.

This report presents the results of two systematic literature reviews of systematic reviews. One includes systematic literature reviews that investigated associations between psychosocial work-environment factors and different aspects of the health and well-being of the individual and the organization. Questions that relate to associations are usually investigated in observational studies in which exposed individuals are compared with non-exposed individuals – for example, those with a stress-filled job have a high risk of developing poor health, compared with those who do not have stress-filled jobs. In observational studies, the participants are not randomly assigned to a certain exposure; instead, they themselves, or other factors, “determine” this. Thus, there is always a risk that the groups that are compared through selection mechanisms differ in more respects than the exposure being investigated – in this case, exposure to stress. A researcher can try to consider such group differences – so-called confounders – when carrying out the study

and the data analysis, but even when that is done, many are hesitant to draw conclusions about causal effects on the basis of observational studies. Therefore, when the results of association studies are presented, researchers rarely talk about the effect, but rather about associations that can be described as health-promoting or protective factors and as risk factors, respectively, depending on the nature of the association and the outcome.

There are also other aspects that should be taken into account when assessing research that has investigated associations between exposures, and one of these is time. Usually, it is reasonable to assume that the longer a person is exposed to a risk factor (or to a protective factor), the greater significance it has for the outcome. This applies particularly to situations in which the outcome is serious consequences such as illness, long-term sick leave, or death. Studies that measure exposure in terms of time before measuring outcomes can provide information about the temporal association between exposure and outcome. If the exposure occurs before the outcome, this strengthens confidence that the association may be causal; that is, that the exposure wholly or partly causes the outcome. Studies that investigate associations and outcomes over a longer period, however, are often expensive and time-consuming. In research on associations we often also find cross-sectional studies. In this type of study, data is gathered about exposure and outcomes at one and the same time, which means that it can be diffi-

cult to establish an association that exists over time. Therefore, cross-sectional studies are not usually considered reliable for establishing causal relationships.

Regarding the compilation of research on effects of interventions, such effects are generally investigated in experimental studies, in which a group of participants receive an intervention and another receives a control intervention. In work-environment contexts it is rarely or never possible to give the control group a placebo— that is, a condition that actually has no active effect. Instead, comparisons are often made with the situation prior to the intervention – that is, before compared with after. Other conceivable control conditions for the group that does not receive any intervention are a wait list, other interventions or no intervention at all. The results must be interpreted with respect to the control condition used. When compiling research that was carried out using an experimental design, researchers often express their conclusions in terms of effects; that is, that an intervention causes a certain outcome – that the intervention had a certain effect.

This report presents the results of published systematic literature reviews and includes both observational studies and controlled studies. When assessing the conclusions of the systematic literature reviews presented, we should consider the type of primary studies that are included and analysed in each particular case.



## 2. Method

This report is based on two systematic literature reviews of systematic reviews. A systematic literature review is a compilation of research results from primary studies, and these two systematic reviews are, thus, a compilation of existing compiled knowledge. The results in this type of systematic review of other systematic reviews are not combined into a single result or conclusion, since the identified and included systematic reviews may have fully or partially investigated different questions, in different populations, and combined their results in different ways.

The result instead constitutes an overview – a general map – of the areas researchers have investigated and for which they have compiled knowledge. Each systematic literature review included could, depending on its particular question, have reached a conclusion that knowledge either exists or that the knowledge situation is inadequate. There may be several reasons why the knowledge situation regarding a particular question is deemed inadequate – for example, there were too few relevant primary studies of sufficient quality; the results of the primary studies included are contradictory; or the reliability of the conclusions is deemed low owing to methodological shortcomings in the underlying study data. Since new research is being initiated continuously, conclusions from older systematic literature reviews have to be re-examined in the light of new research results. This applies particularly if an older systematic literature review assessed the knowledge situation as inadequate because of a dearth of primary studies – a state of affairs that can change within just a few years.

The results in this report have not been evidence-graded; in other words, the reliability of

the included systematic literature reviews has not been assessed. Nor has it been assessed whether results and conclusions are relevant to or transferable to Swedish circumstances. Such analyses and assessments are possible, but did not fall within the projects' time and resource constraints.

### Questions

The report has two questions:

1. What systematic literature reviews exist that have investigated associations between psychosocial work-environment factors and health/well-being on the individual and the organizational levels?
1. What systematic literature reviews exist that have investigated the effects of psychosocial workplace interventions?

### Literature search

Prior to the literature search the questions were refined in accordance with the so-called PEO and PICO structure.<sup>1</sup> Special emphasis has been given to designing the search strategies to ensure they would be broad and inclusive. The search strategies were designed in consultation with an information specialist.

### Population (P)

The population in both of the questions consists of individuals of active working age (18–64) who have a job/a place of work. The population may also include individuals who have a health issue but can work; however, the population may also consist to a certain extent of individuals who are on sick leave.

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<sup>1</sup> PEO is an acronym for Population, Exposure and Outcome, while PICO stands for Population, Intervention, Control (comparative intervention) and Outcome. PEO and PICO are established methods of structuring both the research question, to facilitate the planning of the search strategy, and the relevance assessment.

## Exposure (E, in PEO)

In Question 1, the psychosocial work-environment factors constitute “exposures”. While these may be of widely varying character, they are all aspects that are of relevance in how individuals and groups perceive the psychosocial work climate and the work environment. The search strategy is based on several known terms and theories of psychosocial work-environment exposure, as both established index concepts and key concepts in the area.

## Intervention (I, in PICO)

In Question 2, the effects of psychosocial workplace interventions are investigated. These interventions may be aimed at individuals, groups, managers or the entire organization.

The search strategy employed is based on several known psychological, social and psychosocial interventions as well as on established key concepts and search terms.

## Control (C, in PICO)

In Question 2, the purpose is to investigate the effects, which usually requires comparison of an intervention group with a control group that does not receive any intervention. Since the search is limited to systematic reviews that themselves included primary studies based on their own search strategies, no requirements are imposed as to a control group. The

control conditions in the included systematic reviews have been imposed by the authors of these articles.

## Outcome (O)

No requirements have been imposed as to specific outcomes for Question 1 and 2 other than that they should be relevant for the individual from a health perspective (for example, well-being, quality of life, job satisfaction, self-rated health, morbidity, etc.) or for the organization from a health/sustainability perspective (staff turnover, sick leave).

Based on PICO a search strategy was designed. Table 1 shows examples of the central search terms for each question.

The literature search was conducted in the databases Pubmed, PsycINFO and Cinahl on 11 June 2019 and it generated 2,777 references for Question 1 and 3,056 references for Question 2. No time limitations were used. Over and above the literature searchers in databases, systematic reviews that the authors searched for manually or had knowledge of were added subsequently. This group also includes studies that were obtained via the search strategy for one of the questions, but that upon examination and assessment were included in the second.

**Table 1: Examples of search concepts/terms for Exposure and for Intervention in PEO and PICO, respectively. For the full search strategy, see Appendix 7.**

Question 1 Psychosocial work-environment exposures	Question 2 Psychosocial workplace interventions
job strain, work demand, lack of control, work control, job control, decision latitude, work influence, demand resource, effort reward, time pressure, work overload, coping, social support, support system, social network, emotional support, interpersonal relation, interaction, work justice, injustice, satisfaction, boredom, discrimination, harassment, workplace conflict, workplace violence, bullying, homophobia, racism, sexism, role ambiguity, role conflict, work role, working hour, working time, organizational change	psychosocial support systems, health promotion, counseling, mentoring, psychotherapy, social work, social support, mentoring/organization and administration, education, psychological adaptation, prevention of bullying

## Inclusion and exclusion criteria

To further refine the selection after the screening and relevance assessment of the publications, , delimiting, inclusion and exclusion criteria were established.

### Common delimitations for Questions 1 and 2

- Delimitation to the study type systematic literature reviews or HTA reports.
- Delimitation to the study type systematic reviews in English, Swedish, Norwegian or Danish.
- Delimitation to systematic reviews that analysed quantitative data.

### Common exclusionary criteria for Questions 1 and 2

- The following reviews were excluded:
- Systematic reviews that have not studied a working population (for example, those on disability pension or unemployed). If the study population is mixed, with some individuals working, the review is included if the result for the working subpopulation has been presented separately.
- Systematic reviews in which the population consists only of individuals with a specific serious health condition – for example, cancer, HIV, brain injury or development disorder.
- Systematic reviews of work environments or interventions that were not found to exist in or were not at all relevant for the Swedish context.
- Systematic reviews in which the majority of the studies/populations come from non-Western countries, which would significantly affect the relevance and validity of the conclusions for Swedish and Western societies.
- Systematic reviews that themselves limited their searching to studies from only one country or one region.
- Studies of relatives.

## Inclusionary and exclusionary criteria in Question 1

### *Inclusion*

- Studies that investigated associations between some form of psychosocial work-environment exposure and an outcome on the individual or organizational level.

### *Exclusion*

- Systematic reviews, the purpose of which was to investigate the prevalence of some psychosocial aspect and/or a health condition, without investigating any potential associations between them.
- Systematic reviews of associations between some psychosocial aspect and shift work, night work or work time.
- Systematic reviews of associations between some psychosocial aspect and leadership or organizational changes.
- Systematic reviews that investigated psychosocial work-environment factors and their associations with the following outcomes:
  - surrogate measures, such as hormonal or immunological markers
  - the use of pharmaceuticals
  - physical activity
  - dietary habits
  - drinking habits
  - drug use
  - occupational injuries
  - violence and crime
  - security or the equivalent.

## Inclusionary and exclusionary criteria in Question 2

### *Inclusion*

- The delimitation to systematic literature reviews in which the intervention was carried out at or in close proximity to the workplace.

### **Exclusion**

- Systematic reviews that only investigated the effect of rehabilitation – that is, where the primary purpose was to try to improve health/stimulate the return to work of employees currently on sick leave.
- Systematic reviews that investigated the effects of workplace healthcare (unless this was provided within the framework of an otherwise defined psychosocial intervention).
- Systematic reviews of interventions initiated by individuals or external actors, such as workplace healthcare providers or insurance companies – that is, interventions that were not actual workplace interventions.
- Systematic reviews of the effects of leadership and organizational changes.
- Systematic reviews that investigated the effect of interventions on the following outcomes:
  - surrogate measures, such as biological or immunological markers
  - the use of pharmaceuticals
  - physical activity (including yoga)
  - dietary habits
  - drinking habits
  - drug use
  - occupational injuries
  - violence and crime
  - security or the equivalent.
- Systematic reviews in which the question concerned only implementation or feasibility.

### **Method of selection and relevance assessment**

The titles and abstracts of the references identified in the literature search were read independently by both authors. If both considered that an article should be read in full, the full text of the article was obtained. References/abstracts of which the authors made different assessments were read in detail and consensus decisions were made as to whether

the article was adequate for the set questions and delimitations. In the case of doubt, the article was acquired so the full text of the article could be read.

The authors then assessed, independently of each other, the relevance of the full-text articles on the basis of the project questions, delimitations, and inclusionary and exclusionary criteria.

Differences of opinion were resolved through discussion of the imposed criteria. The studies that did not meet the imposed relevance criteria were excluded. Studies that were read in full text and excluded, and the primary reason for their exclusion, are found in Appendices 3 and 5.

### **Method of quality assessment**

In this report, the search has been delimited to systematic reviews. When conducting a systematic review there is a risk that the result will be skewed because of shortcomings in the delimitation, literature review and handling of the results. It is therefore important to examine the method used in a systematic review.

The authors of this report have assessed, independently of each other, the risk of systematic errors in each systematic review assessed as relevant with the support of the questions that are described in the AMSTAR review template (30, 31), based on the adapted version that the Swedish Agency for Health Technology Assessment and Assessment of Social Services (SBU) use (32). When carrying out the quality assessments, we gave particular weight to the following aspects:

The systematic review should have a clearly defined question that was relevant to the project question. The systematic review should have a predetermined declared method: a literature search was deemed adequate (searching in at least two databases, several relevant search terms and concepts, documented search strategy). The systematic review should declare that screening of titles and abstracts



was done by at least two individuals independently of one another, and that relevance, quality assessment and data extraction were done by at least two independent individuals.

It was further required that the authors of the systematic review have in some way evaluated, documented, and assessed the scientific quality of the studies they included and that they took this information into consideration when formulating their conclusions.

If the above requirements had been met, the systematic literature review would have been considered to have been of at least moderate quality. Other aspects taken into consideration were whether the review described the characteristics and results of the included studies, whether it used appropriate methods for weighing the results, whether it assessed the risk of publication bias, and whether it took potential conflicts of interest into consideration. If such had been the case, the method used in the systematic review would have been considered of high quality, entailing low risk of skewing of the results.

Systematic reviews found to be of high or moderate quality have been included and constitute the basic data of the present report. No special distinction has been made in the report between systematic reviews of moderate quality and systematic reviews of high quality. The reviews judged to be of low quality were excluded owing to a heightened risk that they might present misleading results and conclusions. Initially, differing assessments of study quality by the authors were resolved by a reading the

study again together and discussing it after.

Excluded studies can be found, for Question 1, in Appendix 4, and for Question 2, in Appendix 6.

## Method of compilation of results

This report compiles the knowledge that exists based on published systematic reviews. No summarized synthesis has been made of the results, which are instead given in a descriptive, theme-based presentation. Based on the identification by each included systematic review of the population, exposures/interventions and outcomes studied, the systematic review has been categorized to provide a general description of the research efforts included. For the question concerning associations between psychosocial work-environment factors and health and well-being, it is a matter of generally describing different types of psychosocial exposures and models that were investigated in relation to various types of health outcomes in different populations/work environments. As regards the question of the effects of interventions, we describe the types of interventions assessed, the contexts in which they were conducted, the populations on which they were carried out and what measures of effect were used.

It is not possible, nor is it an aim of this report, to weigh the resulting outcome or effect measures of identified systematic reviews into a single conclusion. We do, however, provide a general summary of the overall conclusions presented in the included systematic reviews.



# 3. Results

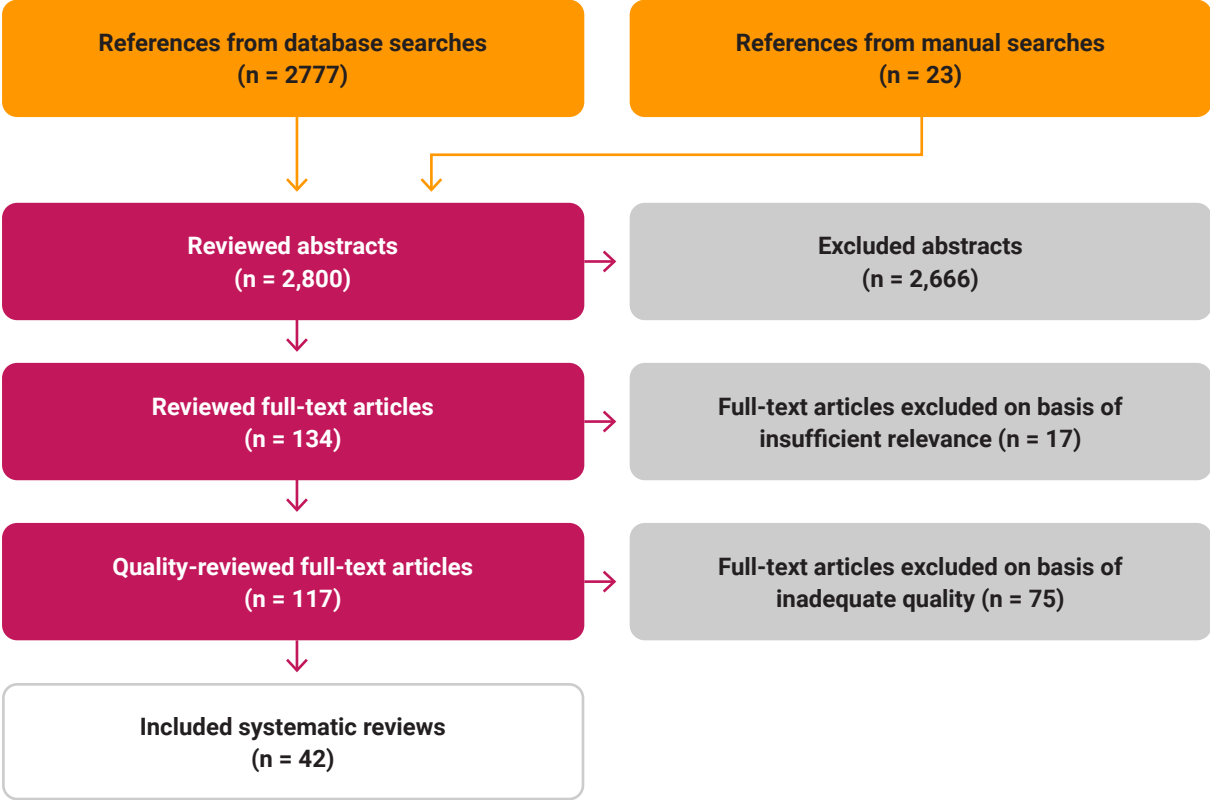
The results of the compilations of identified articles are presented here. The results are presented both generally, in result tables, and in text. The results for the first question are presented first, followed by the results for the second question.

## Results of Question 1: Associations between psychosocial work-environment factors and health/ well-being

The search for systematic literature reviews concerning associations between psychosocial work-environment factors and well-being and health for the individual or the organization generated slightly less than 2,800 references.

A small number of potentially interesting studies were found in the search for intervention studies or through the authors' own awareness of them. The majority of the studies could be excluded after examination on the title and abstract level. The remaining articles were obtained, and of the articles we examined in full text, many were excluded either because they did not meet the established relevance criteria or because they fell short of the quality requirements. After weeding the selection and examining the reviews for relevance and quality, 42 systematic reviews were included that were assessed to be relevant and that met the requirements of being of at least moderate quality. Figure 1 shows a flow chart illustrating publication screening, exclusion and inclusion.

Figure 1: Flow chart showing included studies, Question 1



The included systematic reviews are shown in a table in Appendix 1. The table shows, for each study, what research question the authors had, how many and what type of association studies they included, what exposures and outcomes they studied and what their primary results and conclusions are. Two of the included systematic reviews were systematic reviews of systematic reviews – that is, they included only systematic reviews themselves (9, 33). To reduce the risk of translation errors, the extracted information in the tables is shown in the original language of the study.

**The number of systematic reviews**

In total, 42 systematic reviews, published between 2001 and 2019, have been included. The majority of the systematic reviews were published in the past five years. Figure 2 is a diagram showing the number of included studies by publication year.

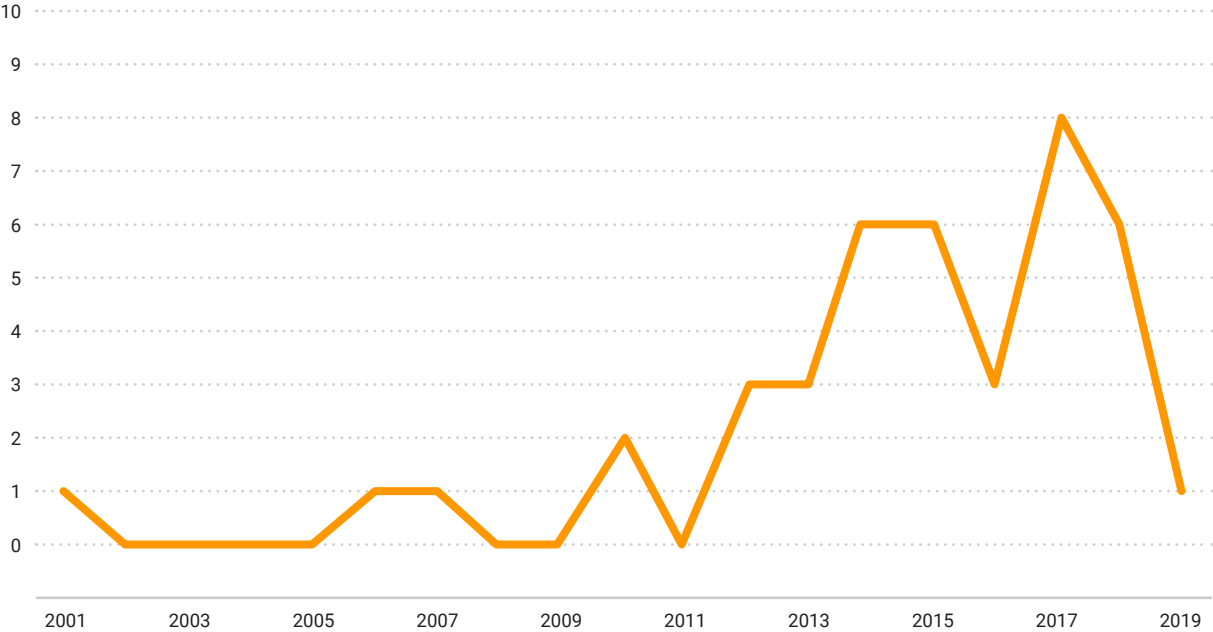
**Systematic reviews focusing on health-promoting factors: the salutogenic perspective**

The concept of “health and well-being” is a

commonly studied outcome and it is possible to describe associations between these outcomes and psychosocial work-environment factors as both risk factors and health-promoting factors, depending on the researcher’s question, how data are measured and how results are compiled and presented in the primary studies.

None of the systematic literature reviews included in Question 1 in this report, based on its question or presentation of results and conclusions present a one-sided focus on health-promoting or protective factors. Most of the included systematic reviews have described the occurrence of associations between psychosocial work-environment factors as risk factors for undesired outcomes. In five systematic reviews, parts of the results have been presented in a salutogenic perspective; that is, when psychosocial work-environment factors are described as health-promoting, protective or buffering/balancing factors for adverse outcomes (6, 8, 11, 12, 15). For example, Aronsson et al. expressed their findings in a systematic review on associations between work environment and burn-out, concluding

**Figure 2: Number of systematic literature reviews concerning associations by publication**



that certain factors protected, whereas others increased the risk of health issues: “While high levels of job support and workplace justice were protective for emotional exhaustion, high demands, low job control, high workload, low reward and job insecurity increased the risk for developing exhaustion” (8). In this case, support at work and organizational justice are examples of health-promoting factors.

Another example is the review by Schneider et al., which investigated associations between psychosocial work-environment factors and mental health among staff in emergency medical care units, with the conclusions: “Conclusive results reveal that peer support, well-designed organizational structures, and employee reward systems balance the negative impact of adverse work factors on ED providers’ well-being” (15).

### **Systematic literature reviews focusing on individual outcomes and on organizational outcomes**

In this report no specific requirements on the outcomes were imposed, other than that they be relevant for the individual or for the organization. Measures that are relevant for the individual concern, in some way, individual health, quality of life, job satisfaction and, to a certain extent, sickness-related or other workplace absence. Common for these measures is that they are applied on the individual level. It is also possible to measure associations between psychosocial work-environment factors and aggregated data on the organizational level. Such data can relate to parameters such as the unit’s, the company’s or the organization’s productivity, profitability, staff turnover, presenteeism and healthy presence, etc.

Only one study included, in its question, outcomes on the organizational level as well as outcomes on the individual level. This study investigated the significance of bullying in the workplace for younger physicians and according to the authors of the systematic review, bullying, for this group, was found to lead not only to health problems for the indi-

viduals but also to more errors and incorrect decisions in the work situation (34).

### **The number of systematic reviews based on the outcomes studied**

Table 2 presents an overview of the types of outcomes that the included systematic reviews studied. The primary outcomes concern individuals’ health, which can be roughly classified as studies that investigated the associations of work-environment factors with mental or somatic health issues.

A systematic review may include, in its question, several types of outcomes, which is why the total number of studies in the table is greater than 42.

Based on the systematic reviews’ questions, approaches to measuring exposures and outcomes, descriptions of results and conclusions, the exposure was classified as either stress or bullying.

Based on these classifications, 24 systematic reviews investigated the results of psychosocial exposures, in the form of stress or in the form of bullying, on mental health. The corresponding figures for somatic health comprised a total of 20 systematic reviews, of which 19 investigated associations with stress exposure and 1 investigated associations with bullying. A total of six systematic reviews had work-related outcomes, five of them on the individual level and one on the organizational level.

These tables are presented below:

- Table 2: Number of studies by type of psychosocial work-environment factor studied in relation to different types of outcomes (individual or organization)
- Table 3: Number of studies by type of psychosocial work-environment factor and types of mental-health issue
- Table 4: Number of studies by type of psychosocial work-environment factor and types of somatic health issue
- Table 5: Number of studies by type of psychosocial work-environment factor and studied populations (work-environment situations).

### Number of systematic reviews by type of outcome relating to mental health

It is possible to further specify the included systematic reviews based on the type of outcome relating to mental health that was studied. Four systematic reviews investigated what can be considered general mental health issues (2, 14, 15, 17), whereas other systematic reviews focused – in their question, outcomes or manner of describing results – on a specific mental health issue. The most frequent type was studies rating workplace-related stress and the association of these ratings with the risk or occurrence of stress-related conditions (1, 3, 6, 8, 13, 18) and with the risk of or occurrence of depression or anxiety symptoms in employees (5–7, 9, 10). There were a couple of systematic reviews that presented associations between stress-related work environment and other outcomes, such as sleep (2, 11), suicidal ideation and behaviour (19), and associations between different aspects of the psychosocial work environment on cognition and dementia (12).

A compilation of the number of systematic reviews based on the type of mental health issue used in outcomes is presented in Table 3.

### Number of systematic reviews by type of outcome relating to somatic health

Similarly, it is possible to further specify the picture of the type of illnesses and somatic complaints used as outcomes in the systematic reviews included. Several studies that investigated associations between stress in working life and the risk and occurrence of cardiovascular diseases such as high blood pressure, myocardial infarction and cardiovascular disease, metabolic syndrome, stroke and cardiovascular-related death (2, 33, 37–43, 51). A majority of systematic reviews had also investigated associations between stress-related aspects of the work environment and the risk of or occurrence of musculoskeletal problems and pain in the neck, shoulders and upper extremities (36, 44–47, 49, 50). Two systematic reviews investigated associations between bullying and the occurrence of general somatic health issues (34, 54).

A compilation of the number of systematic reviews based on the type of somatic health issue used as outcomes is presented in Table 4.

**Table 2: Number of systematic literature reviews of association studies, by studied psychosocial exposure and outcomes on the individual and organizational levels, respectively (categorization based on question, results and conclusions).**

Type of psychosocial exposure	Type of outcome			
	Mental health, sleep, cognition	Physical health	Work-related outcome, individual-related (long-term sick leave disability pension)	Work-related outcome, organization-related (production, collaboration, communication)
<b>Stress</b> (according to different stress models, such as high level of mand/low control, balance between effort/compensation, organizational injustice, low social support, etc.)	19 (1-19)	19 (2, 33, 35-51)	5 (2, 3, 14, 52, 53)	1 (16)
<b>Bullying</b>	6 (5, 6, 9, 11, 34, 54, 55)	1 (54)		

## Number of systematic reviews by type of outcome and occupational group or population studied

A further way of categorizing the systematic reviews that investigated associations between psychosocial work-environment factors and outcomes is based on the population studied – that is, the type of workplace/work environment in which the primary study participants worked. The majority of the included systematic reviews had as their only criterion the restriction that the population had to be employed. Five systematic reviews focused on employees working in healthcare or related occupations (emergency medical services, nursing, veterinary care), particularly as regards the risk of and occurrence of mental health and stress-related issues (14, 15, 18, 19, 53). Individual systematic reviews restricted themselves to other occupations and groups, such as labourers with neck pain (36), individuals working in the police force or the correctional system (13, 51), industrial workers (47) and individuals who in their jobs come into contact with disaster victims (17).

A compilation of the number of systematic reviews based on the type of population studied is presented in Table 5.

## What aspects of the psychosocial work environment have been investigated?

In the tables, the psychosocial exposure has been roughly categorized as stress or bullying. It is possible to further specify these exposures. Certain systematic reviews restricted their question and their inclusion criteria to a specific psychosocial exposure or model, whereas others did not, with the result that they included primary studies that investigated different models.

A large number of the systematic reviews have investigated the psychosocial work environment based on workplace demands alone or based on the demand–control–support model (1–9, 11, 12, 14, 15, 33, 35, 37–44, 46, 47, 49, 50, 52, 53) or effort/reward model (2–6, 9–12, 14, 33, 40, 43, 45). The authors of the majority of these studies conclude that there is an association between the named way of handling stress, workplace stress and different types of mental and somatic health issues. Several systematic reviews had also considered other psychosocial work-environment aspects, such as the significance of justice (3, 5, 6, 9) and the social climate (5, 6).

**Table 3: Number of systematic literature reviews that studied associations between psychosocial exposure by outcome and type of mental health issue**

Type of psychosocial exposure	Type of outcome					
	Mental health issues generally	Stress-related conditions	Depression and anxiety	Sleep	Suicidal ideation and behaviour	Cognitive effects/dementia
<b>Stress</b> (according to different stress models, such as high level of demand/low control, imbalance between effort/reward, organizational injustice, low social support, etc.)	4 (2, 14, 15, 17)	6 (1, 3, 6, 13, 18)	5 (5-10)	2 (2, 11)	1 (19)	1 (12)
<b>Bullying</b>	2 (34, 54)	2 (6, 34)	2 (5, 6)		1 (55)	

**Footnote:** The articles with the reference numbers (8) and (5) are English reports which are part of the results of reference number (6) (in Swedish).

**Table 4: Number of systematic literature reviews that studied associations between psychosocial exposure by outcome and type of somatic health issue**

Type of psychosocial exposure	Type of outcome			
	Somatic health issues generally	Cardiovascular illnesses (cardiovascular death, hypertension, metabolic syndrome, stroke)	Type 2 diabetes	Musculoskeletal problems and pain
<b>Stress</b> (according to different stress models, such as high level of demand/low control, balance between effort/reward, organizational injustice, low social support, etc.)	1 (2)	10 (2, 33, 37-43, 51)	1 (35)	7 (36, 44-47, 49, 50)
<b>Bullying</b>	2 (34, 54)			

**Table 5: Number of systematic literature reviews that studied associations between psychosocial exposure by mental and somatic health issues and populations studied**

Associations between psychosocial exposure and mental health issues, by populations studied					
Type of psychosocial exposure	Type of outcome				
	Working population, generally	Employees with neck pain	Healthcare/eterinary care	Police and correctional care	Occupational groups that deal with disasters and disaster victims
<b>Stress</b> (according to different stress models, such as high level of demand/low control, imbalance between effort/reward, organizational injustice, low social support, etc)	13 (1-12, 52)	1 (36)	5 (14, 15, 18, 19, 53)	1 (13)	1 (17)
<b>Mobbning</b>	1 (55)		2 (34, 54)		

Associations between psychosocial exposure and somatic health issues, by populations studied					
Type of psychosocial exposure	Type of outcomel				
	Working population, generally	Industrial workers	Police and rectional care	Healthcare	-
<b>Stress</b> (according to different stress models, such as high level of demand/low control, imbalance between effort/reward, organizational injustice, low social support, etc.)	17 (2, 33, 35-46, 48, 49, 52)	1 (47)	1 (51)	1 (50)	
<b>Bullying</b>					

**Footnote:** The articles with the reference numbers (8) and (5) are English reports which are part of the results of reference number (6) (in Swedish).



## **A compilation of what included systematic literature reviews found support for**

Here is a summary of the primary findings from the included systematic reviews based on their own conclusions. The authors of several systematic reviews conclude that there is an association between high-stress work environments and the risk or occurrence of stress-related health-issues (1, 3, 6, 8, 13, 18), depression and anxiety (5–7, 9, 10) and sleep problems (2, 11).

The authors of several systematic reviews also conclude that there is an association between perceived bullying and various outcomes such as stress-related health issues, depression and suicidal ideation (5, 6, 34, 54, 55), and the occurrence of sleep problems and headaches, respectively (54).

Regarding somatic health issues the authors report that in several systematic reviews there is an association between psychosocial work-environment factors and the risk or occurrence of cardiovascular disease (2, 33, 37, 42, 43), hypertension (40, 41, 43, 51) and stroke (38), work-related stress and the risk of developing type 2 diabetes (35).

There are also systematic reviews that present some support, or strong support, for the association of psychosocial work-related stress with the risk of or occurrence of back, neck, shoulder, arm and wrist pain (36, 44, 46, 47, 49), as well as general musculoskeletal pain (47, 50).

Altogether there is a great deal of compiled research on associations between aspects of the psychosocial environment and the occurrence or risk of health issues.

There is no compiled research that has specifically investigated associations between psychosocial health-promoting factors and outcomes on the individual or organizational level. The salutogenic perspective – that is, the description of psychosocial work environment as something that can promote health – is taken in only a few of the results and conclusions of the included systematic literature reviews.

The pathological perspective – that is,

when the psychosocial work environment is described as a risk factor for health issues – predominates in the included research.

The primary areas of knowledge are psychosocial stress, based on models of stress (demand/control, support, and effort/reward, respectively), and bullying.

## **Results of Question 2: Effects of psychosocial workplace interventions t**

The search for systematic literature reviews about psychosocial workplace interventions produced slightly more than 3,000 records. A few potentially interesting studies were found among the results for the search for association studies or by other routes. Most of the studies were excluded at the title and abstract level. Of the articles we reviewed in full text, several were eliminated, more on the basis of quality shortcomings than relevance. After the screening of publications in accordance with Figure 3, 44 systematic literature reviews that were relevant to the question, and of at least moderate quality, were included.

### **The number of included systematic reviews**

The included systematic reviews are shown in a table in Appendix 2. The table shows, for each study, what question the authors had, how many primary intervention studies were included, what interventions and what types of outcomes they recognized, and what their primary results and conclusions were. To reduce the risk of translation errors, the information was extracted in the original language.

In total, 44 systematic literature studies, published between 2007 and 2019, have been included. The majority of the studies were published in the past five years. Figure 4 shows a diagram of the number of included studies by publication year.

**Systematic reviews focusing on individual outcomes and organizational outcomes, respectively.**

This report did not impose specific requirements on the outcomes, but rather presents the types of outcomes that were included in the systematic literature reviews. A large proportion of the measurements relate to outcomes on the individual level, but there are also measurements on the organizational level, particularly when it concerns the organization’s productivity or staff turnover. Unlike the reviews on association studies, interventions by their nature focus more on studying favourable outcomes, such as improvements in various health outcomes, reduced depression and long-term sick leave, etc. In other words, intervention research is more often studies of “health-promoting factors”, as it is undesirable or not ethically defensible to expose study participants to anything that leads to health problems.

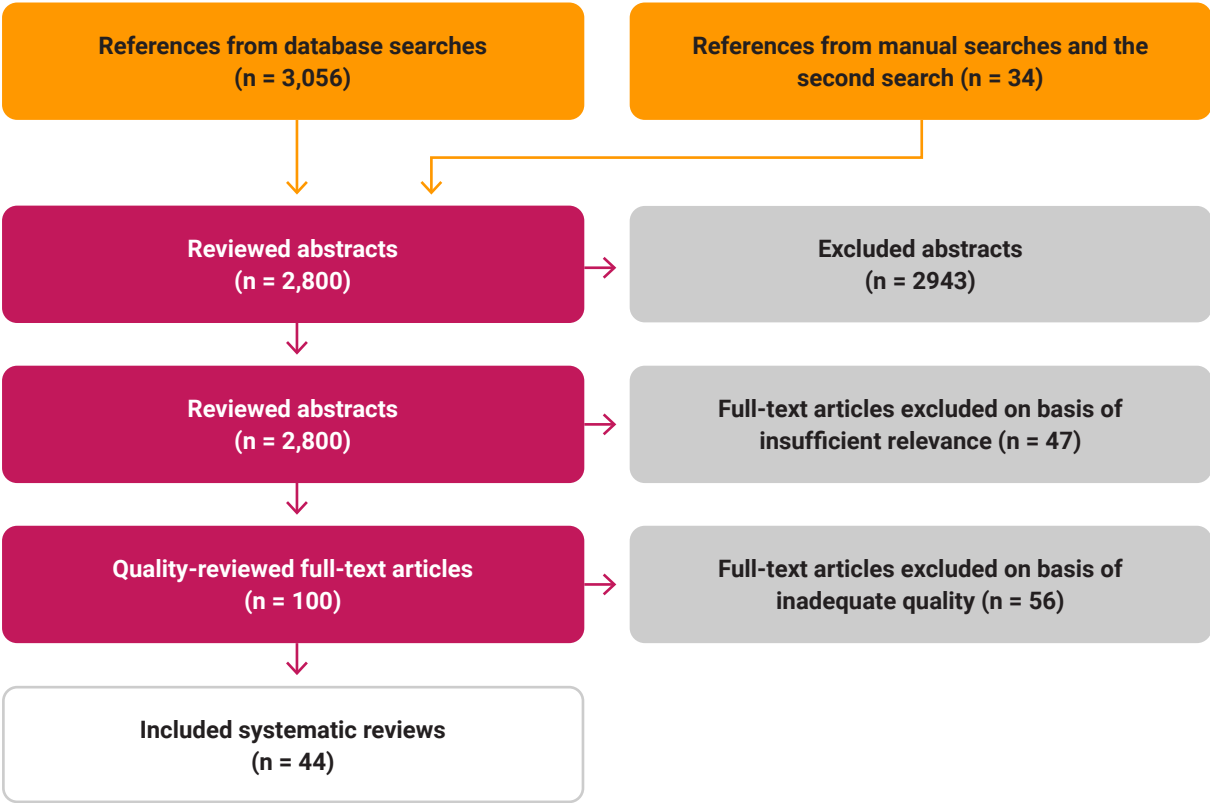
**Number of included systematic reviews based on the type of intervention and type(s) of outcome studied**

These tables are presented below:  
 Table 6: Contains the number of systematic reviews categorized by type of exposure factor studied in the various interventions. This is then shown divided by what relevant outcome the various studies chose to measure and include.

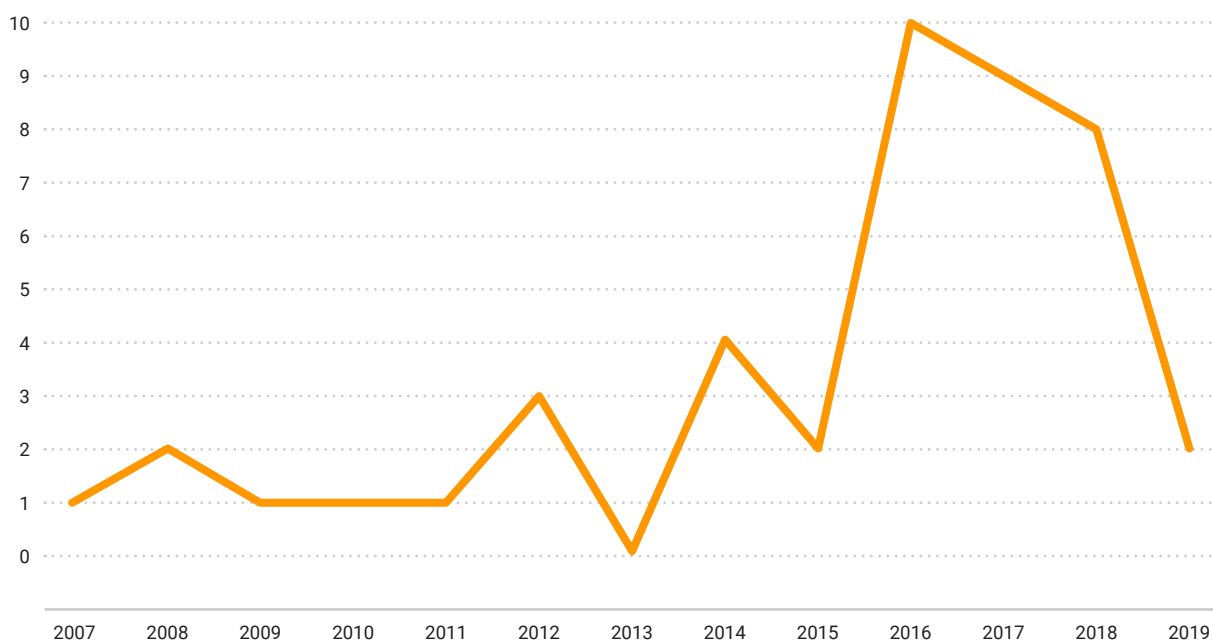
Table 7: Contains the number of systematic reviews divided by either type of exposure factor or measured included relevant outcome and by occupational group or population on which the intervention was conducted.

Table 6 presents a compilation of the types of outcomes that the included systematic literature reviews studied. A systematic review may include, in its question, several types of outcomes, which is why the total number of studies in the table is greater than 44. The delimitations in the individual studies were usually imposed in respect of what types of

**Figure 3: Flow chart showing included studies, Question 2: Systematic literature reviews that included psychosocial workplace interventions**



**Figure 4: Number of systematic literature reviews about interventions by publication year**



interventions were included and in a majority of the cases all types of outcomes in the individual primary studies were included.

We have opted to divide the intervention types into the following six overall categories: stress management, bullying, social support, work efficiency enhancement, health and the psychosocial climate. Most of the interventions described focused on health or stress management.

The systematic reviews of interventions that in some way concerned different methods of handling or reducing stress totalled 19 (56–74). The majority of them contained intervention studies involving various coping and behavioural strategies for reducing stress in the individual (56–58, 60, 62,

64–66, 69, 70, 72, 74). Six systematic literature reviews focused on stress-related interventions that employed mindfulness techniques as a base (59, 61, 63, 67, 71, 73). It is worth noting that mindfulness techniques were not only employed as techniques expressly for reducing stress. Murray and colleagues (75) include studies of interventions in which some mindfulness technique was used for a more general purpose, to enhance employees' well-being. Three syste-

matic literature reviews evaluate interventions that employed stress-reducing programmes, focusing on the organizational level (62, 65, 66). One systematic literature review focused on the use of digital media to implement stress-reducing interventions (68).

Unlike the reviews about association studies, we identified only one systematic review that evaluated interventions to prevent or reduce bullying (76).

Three systematic reviews summarized literature about different forms of social support (77–79). The interventions consisted either of mentor programmes (77, 79) or other forms of social support, and quality in work supervision (78).

We identified seven systematic reviews that concern interventions that were in some way designed to influence the work, such as through work efficiency enhancement, adaptation or changing how work was performed (62, 72, 80–84).

Carolan and colleagues evaluated intervention studies that investigated work efficiency enhancement by means of a digitally distributed intervention – interventions also designed to improve mental health (80). Other individual systematic reviews focused on a special

work method (81), adaptations (83), or changes in working conditions (84). Three systematic reviews evaluated interventions in which they investigated the effects of changing how the work was done (62, 72, 82).

A large number of interventions are designed to promote health in some way (60, 66, 69, 70, 72, 75, 80, 84–92). Under the primary question of this literature review, concerning the psychosocial work environment, we have identified 13 systematic reviews that focused mainly on interventions designed to promote mental health, prevent depression and burn-out, or ease depressive symptoms (56, 60, 66, 70, 75, 80, 85–91). Four studies involved interventions with a more general purpose, such as increasing general health or well-being among employees on the individual level (69, 72, 75, 92) or on the organizational level (84).

Three reviews concerned interventions designed to change the psychosocial climate in the workplace (93–95). Two of these focused more expressly on the climate itself (93, 95) and one review focused on eliminating stress factors in teachers' work situation (94).

We have chosen to group the outcomes presented in the included literature reviews in the following five categories: mental health, general health, stress, work-related individual-related outcomes, and work-related outcomes that are organization-related. Mental health and general health were the most frequently occurring outcomes. The majority of the included systematic literature reviews reported several different outcomes. Most of the reviews reported having difficulty finding comparable outcome measures in the primary studies.

A majority – 23 – of the included literature reviews described some mental health measure (56–68, 75, 82, 84–91). This involved a large number of different measures, everything from changes in depression scales to the occurrence of different diagnoses. Many studies – 14 – included more general health measures (67, 69–73, 80–82, 84, 92–95); studies focusing on well-being or health have been grouped among these.

While distinguishing between the outcomes of mental health and stress is not entirely simple, and several studies describe both outcomes, we have nevertheless chosen to have one outcome category specifically for stress as that is mentioned expressly as an outcome in 11 reviews (58, 59, 61–65, 68, 69, 79, 94). Finally, we have two outcome categories that concern work-related outcomes. The first is the work-related outcomes measured on the individual level (60, 64, 68, 74, 76–79, 82–86, 94). This category concerns particularly reviews that included measures of long-term sick leave and the like (60, 64, 68, 74, 76, 78, 83–86, 94), and/or job satisfaction (60, 64, 77, 79, 85). The second work-related outcome category concerns the outcomes that are more “organization-related” (61, 64, 67, 71, 74, 76–80, 82, 84, 92–94, 96). Here, it is primarily outcomes such as staff turnover (74, 77, 79, 94), different productivity and efficiency measures (64, 71, 74, 78–80, 93, 96) and measures of collaboration and communication in the workforce (61, 67, 76, 77, 92) that are described.

The largest category contained studies that included interventions involving some form of stress management programme and measured outcomes such as mental health, depression, burn-out, and so on (56–68). A large number of these studies also measured stress as an outcome. The next-largest category included interventions that more generally focused on improving health or preventing mental health issues or depression, studies in which the outcome was mental health issues, depression or burn-out, and so on (60, 66, 75, 84–91).

### **Number of included systematic reviews by different occupational groups or populations**

Many interventions focused on a general group of individuals in employment (59, 60, 68, 71, 74, 76, 78, 80, 82–85, 87–89, 93, 95, 96); however, interventions targeting particular occupational groups were also common. A majority of the included reviews were con-

ducted on healthcare workers (56–58, 61, 62, 64–67, 69, 70, 72, 73, 75, 77, 79, 81, 90, 92), particularly physicians or nurses. Other occupational groups targeted in the reviews were police and correctional officers (91), as well as teachers (94). We identified two reviews that limited themselves to populations that had already reported mental health issues (60, 63), and one review that was limited to male-dominated industries (86).

The most common interventions for healthcare workers involved different types of stress-management programmes (56–58, 61, 62, 64–67, 69, 70, 72, 73) while those for a more general working population involved, to a greater extent, more broadly focused interventions to prevent mental health issues and

increase well-being and general health (60, 80, 84, 85, 87–89, 96).

A large proportion of the studies that focused on the healthcare system had different forms of mental health issues as their outcome (56–58, 61, 62, 64–67, 75, 90) while a significantly larger proportion of the studies of a general working population focused on more work-related measures on both the individual (60, 68, 74, 76, 78, 82–85) and the organizational level (71, 74, 76, 78, 80, 82, 84, 93, 96).

A compilation of the number of systematic reviews by the type of occupational group or population studied is presented in Table 7.

**Table 6: Number of systematic literature reviews that study different psychosocial workplace interventions on the individual or the organizational level, by type of included outcome**

Type of psychosocial exposure	Type of outcome				
	Mental health issues, depression, depressive symptoms, burn-out, cognition	Mental health, sleep, cognition	Physical health	Work-related outcome, individual-related (long-term sick leave disability pension)	Work-related outcome, organization-related (production, collaboration, communication)
Stress management/reduction, resilience, mindfulness	13 (56-68)	6 (67, 69-73)	9 (58, 59, 61-65, 68, 69)	4 (60, 64, 68, 74)	5 (61, 64, 67, 71, 74)
Bullying				1 (76)	1 (76)
Social support, mentoring			1 (79)	3 (77-79)	3 (77-79)
Work efficiency enhancement, adaptations, assistive devices, methods	2 (62, 82, 84)	4 (72, 80-82, 84)	1 (62)	2 (82-84)	2 (80, 82, 84)
Health, mental health, well-being and return to work	11 (60, 66, 75, 84-91)	6 (69, 70, 72, 80, 84, 92)	1 (69)	4 (60, 84-86)	4 (80, 84, 92, 96)
Psychosocial climate/ Workplace stressors		3 (93-95)	1 (94)	1 (94)	2 (93, 94)

## Compilation of what the included systematic literature reviews found support for

Here is a summary of the conclusions reached by the individual included literature reviews from the results of the primary interventions for which they compiled findings.

Different types of stress-reducing interventions in the workplace have been shown to be able to reduce stress levels among employees in a favourable manner in several reviews (60, 62, 63, 65, 69, 97), and also have an effect on well-being and sleep (97). One review found some evidence for social support having an effect on absence from work (78). The two reviews that categorized their included interventions in a demand/control perspective (60, 82) found

connections between increased control and favourable health outcomes. Different forms of interventions designed to promote employee health have been shown capable of favourably influencing stress levels (57, 98) and mental health (57, 87, 88, 98). Preventative measures relating to mental health were found to be cost-effective (96). Daniels and colleagues (93) found, in their review, that interventions to improve the psychosocial climate had an effect on employees' well-being.

Several reviews also focused on the method of the intervention and found that digital interventions to influence mental health worked (80) and that interventions that targeted multiple levels simultaneously, such as individual, group and organization levels, (66, 84, 85, 90) had greater effect.

**Table 7: Types of interventions and outcomes studied, by studied occupational groups or populations**

Types of interventions by studied occupational groups or populations						
Type of intervention	Type of population					
	Working population, generally	Workers with mental health issues	Healthcare	Police and correctional care	School	Part of the labour market
Stress management/reduction, resilience	5 (59, 60, 68, 71, 74)	2 (60, 63)	13 (56-58, 61, 62, 64-67, 69, 70, 72, 73)			
Bullying	1 (76)					
Social support, mentoring programmes, management	1 (78)		2 (77, 79)			
Work efficiency enhancement, adaptations, assistive devices, methods	3 (80, 82-84)		2 (62, 72, 81)			
Health, mental health, well-being and return to work	8 (60, 80, 84, 85, 87-89, 96)	1 (60)	7 (66, 69, 70, 72, 75, 90, 92)	1 (91)		1 (86)
Psychosocial climate/workplace stressors	2 (93, 95)				1 (94)	
Types of studied outcomes based on studied occupational groups or populations						
Type of outcome	Type of population					
	Working population, generally	Workers with mental health issues	Healthcare	Police and correctional care	School	Part of the labour market
Mental health, depression, depressive symptoms, burn-out, sleep, cognition, etc.	8 (59, 60, 68, 82, 84, 87-89)	2 (60, 63)	11 (56-58, 61, 62, 64-67, 75, 90)	1 (91)		1 (86)
General health, somatic health, well-being	7 (71, 80, 82, 84, 85, 93, 95)		7 (67, 69, 70, 72, 73, 81, 92)		1 (94)	
Stress and mindfulness	2 (59, 68)	1 (63)	7 (58, 61, 62, 64, 65, 69, 79)		1 (94)	
Work-related outcome, individual-related (long-term sick leave, disability pension, job satisfaction)	9 (60, 68, 74, 76, 78, 82-85)	1 (60)	3 (64, 77, 79)		1 (94)	1 (86)
Work-related outcome, organization-related (production, efficiency, cooperation, communication, staff turnover, cost-effectiveness)	9 (71, 74, 76, 78, 80, 82, 84, 93, 96)		6 (61, 64, 67, 77, 79, 92)		1 (94)	





# 4. Discussion

## Discussion of results

We have produced two systematic literature reviews in which we have analysed and compiled existing knowledge in the form of previously published systematic reviews. Since the two questions together include studies that looked at actual circumstances at workplaces (that is, associations between psychosocial work-environment factors and health) and active interventions carried out at workplaces (effects of interventions conducted at or in close proximity to workplaces), a more comprehensive picture of the total knowledge base regarding what has been studied in relation to the question of what creates workplaces that promote healthy and satisfied employees is given.

We have found that there is a great deal of compiled research on association studies of psychosocial work-environment factors and some type of health outcome, particularly on the individual level. There is also a great deal of compiled research relating to the effects of psychosocial workplace interventions. As regards both of these questions, the number of systematic literature reviews has grown in the past five years.

### Discussion of results of Question 1: Associations

Particular attention has been paid to psychosocial work-environment exposures, based on models of stress (demand/control, support, and effort/reward) and bullying and the associations of these factors with individuals' well-being and health. There are approximately equally many systematic literature reviews that have investigated associations between the psychosocial work environment and outcomes of mental-health and somatic health

issues. The most common type of mental health issues for which associations have been studied for psychosocial work-environment factors were stress-related health issues, anxiety and depression. The most common type of somatic health issue for which associations have been studied for psychosocial workplace-factors were cardiovascular and musculoskeletal disease, and pain. The compiled research has usually been based in a general work environment (not further specified); however, several systematic literature reviews investigated specific work environments or populations – primarily healthcare or other care organizations.

What has not been studied/ compiled? Strikingly, very few systematic reviews have investigated and described different types of psychosocial work-environment factors as health-promoting or protective factors. The absolute majority of the included reviews present results and conclusions in which work-environment aspects are identified as risk factors for health issues and illness. The results presumably reflect the questions, perspectives, results and conclusions that are found in the primary research. A possible explanation for why the knowledge situation looks the way it does is that there are often definitions of health issues and illness and there are established and validated methods of identifying, diagnosing and assessing health issues and illness, which makes these outcomes appropriate as outcome measures in research studies. Corresponding methods for assessing when an individual feels good or has optimal working ability have not been developed and established to the same extent. The absence of health issues does not mean that physical, mental and social functioning in a workplace is optimal or good. There is

an opportunity here to develop methods for measuring and classifying working ability and to determine the factors that support working ability from a salutogenic perspective. The development and establishment of health-promoting factors that reflect a good psychosocial function could be used in both work-environment research and practical work to promote a healthy work environment and to prevent the risk of health issues due to organizational and social circumstances in a workplace.

Another remarkable result was that the outcomes that the included systematic reviews presented were primarily on the individual level and less frequently on the organizational level. Many outcomes on the individual level are easy to study and relevant to both the individual and organization. Outcomes on the organizational level are often aggregated, which can make it more difficult to draw conclusions regarding causes than if the exposure is assessed on the individual level. Aggregated outcomes on the organizational level, however, have the advantage of being able to directly identify aspects that may be relevant for organizations and employers – in terms of productivity, long-term sick leave and staff turnover, for example.

## Discussion of results for Question 2: Interventions

What has been studied above all is interventions designed to reduce stress or improve employees' ability to handle stress. The most common outcomes studied are the effects of different interventions on well-being and mental health. Many of the interventions compiled in systematic literature reviews investigated interventions conducted in health-care settings.

What has not been studied/compiled? Given the number of association studies identified about bullying, it is remarkable that more compilations of intervention studies on that theme have not been conducted. Only one such review was identified (76), and it in turn included only five primary studies of low

quality. Long-term effects of workplace-focused psychosocial interventions have not been investigated either to any great extent.

The dominance of association studies that investigated the demand/control model is not present to the same extent among the intervention studies. We identified only two systematic literature reviews that compiled interventions that in some way focused on greater control or studied work task changes that led to less control (60, 82).

Occupational groups other than those in healthcare are present to a very limited extent among the interventions included in the reviews we found. However, a large proportion of the reviews were not restricted other than to a generally employed population.

In the analysis of reviews of interventions, it is apparent that the most common effect measures concern different types of health-related outcomes or outcomes that measure symptom reduction. It is less common to find the work-related outcomes have been measured as well, which implies that from an employer perspective it is difficult to know whether the intervention would be cost-effective or not. The great diversity of outcomes also makes it more difficult to make a comparison of the effects of different studies and thus the possibility of drawing general conclusions.

We have not conducted an analysis of whether the association studies or the interventions conducted might be valid in a Swedish context. However, we limited the inclusion of reviews to those that were relevant to "Western" contexts and did not set a restriction to any particular geographic area – for example, studied only nurses in Australia.

## Discussion of method

This report is based on two systematic literature reviews. The method of implementation of these essentially follows the international standard used by Cochrane, among others. This method involves a rigorous process for

defining and delimiting the question, searching systematically for references in several electronic databases, screening references and examining full-text articles that could be of value for the question for relevance and quality. The process has to be transparent so that the reader can interpret the results based on the question, the inclusionary and exclusionary criteria and other restrictions imposed. The selection process and data extraction must also, as far as possible, be implemented by at least two independent reviewers and thus reduce the risk of results that skew the total knowledge base being included. This structured method is a strength.

This report restricted its search to studies that themselves are systematic reviews. One shortcoming of this type of review is that its results consist of questions to which other researchers have limited themselves. It is possible that knowledge may exist in the form of primary studies that have, however, not been compiled within the framework of a systematic literature review. Accordingly, it is not certain that the absence of systematic reviews in an area, based on one question and/or specific population, can be interpreted as indicating that knowledge does not exist in that area. To be able to state that knowledge does or does not exist requires a well-conducted systematic review that is not too old and that has found the knowledge situation to be insufficient. This in turn may be because there is too little primary research, or the primary research that exists is poorly executed, or shows contradictory results.

The compilation of systematic literature reviews of associations between psychosocial work-environment factors and health outcomes included two reports that themselves involved only systematic reviews (9, 33). The one by Harvey et al., published in 2016 (9), was designed to investigate how different psychosocial work-environment factors co-vary with mental health issues. This review included seven systematic reviews, which have also been included separately in this report. The authors of the review propose

a meta-theory of how three broad work-environment categories (imbalance in the work setup, absence of foundational values and respect, work-related uncertainty) can be seen as interacting risk factors for the development of mental health issues.

The second systematic review, which only involved systematic reviews, was authored by Fishta and Backe and published in 2015 (33), and was designed to investigate whether there is a connection between psychosocial work-environment factors and the risk of cardiovascular disease and death. Six systematic reviews were included, of which one is also among the reviews included in the present report. The authors did not perform any meta-analysis of their own, but rather present the results of two included studies that indicate that there is a moderately strong connection between the psychosocial work environment and cardiovascular events.

The compilation of systematic reviews of associations between psychosocial work-environment factors and health outcomes also included a Swedish Health Technology Assessment (HTA) report (6), from which specific results for different questions were also published as systematic reviews in international journals (5, 8). This means that the same results were included in two instances for the different questions, which should be taken into consideration.

The compilation of systematic literature reviews on psychosocial workplace interventions includes two reviews that in themselves include systematic literature reviews, by Joyce et al. (60) and Wagner (78). Both include individual reviews that we also include in the present analysis; however, since the questions are different, the overlap is minimal. It could also be the case that individual primary intervention studies were included in more than one systematic literature review. We have not had the opportunity to consider what primary studies were included in the systematic reviews. Since this systematic literature review is intended to describe the areas that have been researched and does not provide any summa-

rized synthesis of the results; this fact could be viewed as a minor problem.

The quality of the systematic reviews included in this report has been assessed using AMSTAR. On the other hand, we have not conducted quality assessment of the primary studies that the authors of each included study included in turn. One of the criteria for a systematic review being considered at least moderately well conducted is that the authors have assessed the quality of the primary studies it included. We, however, have not made any assessment

of whether the authors' assessments are correct or not. Nor have we assessed the reliability of (that is, assessed in terms of evidence) the authors' conclusions, or assessed whether they are relevant and transferrable to a Swedish context.

One of the challenges when compiling the existing knowledge about psychosocial work-environment factors and their associations with and significance for workplaces that promote healthy and satisfied employees is the need to define concepts and delimit the question. One overall challenge has been defining what we mean by the concept "psychosocial", partly in a work-environment perspective and partly as a factor that can be influenced by some intervention. Different specialist and subject areas and research disciplines can be based on different theoretical schools and use different terminology. We have chosen definitions that to our own eyes are broad, definitions designed to capture the psychological perspective for individuals and groups as well as social interaction that goes on between individuals. This understanding of the concept of "psychosocial" and the delimitation it implies is of course open to question, and it is possible that researchers with a different subject background would have chosen to define concepts, search stra-

tegy and restrictions in another way, which would then affect the results. For example, we have chosen not to include systematic reviews of interventions that only included studies of yoga interventions or physical activity; however, on the other hand, we have included studies about mindfulness interventions and other stress-reducing programmes, if they were conducted at or in close proximity to the workplace. A wider definition of the type of intervention that could conceivably influence the psychosocial work environment would, in other words, probably have led to more included studies.

A specific restriction in the form of an exclusionary criterion concerned associations between leadership and psychosocial work environment and effects of leadership and organizational changes (provided they were not conducted within the framework of some defined intervention). These restrictions were done for reasons of resources – partly since the significance of the management and organizational structure is examined in other literature reviews in the Healthy and Well-Functioning Workplaces project. However, we do find that we have excluded very few systematic reviews that compiled knowledge based on these questions.

The search strategy in the two conducted systematic reviews that provide the foundation of the present report was implemented in three digital databases: PubMed (Medline), Cinahl and Psycinfo. That is a relatively small number of databases. However, many systematic reviews are found in more than one database; for example, Pubmed also covers those published by Cochrane. Further, it has been previously observed that a search in Pubmed (Medline) concerning intervention studies in research on working life captures about 90 per cent of high-quality research. (99)

## 5. Conclusions

We have carried out two systematic literature reviews in which we have analysed and compiled existing knowledge in the form of published systematic reviews. We have not carried out any summarized synthesis of the results, and our conclusions are therefore general and descriptive in nature. However, we can state the following based on the project aims and questions:

- There is extensive compiled research on both associations and interventions. Knowledge production in the form of systematic literature reviews has increased in the past few years.
- For the question concerning the effects of interventions, there are more outcomes on the organizational level compared with the question concerning associations between psychosocial work-environment factors and health/well-being.

### **Conclusions based on the analysis of systematic literature reviews that investigated associations between psychosocial work-environment factors and health/well-being**

- There is no compiled research specifically investigating associations between psychosocial health-promoting factors and outcomes on the individual or the organizational level. The salutogenic perspective – the description of the psychosocial work environment as something that can promote health – is evident in only a few of the results and conclusions of the included systematic literature reviews. The pathological perspective – when the psychosocial work environment is described as a risk factor for health issues – predominates in the included research.

- Regarding the question on associations between psychosocial work-environment factors and health/well-being, the research has focused primarily on psychosocial stress based on stress models (demand–control–support, and effort/reward) and bullying.
- Regarding the question concerning psychosocial work-environment factors there are systematic reviews that focused on associations with both mental-health and somatic outcomes, particularly on the individual level.
- Most of the systematic reviews that concern these associations examined the work environment in general. A specific work environment investigated in several studies is the healthcare system and other care operations.

### **Conclusions based on the analysis of systematic literature reviews that investigated the effects of psychosocial workplace interventions**

- For the question on the effects of interventions, what has been studied above all is interventions designed to reduce stress or improve employees' ability to cope with stress. There are also several systematic reviews that investigated the effects of general or specifically health-promoting interventions.
- For the question on the effects of interventions, what has been studied above all is the effects of interventions on well-being and mental health, on both the individual and the organizational levels.
- For the question on the effects of psychosocial workplace interventions, the majority of the systematic literature reviews investigated interventions conducted in the healthcare system.

- For the question concerning the effects of interventions, there are very few systematic reviews that describe long-term effects.
- There are many different ways of assessing the effects of interventions. The diversity of outcomes makes it more difficult to compare the effects and opportunities in order to draw general conclusions.

## 6. General recommendations

These recommendations are based on the authors' interpretation of the conclusions found in the studies that were included. We have chosen to formulate our recommendations in such a way that they address employers, decision-makers, public agencies or researchers.

### Employers

- The psychosocial work environment is of great importance for employees, and it can be influenced through active workplace interventions. That is one of the overall conclusions of this report. There is relatively extensive research indicating the significance of the psychosocial work environment. Much research also indicates considerable adverse consequences for employees when the psychosocial work environment is perceived as challenging.
- Interventions can be conducted on different levels: they may target the individual, or they may be more extensive interventions that involve the employer organization. Several of the identified literature reviews indicate greater effects from interventions that involve several levels simultaneously.
- There is a need for further compiled knowledge concerning the significance of psychosocial factors in many commonly occurring workplace environments, such as among private-sector employees, independent entrepreneurs, and in non-traditional occupations.
- There is a need for compiled knowledge concerning the significance of psychosocial factors for specific groups, such as women, men, and those born abroad.
- There is a need to investigate the extent to which existing knowledge concerning workplace interventions is transferrable and feasible in a Swedish context.
- It would be useful to have more long-term follow-ups of effects of workplace interventions, to investigate whether changes in the psychosocial workplace environment and the employees' ability to cope with the work environment persist over time.
- It would be useful to have more studies that investigate outcomes on the organizational level.
- There is a need to develop standardized/recommended outcome measures for workplace interventions, to enable comparison.

### Decision-makers, public authorities and researchers

- There is a need to develop concepts, methods and relevant outcomes so that we may systematically study the salutogenic perspective; that is, the significance of the psychosocial work environment in creating workplaces that promote healthy, satisfied employees.





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## 8. Appendices

## Appendix 1 Included studies for research question 1 - associations

Table of included studies that investigated associations between psychosocial work-environment factors and health/well-being on an individual or organizational level. Data is extracted in the study's original language.

Author, Year [Ref]	Population/context Aim	Number of studies/ participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Rosario et al. 2016. (2)</b>	Population: adult workers (variety of settings) Aim: to review the existing high-quality evidence for the influence of work-related psychosocial factors on workers' health.	10 included studies, 7 prospective cohorts and 3 cross-sectional.	Exposure: psychosocial work characteristics measured with psychosocial validated instrument, typically within theoretical model (demand-control-support model, effort-reward imbalance model). Outcome: physical and mental health outcomes as reflected through psychosocial validated instruments, medical evaluation, health-related work outcomes, data on sickness absence.	Most studies (7/10) observed an adverse effect of poor psychosocial work factors on workers' health: 3 on sickness absence, 4 on cardiovascular diseases. The other 3 studies reported detrimental effects on sleep and on disease-associated biomarkers. A more consistent effect was observed in studies of higher methodological quality that used a prospective design jointly with the use of validated instruments for the assessment of the psychosocial (work) environment and clinical evaluation.	
<b>Sui et al. 2016 (35)</b>	Population: persons with work related stress. Systematic review of cohort studies. Aim: explore association between work-related stress and risk of type 2 diabetes.	7 cohort studies involving 214,986 participants.	Exposure: work related stress (including job demands, decision latitude/job control, job strain). Outcome: incidence of type 2 diabetes.	No significant association was found between work-related stress and risk for type 2 diabetes based on meta-analysis of seven prospective cohort studies involving 214,086 participants and 5,511 cases.	
<b>Nieuwenhuijsen et al. 2010. (3)</b>	Population: adult workers Aim: to assess which work-related psychosocial risk factors may contribute to the occurrence of stress related disorders.	7 prospective cohort studies were included. Follow-up times 12–48 months.	Exposure: The psychosocial work factors that were measured in the original studies were grouped in 10 categories, derived from the three models on work-related psychosocial risk factors.	Strong evidence was found that high job demands, low job control, low co-worker support, low supervisor support, low procedural justice, low relational justice and a high effort–reward imbalance predicted the incidence of SRDs.	

Author, Year [Ref]	Population/context Aim	Number of studies/ participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Stansfeld et al 2006. (4)</b>	<p>Population: working age adults.</p> <p>Aim: to clarify the associations between psychosocial work stressors and mental ill health.</p>	<p>38 papers were identified that explored psychosocial work characteristics and subsequent common mental disorders. The numbers of papers eligible for the meta-analysis were reduced to 11 which reported results in a form that could be submitted to a meta-analysis.</p>	<p>Exposure: the psychosocial work characteristics that were included in the meta-analysis were Karasek's job-strain indices: decision latitude, decision authority, psychological demands, job strain, work social support, the combination of high efforts and low rewards, and job insecurity.</p> <p>Outcomes: new onset of a common mental disorder: neurotic disorders (WHO, ICD-10 codes F40–F42), depressive disorders (codes F32–39), and suicide.</p>	<p>This meta-analysis provides robust consistent evidence that (combinations of) high demands and low decision latitude and (combinations of) high efforts and low rewards are prospective risk factors for common mental disorders and suggests that the psychosocial work environment is important for mental health. The associations are not merely explained by response bias. The impact of work stressors on common mental disorders differs for women and men.</p>	
<b>Theorell et al. 2015. (5)</b>	<p>Population: people at work, with working conditions relevant to Sweden.</p> <p>Aim: to provide systematically graded evidence for possible associations between work environment factors and near-future development of depressive symptoms.</p>	<p>59 studies included, 19 of high quality and 40 of moderate quality.</p>	<p>Exposure: was not confined to any specific kind of work environment factors. Physical/chemical/ergonomic exposures as well as psychosocial factors were screened.</p> <p>Outcomes: symptoms of depression. These should have been certified through diagnostic investigation or with established scales.</p>	<p>Moderately strong evidence (grade three out of four) was found for job strain (high psychological demands and low decision latitude), low decision latitude and bullying having significant impact on development of depressive symptoms. Limited evidence (grade two) was shown for psychological demands, effort reward imbalance, low support, unfavorable social climate, lack of work justice, conflicts, limited skill discretion, job insecurity and long working hours. There was no differential gender effect of adverse job conditions on depressive symptoms</p> <p>There is substantial empirical evidence that employees, both men and women, who report lack of decision latitude, job strain and bullying, will experience increasing depressive symptoms over time.</p>	
<b>Seidler et al. 2014 (1)</b>	<p>Population: working age population, aged 17 or older.</p> <p>Aim: to provide a comprehensive overview about the effects of psychosocial working conditions on the development of burnout and its core symptom, emotional exhaustion.</p>	<p>6 moderate level quality prospective cohort studies, follow-up times 8 months to 3 years.</p>	<p>Exposure: psychosocial working conditions.</p> <p>Outcome: burnout and emotional exhaustion (measured by burnout-sub-scales or by multi-item measures).</p>	<p>The results of our systematic review point to a relationship between psychosocial working conditions and the development of emotional exhaustion/burnout. Particularly high job demands seem to play a role in the development of emotional exhaustion. However, strong intercorrelations between workplace factors, as a matter of principle, make the identification of a single psychosocial workplace factor (being associated with an especially high or low risk of burnout) difficult.</p>	

Author, Year [Ref]	Population/context Aim	Number of studies/ participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
SBU, Statens beredning för medicinsk och social utvärdering, 2014. (6)	Population: arbetare Frågeställningar: Vilken betydelse har olika faktorer i arbetsmiljön för uppkomst och vidmakthållande av depressionssymtom respektive symtom på utmattningssyndrom?	59 artiklar om depressionssymptom och 25 över utmattningssyndrom. Delmängder av studier användes för samband mellan specifika exponeringar och utfall, ibland i metaanalys, ibland narrativt.	Exponering: psykosociala arbetsmiljöfaktorer, däribland krav/kontroll/stöd, passivt arbete, pressande arbete, obalans i ansträngning/belöning, lågt stöd från arbetsledning, lågt stöd på arbetsplatsen, lågt stöd från medarbetare, ogynnsamt socialt klimat, ogynnsamt socialt kapital, låg förekomst av rättvis miljö, konflikter, mobbning, liten möjlighet till utveckling, osäkerhet i anställning. Utfall: Depression/depressionssymtom (skalor, register, diagnos m.m.) Utmattningssyndrom/symtom på utmattning (skattningsskalor)	Personer som upplever en arbetssituation med små möjligheter att påverka, i kombination med alltför höga krav, utvecklar mer depressionssymtom. Personer som upplever bristande medmänniskt stöd i arbetsmiljön utvecklar mer symtom på depression och utmattningssyndrom än andra. De som upplever mobbning eller konflikter i sitt arbete utvecklar mer depressionssymtom än andra, men det går inte att avgöra om det finns något motsvarande samband för symtom på utmattningssyndrom. Personer som upplever att de har pressande arbete eller en arbetssituation där belöningen upplevs som liten i förhållande till ansträngningen utvecklar mer symtom på depression och utmattningssyndrom än andra. Detta gäller även för dem som upplever osäkerhet i anställningen, t ex en oro för att arbetsplatsen ska läggas ner. I vissa arbetsmiljöer har människor mindre besvär. Personer som upplever goda möjligheter till kontroll i det egna arbetet och de som upplever att de behandlas rättvist utvecklar mindre symtom på depression och utmattningssyndrom än andra.	Den systematiska översikten har en bredare frågeställning än enbart psykosociala exponeringar.
Madsen et al. 2017. (7)	Populations: workers Aim: investigating the association between job strain and clinically diagnosed depression in a systematic review and meta-analysis using individual patient data.	6 published studies and unpublished data from 14 cohort studies were used for separate individual-participant-data meta-analysis.	Exposure: job strain Outcomes: clinically diagnosed depression (assessed by diagnostic interview or hospital records).	Job strain was associated with an increased risk of clinical depression in both published [relative risk (RR) = 1.77, 95% confidence interval (CI) 1.47–2.13] and unpublished datasets (RR = 1.27, 95% CI 1.04–1.55). ... Job strain may precipitate clinical depression among employees.	



Author, Year [Ref]	Population/context Aim	Number of studies/participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Ariens et al. 2001 (36)</b>	Population: persons with neck pain. Systematic review of cohort and cross-sectional studies. Aim: to identify psychosocial work risk factors for neck pain.	In total 29 studies, one prospective cohort and 28 cross-sectional.	Exposure: quantitative job demands, social support, conflicts, job control, job strain, job satisfaction, job security, rest break opportunities. Outcome: neck pain	Some evidence was found for a positive relationship between neck pain and high quantitative job demands, low social (coworker) support, low job control, high and low skill discretion and low job satisfaction. Inconclusive evidence was found for high job strain, low supervisor support, conflicts at work, low job security, and limited rest break opportunities.	Quality issues noted.
<b>Aronsson et al 2017 (8)</b>	Populations: employees Systematic review Aim: to provide systematically graded evidence in longitudinal studies for possible associations between working conditions and near-future burnout, emotional exhaustion, cynicism and reduced personal accomplishment among the employees.	25 included studies (case control, cohort or randomised controlled studies).	Exposures: job control, demands (different types), support (different types), workload, reward, job insecurity, workplace justice, conflicts, threats, lack of feedback, occupational role. Outcome: burnout (and like)	While high levels of job support and workplace justice were protective for emotional exhaustion, high demands, low job control, high workload, low reward and job insecurity increased the risk for developing exhaustion. Our approach with a wide range of work exposure factors analysed in relation to the separate dimensions of burnout expanded the knowledge of associations, evidence as well as research needs. The potential of organizational interventions is illustrated by the findings that burnout symptoms are strongly influenced by structural factors such as job demands, support and the possibility to exert control.	Results structured as findings associated with more or less burnout. The article is a shorter, peer reviewed version of a Swedish SBU-report: Arbetsmiljöns betydelse för symptom på depression och utmattningssyndrom. (6)
<b>Harvey et al. 2017. (9)</b>	Systematic review of reviews (meta review) Population: workers Aim: investigate how work factors may contribute to the development of depression and anxiety disorders and symptoms.	37 studies included, 7 of at least moderate quality.	Exposures: Twelve work-related risk factors were identified among the included reviews; high job demand, low job control, low workplace social support, effort-reward imbalance (ERI), low organisational procedural justice, low organisational relational justice, organisational change, job insecurity, temporary employment status, atypical working hours, workplace conflict/bullying and role stress. Outcomes: common mental health problems, specifically depression, anxiety and/or work-related stress.	Within these broad categories, there was moderate level evidence from multiple prospective studies that high job demands, low job control, high effort-reward imbalance, low relational justice, low procedural justice, role stress, bullying and low social support in the workplace are associated with a greater risk of developing common mental health problems.	

Author, Year [Ref]	Population/context Aim	Number of studies/participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Rugulies et al 2017. (10)</b>	Population: workers (economically active individuals.) Aim: The primary objective of this article is to determine whether employees who are exposed to effort-reward-imbalance at work have a higher risk of depressive disorders compared to employees who are not exposed.	8 studies from 6 articles were included, all being prospective cohorts encompassing 84,963 employees and 2,897 (3.4%) new cases of depressive disorders.	Exposure: quantitative baseline assessment of exposure to effort-reward-imbalance model. Outcome: depressive disorder (assessed by a psychiatric diagnostic interview, a diagnosis by a physician, register data, administrative data with diagnosis of depression) or a validated self-administered rating scale.	Seven of the eight studies suggested an increased risk of depressive disorders among employees exposed to ERI. The pooled random-effects estimate was 1.49 [95% confidence interval (95% CI) 1.23–1.80, P<0.001], indicating that ERI predicts risk of depressive disorders. The estimate was robust in sensitivity analyses stratified by study quality, type of ERI ascertainment and type depressive disorder ascertainment, respectively.	
<b>Lever et al. 2019 (54)</b>	Population: health care workers. Aim: to provide a synthesis of studies examining both mental and physical health consequences for staff who report being bullied in health care settings.	45 studies of primarily nurses (66.7%), doctors (22.2%) and midwives (8.9%).	Exposure: perceived workplace bullying Outcome: physical and mental health, sick leave.	Perceived bullying was associated with mental health problems including psychological distress, depression and burnout, as well as physical health problems including insomnia and headache. Bullied staff took more sick leave.	Unclear if screening was performed by two independent researchers.
<b>Leach et al. 2017. (55)</b>	Population: workers Aim: to investigate the relationship of workplace bullying with suicidal ideation and behaviour.	12 included studies, 8 on suicide ideation and 1 on suicidal behaviour (other on prevalence and more).	Exposure: work place bullying/mobbing Outcome: prevalence of suicidal ideation and behaviour.	The results show an absence of high-quality epidemiological studies (eg. prospective cohort studies, which controlled for workplace characteristics and baseline psychiatric morbidity). While the available literature (predominantly cross-sectional) suggests that there is a positive association between workplace bullying and suicidal ideation, the low quality of studies prevents ruling out alternative explanations.	Superficial quality evaluation.
<b>Linton et al. 2015. (11)</b>	Population: workers Aim: to review systematically the literature on the effects of work (physical, organizational, and psychosocial factors) on sleep.	24 studies included, 3 of high and 21 of moderate quality)	Exposure: a broad range of known work environment variables, one being psychosocial factors. Outcome: any measure of sleep disturbance including all ICD-10 sleep diagnoses.	Results showed that the psychosocial work variables of social support at work, control, and organizational justice were related to fewer sleep disturbances, while high work demands, job strain, bullying, and effort-reward imbalance were related to more future sleep disturbances.	Aim broader than just psychosocial exposure. Partly salutogenic presentation of work factors as protective factors.

Author, Year [Ref]	Population/context Aim	Number of studies/ participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Then et al. 2014.</b> (12)	<p>Population: Working population, age <math>\geq</math> 17year</p> <p>Aim: investigate the evidence on the effects of psychosocial work conditions on cognition and dementia</p>	<p>We identified 17 articles of adequate quality; 9 studies examined the impact of psychosocial work conditions on clinical dementia, 5 studies reported on global cognitive functioning and 3 studies focused on performance in specific cognitive abilities.</p>	<p>Exposure: Psycho-social work environment characteristics: stress, mental load, work load, effort, reward, shift work, time pressure, job insecurity, institutional changes like downsizing or merger, social support/mobbing, bullying, leadership style, climate and work-related justice</p> <p>Outcome: Long-term cognitive (dis)abilities: measured in terms of errors, injuries, processing speed, alertness, distraction, memory, testing of intellectual skills (eg. intelligence); dementia and Alzheimer's disease.</p>	<p>We found evidence for a protective effect of high job control and high work complexity with people and data on the risk of cognitive decline and dementia. Moreover, cognitively demanding work conditions seem to be associated with a decreased risk of cognitive deterioration in old age. Psychosocial work conditions can have an impact on cognitive functioning and even on the risk of dementia.</p>	<p>Work factors as protective factors.</p>
<b>Knardahl et al. 2017</b> (52)	<p>Population: workers</p> <p>Aim: Which psychological task-level work factors contribute to retirement due to disability? Which social interaction factors at work contribute to retirement due to disability? Which organizational work factors contribute to retirement due to disability?</p>	<p>39 studies of acceptable quality, 37 of them from the Nordic countries.</p>	<p>Exposure: organizational, psychological, and social exposure pertaining to work.</p> <p>Outcome: registry-based disability pension awards or self-reported retirement from work due to ill health or disease.</p>	<p>There was moderate evidence for the role of low control (supported by weighted average RR = 1.40; 95% CI = 1.21-1.61) and moderate evidence for the combination of high demands and low control (although weighted average was RR = 1.45; 95% CI = 0.96-2.19) as predictors of disability retirement.</p>	
<b>Watanabe et al 2018.</b> (37)	<p>Population: workers</p> <p>Aim: to evaluate published prospective studies to investigate whether adverse work-related psychosocial factors were associated with an elevated risk of metabolic syndrome.</p>	<p>8 prospective studies included in metanalysis.</p>	<p>Exposure: adverse work related psychosocial factors.</p> <p>Outcome: metabolic syndrome onset.</p>	<p>The pooled risk of adverse work-related stress on metabolic syndrome onset was significant and positive (RR = 1.47; 95% CI, 1.22–1.78). Sensitivity analyses limiting only the effects of job strain and shift work also indicated a significant positive relationship (RR = 1.75; 95% CI, 1.09–2.79; and RR = 1.59; 95% CI, 1.00–2.54, P = 0.049 respectively).</p> <p>This study reveals a strong positive association between work related psychosocial factors and an elevated risk of metabolic syndrome onset.</p>	

Author, Year [Ref]	Population/context Aim	Number of studies/participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
Huang et al. 2015 (38)	<p><b>Population: workers</b></p> <p><b>Aim: In this study, we aimed to assess the association between job strain and the risk of incident stroke.</b></p>	6 prospective cohorts comprising 138,782 participants.	<p>Exposure: job strain</p> <p><b>Outcome: incident stroke</b></p>	Exposure to high strain jobs was associated with an increased risk of stroke, especially in women. Further studies are needed to confirm whether interventions to reduce work stress decrease the risk of stroke.	Unclear if screening was performed by two independent researchers.
Babu et al. 2014 (39)	<p>Population: adults in occupational setting.</p> <p>Systematic review and meta-analysis</p> <p>Aim: to determine whether job strain is associated with hypertension.</p>	Nine observational studies (3 case control, 6 cohort), about 25,000 participants.	<p>Exposures: job strain as defined as the combination of high job demands and low job decision latitude.</p>	<p>Outcome: hypertension</p> <p>The pooled OR of the nine studies was 1.3 (95% CI 1.14 to 1.48; <math>p &lt; 0.001</math>), of case-control studies 3.17 (95% CI 1.79 to 5.60; <math>p &lt; 0.001</math>) and of cohort studies 1.24 (95% CI 1.09 to 1.41)</p> <p>...</p> <p>We conclude that despite methodological differences, case-control and cohort studies of good methodological quality showed positive associations between hypertension and job strain.</p>	
Gilbert-Ouimet et al. 2014 (40)	<p>Population: workers</p> <p>Aim: do workers exposed to psychosocial work factors of the demand control support and effort reward imbalance and effort reward imbalance models have higher blood pressure than unexposed workers? (There were additional specific objectives).</p>	74 included studies (57 cross sectional, 15 prospective cohorts and 2 case-control studies).	<p>Exposure: psychosocial work factors of the demand-control-support model and/or the effort-reward-imbalance model.</p> <p>Outcome: blood pressure or hypertension incidence/prevalence.</p>	<p>Approximately half of the studies observed a significant adverse effect of psychosocial work factors on BP. A more consistent effect was observed, however, among men than women. For job strain, a more consistent effect was also observed in studies of higher methodological quality, i.e. studies using a prospective design and ambulatory BP measures.</p>	
Landsbergis et al. 2013 (41)	<p>Population: workers</p> <p>Aim: to review evidence of the relationship between job strain and ambulatory blood pressure.</p>	29 studies included. Meta-analysis on 22 cross-sectional studies of a single exposure to job strain. Review of 1 case-control study, 3 studies of cumulative exposure to job strain, and 3 longitudinal studies.	<p>Exposure: exposure to job strain via its 2 major dimensions, job psychological demands and job decision latitude, an operationalization of the concept of job control.</p> <p>Outcome: ambulatory blood pressure (during work hours, leisure time or evening, sleep, or 24 hours) or hypertension status (if measured by ambulatory blood pressure).</p>	<p>Single exposure to job strain in cross-sectional studies was associated with higher work systolic and diastolic ABP. Associations were stronger in men than women and in studies of broad-based populations than those with limited occupational variance.</p>	<p>Quality issue unclear if study selection was performed by at least two authors.</p> <p>Measures of blood pressure and hypertension used as outcomes.</p>

Author, Year [Ref]	Population/context Aim	Number of studies/ participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Xu et al. 2015 (42)</b>	<p>Population: workers</p> <p>Aim: the objectives of the present study include: 1) investigating the association between coronary heart disease risk and categories of job strain accessed by demand control model; and 2) evaluating whether this relationship is caused by job control or job demands as observed separately.</p>	14 prospective cohort studies (including 232,767 participants) were included. Several meta analyses were performed.	<p>Exposure: job strain and job demands with the demand control model.</p> <p>Outcomes: risk/onset of coronary heart disease.</p>	<p>Fourteen prospective cohort studies comprising 232,767 participants were included. The risk of coronary heart disease was increased in high strain (RR 1.26; 95% CI 1.12–1.41) and passive jobs (RR 1.14; 95% CI 1.02–1.29) but not in active jobs (RR 1.09; 95% CI 0.97–1.22), when compared with low-strain group.</p> <p>...</p> <p>Individuals with high-strain and passive jobs were more likely to experience a coronary heart event.</p>	
<b>Fishta et al 2015 (33)</b>	<p>Systematic review of systematic reviews</p> <p>Population: working population.</p> <p>Aim: to find out whether psychosocial stress at work leads to cardiovascular morbidity and mortality.</p>	6 systematic reviews included, based on 81 studies.	<p>Exposure: various psychosocial stress models, such as demand-control model, effort-reward imbalance, organizational justice imbalance.</p> <p>Outcomes: cardiovascular morbidity and mortality.</p>	<p>The two enrolled meta-analysis confirmed a modest (1.32, 95 % CI 1.09–1.59) to moderate evidence (1.45; 95 % CI 1.15–1.84), predominantly among men, for the association between psychosocial stress at work and CV outcomes.</p>	Systematic review of systematic reviews, no meta-synthesis.
<b>Backe et al. 2012 (43)</b>	<p>Population: Working population.</p> <p>Aim: to conduct an up-to-date systematic review based on longitudinal data on the association of psychosocial stress at work with cardiovascular diseases.</p>	26 cohort studies of unselected general working population.	<p>Exposures: perceived at work (psychosocial stress at work, work stress, occupational stress, mental stress, job strain, effort, reward, demand, control).</p> <p>Outcomes: cardiovascular disease, coronary heart disease, myocardial infarction, heart failure, angina pectoris, stroke and hypertension.</p>	<p>No meta-analysis, descriptive results: In summary, statistically significant associations between psychosocial stress and cardiovascular disease were described in 14 out of 26 publications (11 out of 20 cohorts, respectively).</p> <p>Conclusions: In accordance with other systematic reviews, this review stresses the importance of psychosocial factors at work in the aetiology of cardiovascular diseases.</p>	
<b>Bongers et al. 2002 (44)</b>	<p>Population: working population.</p> <p>Aim: investigate relationship between psychosocial factors and upper limb problems, i.e., symptoms and disorders of the hand/wrist, elbow/forearm, and shoulder.</p>	28 included studies, of which 26 were cross sectional.	<p>Exposures: various models of job demands (quantitative and qualitative), job stimulus, job control, job support, job satisfaction and more.</p> <p>Outcome: Upper extremity problems (UEP)</p>	<p>The large majority of the identified studies reported an association between at least one work-related psychosocial factor and adverse upper extremity symptoms or signs. High perceived job stress was consistently associated with all assessed UEP in high and lower quality studies.</p>	

Author, Year [Ref]	Population/context Aim	Number of studies/ participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Koch et al. 2014 (45)</b>	Population: working population. Aim: investigate whether there is an association between the psychosocial factors ascertained using the ERI (effort-reward-imbalance) model and job-related musculoskeletal pain.	In total 19 studies were included (15 cross sectional, 3 prospective cohorts and 1 case control.)	Exposure: measure of effort-reward-imbalance. Outcome: reporting of having musculoskeletal disorders.	The association between the psychosocial factors ascertained using the ERI model and the frequency of musculoskeletal.	Aim was broader than just psychosocial exposure. Results and conclusion somewhat conflicting.
<b>Kraatz et al. 2013 (46)</b>	Population: workers Aim: to investigate whether psychosocial workplace factors have an independent, incremental effect on the development of neck and/or shoulder complaints, as described in studies of a longitudinal design.	In total 18 studies of which 16 were deemed high quality.	Exposure: psychosocial factors at work (job-demand-control model, job satisfaction, mental stress, organizational factors). Outcomes: the development and reporting of neck/shoulder complaints.	Study results were too heterogeneous to deduce pooled risk estimates. But the weight of evidence was strong for an incremental effect of job demands, job control, social support, and job strain, on the development of neck and/or shoulder disorders.	
<b>Lang et al 2012. (47)</b>	Population: workers in industrialized work settings. Aim: to conduct a systematic review and meta-analysis regarding the influence of occupational psychosocial risk factors on the development of musculoskeletal problems.	In total 50 included studies with various measures of psychosocial work factors and musculoskeletal problems used for 23 analyses.	Exposures: various psychosocial factors such as demands, control, job strain, social support, supervisor support, co-worker support, security etc.). Outcome: symptoms from low back, neck/shoulder, upper and lower extremity.	In total, 50 primary studies fulfilled inclusion criteria. Within these studies at least five effect sizes were available for 23 of the 45 possible psychosocial work stress musculoskeletal problems relationships, leaving 9 psychosocial variables and four musculoskeletal problem areas for analyses. Of these 23 relationships, pooled OR estimates were positive and significant ranging from 1.15 to 1.66 with the largest pooled OR estimating the relationship between highly monotonous work and lower back pain.	

Author, Year [Ref]	Population/context Aim	Number of studies/participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Mansfield et al. 2018. (48)</b>	Population: adults with carpal tunnel syndrome Aim: to investigate the incidence of carpal tunnel syndrome in association to psychosocial factors and whether psychosocial factors may predict the development of carpal tunnel syndrome.	6 moderate- to high-quality studies were included in the final review.	Exposure: psychosocial factors – cognitive (eg. neuropsychological functioning), affective (eg. distress, mood), behavioral (eg. coping strategies), vocational (eg. employment status, job satisfaction, self-perceived work ability), or interpersonal processes (eg. social support). Outcome: carpal tunnels syndrome (clinically diagnosed, self reported, electrophysiological testing).	Five studies reported a positive association between psychosocial factors and carpal tunnel syndrome, where psychosocial factors were more in those who reported carpal tunnel syndrome. One study reported no positive or negative association with carpal tunnel syndrome development. Four studies reported a negative association between psychosocial factors and carpal tunnel syndrome, where psychosocial factors were less in those who reported carpal tunnel syndrome. ... There is limited evidence for a positive association between psychosocial factors and carpal tunnel syndrome.	Aim broader than just work related psychosocial exposures.
<b>McLean et al. 2010 (49)</b>	Population: Workers without neck pain at baseline. Aim: to summarise current good-quality literature in order to identify factors that have been linked to the onset of a new episode of non-specific neck pain.	15 studies of which 14 were independent cohorts.	Exposures: risk factors (physical, psychological, sociodemographic and clinical). Outcome: onset of neck pain.	Female gender, older age, high job demands, low social/work support, being an ex-smoker, a history of low back disorders and a history of neck disorders were linked to the development of non-specific neck pain.	Broader aim than just psychosocial exposures.  Unclear if screen were performed by two independent researchers.
<b>Finney et al. 2013 (13)</b>	Population: employed in adult correctional facilities. Aim: examine organizational stressors that are related to job stress and burnout.	8 studies included	Exposures: categorized as: the organizational structure, climate, stressors intrinsic to the job, role within the organization, rewards at work and supervisory support. Outcome: job stress and burnout.	The results of this review indicate that organizational stressors are associated with job stress and burnout in COs within adult correctional facilities. Specifically, the organizational structure and climate was significantly associated with CO job stress and burnout.	

Author, Year [Ref]	Population/context Aim	Number of studies/participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Basu et al 2017 (14)</b>	Population: clinical staff working in emergency departments (medical, nursing, support workers). Aim: examining sources of organisational stress leading to psychological illness, burnout and adverse occupational outcomes.	25 studies included, several cross sectional. The heterogeneity of data precluded a meta-analysis, thus narrative review of contextual factors.	Exposure: Occupational stress, defined as when the resources of the individual are not sufficient to cope with the demands of a situation. Outcome: adverse health outcomes.	Results: Whilst high demand and low job control were commonly featured; other studies demonstrated the role of insufficient support at work, effort-reward imbalance and organisational injustice in the development of adverse health and occupational outcomes.	
<b>Bernal et al. 2015. (50)</b>	Population: nurses and aides (health care). Aim: To estimate the association between psychosocial risk factors in the workplace and musculoskeletal disorders.	24 studies included in systematic review, 17 in meta-analysis.	Exposure: psychosocial stress (high demand/low control). Outcomes (different models using subsets of studies) for back pain, low back pain, shoulder pain, neck pain.	This meta-analysis suggests that psychosocial risk factors at the workplace are associated with MSD in hospital nurses and nursing aides. Although most preventive strategies at the workplace are focused on ergonomic risk factors, improving the psychosocial work environment might have an impact on reducing MSD.	Quality issue: unclear if there were two independent screeners.
<b>Brborović et al 2017. (53)</b>	Population: nurses Aim: to investigate elements associated with nursing sickness presenteeism (SP) and sickness absenteeism (SA).	12 cohort studies (11 on sickness absenteeism and 1 on presenteeism).	Exposure: any exposure in primary studies. Outcome: sickness absenteeism (SA) and sickness presenteeism (SP).	Twentythree antecedents were associated with SA and grouped as work and organizational, mental and physical health, and demographic; 3 antecedents were associated with SP (job demands, burnout, and exhaustion). Exhaustion (fatigue) and job demands were associated with SA and SP.	Aim broader than just investigating psychosocial antecedents and associations with the outcomes.
<b>Samsudin et al 2018. (34)</b>	Population: junior doctors Aim: What impact has workplace bullying had on victims of workplace bullying as well as on organizations?	18 studies with 9,597 junior doctor participants included in narrative synthesis.	Exposure: bullying defined as being exposed to "situations where an employee is persistently exposed to negative and aggressive behaviours at work from superiors, colleagues and subordinates that are primarily of a psychological nature with the effect of humiliating, intimidating, frightening or punishing the target". Outcomes: health outcomes.	... significant associations between bullying and mental strain, job dissatisfaction, burnout, and increased accidents at work were observed. Concurrently, heterogeneity in the terms and methodologies used to examine workplace bullying as well as definitional issues in relation to the persistency of negative interactions were noted. Evidence suggests that workplace bullying is a serious occupational hazard for junior doctors.	Aim broader, had three aims in total.



Author, Year [Ref]	Population/context Aim	Number of studies/ participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
Schneider et al. 2018. (15)	<p>Population: workers at emergency departments (ED).  Aims: (1) to identify and categorize psychosocial ED work factors associated with the mental well-being of ED providers, (2) to systematically categorize these relationships according to their quantity as well as strength, and (3) to derive recommendations for future research and prevention practice.</p>	<p>In total 39 studies included, 37 cross-sectional and 2 prospective cohorts.  18 of the included studies focused on nurses and 12 on physicians, 4 studies involved nonclinical ED professions including administrative and support staff.</p>	<p>Exposure: psychosocial work factors assigned to a multi-level taxonomy drawing on the work system model: (a) patients and task-related work factors, e.g. job control, work overload; (b) organizational factors, e.g. personnel resources, rewards; (c) social factors, e.g. support from supervisors or colleagues, interpersonal conflict; and (d) other factors which could not be assigned to (a)–(c), such as general job demands.  Outcomes: mental well-being outcomes were classified into positive well-being outcomes, (job satisfaction, work engagement), affective symptoms and negative psychological functioning (emotional exhaustion, post-traumatic stress reactions), cognitive-behavioural outcomes, (turnover intention, commitment and role behaviours), health complaints, (somatic symptoms, physical complaint).</p>	<p>To the best of our knowledge, this review is the first to provide a quantitative summary of the research base on associations of psychosocial ED work factors and provider well-being. Conclusive results reveal that peer support, well-designed organizational structures, and employee reward systems balance the negative impact of adverse work factors on ED providers' well-being.</p>	
Magnavita et al. 2018 (51)	<p>Population: police workers.  Aim: investigate the associations between life stress, work stress, and the risk of metabolic syndrome and cardiovascular disease in police.</p>	<p>16 studies with total 17,698 participants. Average low quality of studies.</p>	<p>Exposure: occupational stress  Outcome: incidence and prevalence of cardiac and vascular diseases, including risk factors for CVD, such as hypertension, hypercholesterolemia, hypertriglyceridemia, obesity, and diabetes.</p>	<p>Exposure to stress in cross-sectional studies was inconsistently associated with hypertension, obesity, dyslipidaemia, and impaired glucose metabolism.  Results were, however, often conflicting and inconsistent with regard to definitions and measurement of stress, features of individual study design, study conduct, and conclusions drawn.</p>	<p>Aim broader than just investigating psychosocial risk.</p>

Author, Year [Ref]	Population/context Aim	Number of studies/participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Zangaro et al. 2007 (16)</b>	Population: registered nurses working in staff positions. Aim: to examine the strength of the relationships between job satisfaction and autonomy, job stress, and nurse-physician collaboration among registered nurses.	31 studies with 14,567 participants included in meta-analysis.	Exposure: job satisfaction Outcome: measures of autonomy, job stress, and workplace communication.	Job satisfaction was most strongly correlated with job stress (ES¼.43), followed by nurse-physician collaboration (ES¼.37), and autonomy (ES¼.30).	Authors had job satisfaction as exposure and job stress as outcome, results are however reported as correlations. Unclear screening was performed by two independent researchers.
<b>Brooks et al. 2016 (17)</b>	Population: occupational groups affected by disasters Aim: identify social and occupational factors affecting the psychological impact of disasters on responders.	111 studies, most of cross-sectional design. Most common disaster: terrorism followed by natural disasters.	Exposures: occupational factors in pre, peri and post phase of disaster. Outcome: wellbeing	The psychological impact of disasters on responders appeared associated with pre-disaster factors (occupational factors; specialised training and preparedness; life events and health), during-disaster factors (exposure; duration on site and arrival time; emotional involvement; peri-traumatic distress/dissociation; role-related stressors; perceptions of safety, threat and risk; harm to self or close others; social support; professional support) and post-disaster factors (professional support; impact on life; life events; media; coping strategies).	Aim broader than just psychosocial exposure. Authors developed their own quality assessment.
<b>O'Connor et al. 2018 (18)</b>	Population: mental health professionals Aim: The aim of this review is [1] to quantify the level of burnout in Mental health professionals and [2] to identify specific determinants of burnout in mental health professionals.	33 studies used in quantitative synthesis of prevalence data and 60 studies used in qualitative narrative synthesis of determinants of burnout.	Exposure: determinants were categorised as 'individual' factors and 'work-related' factor. Outcome: measures of burnout, typically validated questionnaires	Work-related factors such as workload and relationships at work, are key determinants for burnout, while role clarity, a sense of professional autonomy, a sense of being fairly treated, and access to regular clinical supervision appear to be protective. Staff working in community mental health teams may be more vulnerable to burnout than those working in some specialist community teams, e.g. assertive outreach, crisis teams.	Aim broader than just investigating psychosocial determinants of burnout.

Author, Year [Ref]	Population/context Aim	Number of studies/ participants	Exposure Outcome Method of synthesis	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Platt et al. 2012 (19)</b>	Population: veterinary surgeons. Aim: to conduct a systematic review of studies investigating suicidal behaviour and psychosocial problems in veterinary surgeons.	52 studies in total are included in this review, 11 were of relatively high quality as defined by scores 9–12 on the quality rating scale.	Exposure: non-fatal suicidal behaviour. Outcomes: psychosocial problems.	The majority of studies were of stress and occupational difficulties experienced by veterinary surgeons. Occupational stressors included managerial aspects of the job, long working hours, heavy workload, poor work-life balance, difficult client relations, and performing euthanasia. Few studies investigated suicidal behaviour or mental health difficulties in the profession. Some studies suggested that young and female veterinarians are at greatest risk of negative outcomes such as suicidal thoughts, mental health difficulties, and job dissatisfaction.	Unclear which was considered exposure, and which was outcome.

## Appendix 2 Included studies for research question 2 - interventions

Table of included studies that investigated effects of psychosocial workplace interventions.  
Data is extracted in the study's original language.

Author, year [Ref]	Population/kontext Syfte	Number of studies/ participants	Intervention Outcome	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Bartlett, L. et al. 2019 (97)</b>	Employees/Work To assess the effectiveness of mindfulness training delivered in the work context for employee mindfulness, stress, mental health, well-being and second to explore the moderating role of workplace characteristics and of intervention dose, content, and delivery mode.	25 primary studies (27 articles)	Intervention: Mindfulness training Outcomes: A range of outcomes including: mindfulness, stress, mental health, well-being etc.	Training increased mindfulness and had significant positive effects for perceived stress, psychological distress, anxiety, well-being and sleep, but evidence for improvements in work performance, depression and burnout was ambivalent. No significant results were observed in analyses of the influence of intervention or workplace characteristics.	Test of mediators
<b>Bellon, J.A. et al. 2018 (100)</b>	Working/Workplace To evaluate the effectiveness of psychological and educational interventions in preventing depression in the workplace.	3 primary studies/1,246 in intervention and 614 in control group.	Intervention: Universal prevention programs with non-depressed workers with any level of risk of depression. Outcomes: Depression	Psychological or educational interventions in the workplace may prevent depression, although the quality of evidence was low.	
<b>Buchberger, B. et al 2011 (98)</b>	Health care personnel/workplace health promotion. What kind of interventions in workplace health promotion help maintain the working capacity of health care personnel?	6	Intervention: Psychological health interventions Outcomes: A range of outcomes including: stress management, coping with workload, communication skills, burnout etc.	Study personnel actively taking part in psychological health interventions benefited from a significantly decreased intake of analgesics, better stress management and better coping with workload; they also displayed improved communication skills and gained additional vocational training.	Also economic evaluations and physical health interventions HTA-report

Author, year [Ref]	Population/kontext Syfte	Number of studies/ participants	Intervention Outcome	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Carolan, S. et al 2017 (80)</b>	Employees/Workplace To evaluate the overall effectiveness of occupational digital mental health interventions for employee psychological well-being and work effectiveness and to identify, through the partial implementation of positive deviance methodology, which intervention features influence engagement and adherence.	21 primary studies/5,260 (2711 intervention and 2,549 control group).	Intervention: Psychological interventions aimed at increasing psychological well-being or work effectiveness delivered via the Internet, mobile technology, or a computer program.  Outcome: Well-being or work effectiveness.	Occupational digital mental health interventions can improve workers' psychological well-being and increase work effectiveness.	
<b>Chen, C. M. and Lou, M.F. 2014 (77)</b>	Nurses/Health care To examine the effectiveness and application of mentorship programmes for recently registered nurses.	5 primary studies	Intervention: Mentorship programs  Outcome: Turnover rate, turnover costs, medical negligence rate, nursing competencies, job satisfaction, communication skills, and development of interpersonal relationships.	The results of this systematic review suggest that mentorship programmes are a beneficial process for mentors and recently registered nurses.	
<b>Clough, B. A. et al 2017 (57)</b>	Medical doctors/Health care To review and evaluate evidence on psychosocial interventions aimed at reducing occupational stress and burnout among medical doctors.	23 primary studies	Intervention: Psychosocial intervention targeting individual level stress or burnout.  Outcome: Directly assessed occupational stress or burnout among doctors (e.g. depression, anxiety, or substance use).	This review found that the quality of research examining the benefits of psychosocial/behavioural interventions for occupational stress and burnout in medical doctors remains low. Despite this, interventions focused on cognitive and behavioural principles appear to show promise in reducing doctor stress and burnout.	Unclear if initiated by workplace
<b>Corbiere, M. et al 2009 (85)</b>	Employees/Worksites To review the literature from 2001 to 2006 using Cottrell's conceptualization to assess preventive psychological interventions for workers.	24 primary studies	Intervention: Preventive (primary or secondary) psychological interventions for workers.  Outcome: A range of work and health-related outcomes.	There was a predominance of studies utilizing skills training. One-third of studies used a combination of individual, group and organization level interventions, most often supported by psychosocial intervention or participatory research. These components brought positive and significant results with regard to work and mental health outcomes to workers.	

Author, year [Ref]	Population/kontext Syfte	Number of studies/ participants	Intervention Outcome	Results and/or conclusions as presented by the authors of the systematic review	Comments
Daniels, K. et al 2017 (93)	Workers/Organisations To assess if interventions that seek to improve social environments in organizations promote well-being? Further: if interventions that seek to improve social environments in organizations improve performance?	8 primary studies	Intervention: Changes in the social environment in work organizations. Outcome: Well-being, performance.	There is promising evidence that workers' well-being may be improved through a combination of initiatives based on shared social activities. There is insufficient evidence to make any conclusions about the effects on well-being of organizational interventions to improve perceptions of fair treatment at work.	
Fox, S. et al 2018 (58)	Physicians/Health care To synthesise the literature describing interventions to improve resilience among physicians, to evaluate the quality of the extant research and to outline the type and efficacy of interventions implemented.	22 primary studies	Intervention: Interventions promoting resilience Outcome: Perceived stress, perceived resilience.	Methodological quality was low to moderate. The most frequently employed interventional strategies were psychosocial skills training and mindfulness training. Effect sizes were heterogeneous.	Unclear if two individuals did the screening for inclusion
Furlan, A. et al 2012 (74)	Workers/Work or facilitated by work To identify evidence-based programs, or intervention approaches that could be implemented or facilitated by employers to manage workers' depression and reduce associated productivity losses.	12 primary studies (from 14 publications)	Intervention: Interventions to manage workers' depression and reduce associated productivity losses. Outcome: A range of outcomes including: sickness absence, absenteeism, worker turnover, long-term disability, on-the-job health-related performance, work-functioning.	There is no one intervention found that can be recommended as effective for the four main outcomes suggested by the stakeholders (prevention and management of work disability/sickness absence, work functioning and recurrences of work disability/sickness absence).	
Gillen, P. A. et al 2017 (76)	Workers/Workplace To evaluate the effectiveness of workplace interventions to prevent bullying in the workplace.	5 primary studies	Intervention: Prevention of bullying in the workplace. Outcome: Bullying victimization, absenteeism, bullying perpetration, absenteeism.	This review shows that organisational and individual interventions may prevent bullying in the workplace. However, the evidence is of very low quality.	

Author, year [Ref]	Population/kontext Syfte	Number of studies/participants	Intervention Outcome	Results and/or conclusions as presented by the authors of the systematic review	Comments
Haggman-Laitila, A. et al 2018 (69)	Nurse leaders, nursing staff/Health care To gather, assess and synthesize current research knowledge on interventions that aimed to improve nurse leaders' well-being at work.	5 primary studies	Intervention: Interventions on well-being at work, where the target group consisted of nurse leaders or nurse leaders and nursing staff. Outcome: Wellbeing at work.	Stress management with mental exercises was the most examined and most successful interventions, as these primarily reduced the participants' stress levels.	
Hamberg-van Reenen, H. H. et al 2012 (96)	Workers/Workplace and elsewhere To give an overview of the evidence on the cost-effectiveness and financial return of interventions aimed at preventing or treating mental health problems, or to improve RTW of workers sicklisted from mental health problems.	10 primary studies	Intervention: Interventions aimed at preventing or treating mental health problems, or to improve RTW of workers sicklisted from mental health problems. Outcome: Effectiveness or costs.	Worksite interventions to prevent or treat mental health problems might be cost-effective, while RTW interventions aimed at depressed employees do not seem to be cost beneficial on the basis of those studies that included a full economic evaluation.	Not all workplace-based
Hill, R. C. et al 2016 (70)	Palliative care staff/Palliative care To investigate quantitative studies exploring the effectiveness of psychosocial interventions that attempt to improve psychological well-being of palliative care staff.	9 primary studies	Intervention: Psychosocial interventions Outcome: A range of psychological outcomes	Interventions comprised a mixture of relaxation, education, support and cognitive training and targeted: stress, fatigue, burnout, depression and satisfaction. The RCT evaluations didn't improve psychological wellbeing of palliative care staff. Only two of the quasi-experimental studies appeared to show improved staff wellbeing though these studies were methodologically weak.	Note definition of psychosocial: "An important aspect of our definition of psychosocial interventions is that there had to be an experiential and reflective component."
Janssen, M. et al 2018 (59)	Workers/Digital means related to workplace To gain deeper insight into the effects of two mindfulness interventions on employees' mental health across different occupational sectors.	23 primary studies (from 24 publications)	Intervention: Interventions with Mindfulness-Based Stress Reduction or Mindfulness-Based Cognitive Therapy. Outcome: A range of mental and psychological outcomes.	The results of this systematic review suggest that mindfulness based stress reduction may help to improve psychological functioning in employees.	Unclear if two individuals did the screening for inclusion.

Author, year [Ref]	Population/kontext Syfte	Number of studies/participants	Intervention Outcome	Results and/or conclusions as presented by the authors of the systematic review	Comments
Joyce, S. et al 2016 (60)	<p>Workers, workers with a depression or anxiety diagnosis/Workplace.</p> <p>To examine the effectiveness of workplace mental health interventions, defined as any intervention that a workplace may either initiate or facilitate that aims to prevent, treat or rehabilitate a worker with a diagnosis of depression, anxiety or both.</p>	140 systematic reviews including 481 primary studies.	<p>Intervention: Primary, secondary and tertiary workplace mental health interventions for anxiety and depression disorders.</p> <p>Outcome: Symptom reduction and occupational outcomes</p>	<p>Moderate evidence was identified for two primary prevention interventions: enhancing employee control and promoting physical activity. Stronger evidence was found for CBT-based stress management although less evidence was found for other secondary prevention interventions, such as counselling. Strong evidence was also found against the routine use of debriefing following trauma. Tertiary interventions with a specific focus on work, such as exposure therapy and CBT-based and problem-focused return-to-work programmes, had a strong evidence base for improving symptomology and a moderate evidence base for improving occupational outcomes.</p>	
Lamothe, M. et al 2016 (61)	<p>Healthcare personnel/Healthcare</p> <p>To identify outcomes in studies on the effect of Mindfulness-Based Stress Reduction in healthcare personnel. The second objective is to evaluate the impact of Mindfulness-Based Stress Reduction on these outcomes. The third objective is to assess if some of these outcomes reflect empathy and three key emotional competencies: (a) identification of one's own emotions, (b) identification of other's emotions, and (c) emotional acceptance, as these are deemed essential to professional healthcare.</p>	39 primary studies	<p>Intervention: Mindfulness-Based Stress Reduction -based intervention.</p> <p>Outcome: A range of mental health, physical health, mindfulness and relational outcomes.</p>	<p>Evidence regarding the effects of Mindfulness-Based Stress Reduction in professionals suggests this intervention is associated with improvements in burnout, stress, anxiety and depression. Improvements in empathy are also suggested but no clear evidence is currently available on emotional competencies.</p>	



Author, year [Ref]	Population/kontext Syfte	Number of studies/ participants	Intervention Outcome	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Lee, N. K. et al 2014 (86)</b>	Workers/Male dominated industries To examine the current evidence base for workplace interventions addressing mental health problems in male-dominated industries.	5 primary studies	Intervention: Mental health workplace interventions Outcome: Work and health related outcomes	Overall, the body of evidence supporting effective interventions for mental health problems among workers in male-dominated industries is limited. Nonetheless, the evidence does suggest that mental health interventions in male-dominated industries are logistically feasible and can have some positive impact on the mental health of workers, particularly for high prevalence low severity disorders such as anxiety and depression.	
<b>Marine, A. et al 20016 (62)</b>	Healthcare workers/Health care To evaluate the effectiveness of work- and person-directed interventions compared to no intervention or alternative interventions in preventing stress at work in healthcare workers.	19 primary studies	Intervention: Interventions aimed at preventing or reducing stress arising from work. Outcome: Occupational stress or burnout.	We conclude that cognitive-behavioral training as well as mental and physical relaxation all reduce stress moderately. Changing work schedules can also reduce stress, but other organizational interventions have no clear effects.	
<b>Montano, D. et al 2014 (84)</b>	Employees/Workplace Evaluate all organisational-level intervention studies identified by our search strategy on the basis of a systematic classification. This classification aims to synthesise the major modifications of the working conditions implemented by the interventions. We distinguish work organisation-directed changes from work time-directed changes and from changes of the material substrate of work.	39 primary studies	Intervention: Organisational-level workplace interventions aiming at improving employees' health Outcome: Effect of intervention, which is a wide range of different outcomes including different health outcomes, sleep, injury rates and sick leave.	Success rates were higher among more comprehensive interventions tackling material, organisational and work-time related conditions simultaneously.	

Author, year [Ref]	Population/kontext Syfte	Number of studies/participants	Intervention Outcome	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Murray, M. et al 2016 (75)</b>	<p>General Practitioners/Health care</p> <p>To evaluate the effectiveness of interventions designed to improve General Practitioner well-being across two continua; psychopathology (mental ill-health focus) and 'flourishing to flourishing' (positive mental health focus).</p>	4 primary studies/997 general practitioners	<p>Intervention: Well-being interventions</p> <p>Outcome: Mental illness or positive mental health</p>	The studies reported statistically significant improvement in self-reported mental ill-health. Two interventions used cognitive-behavioral techniques, one was mindfulness-based and one feedback scores and self-help information.	
<b>Naghieh, A. et al 2015 (94)</b>	<p>Teachers/School</p> <p>To evaluate the effectiveness of organisational interventions for improving wellbeing and reducing work-related stress in teachers.</p>	4 primary studies	<p>Intervention: Organisational interventions for employee wellbeing targeting the stressors in the work environment, rather than the stress response of the individual employee.</p> <p>Outcome: work stress, wellbeing, teacher turnover (retention rates), and sickness absence.</p>	Changing the way teachers' work is organised at schools may improve the teachers' wellbeing and may reduce teacher resignations.	
<b>Nigatu, Y. T. et al 2019 (87)</b>	<p>Workers/Workplace</p> <p>To evaluate the effectiveness of indicated interventions for reducing depressive symptoms in the workplace.</p>	15 primary studies	<p>Intervention: Indicated interventions for reducing depressive symptoms.</p> <p>Outcome: Depressive disorder or depressive symptomatology.</p>	This review demonstrates that indicated interventions can significantly reduce the level of depressive symptoms among workers.	
<b>Wagner et al. 2015 (78)</b>	<p>Adults (15+ years) working or attempting to work/Work or work related.</p> <p>To investigate what level of evidence is available that social support and/or supervisory quality interventions impact work outcomes.</p>	10 systematic literature reviews	<p>Intervention: workplace interventions specifically targeting social support or supervisory quality.</p> <p>Outcome: Absenteeism, financial outcomes, and/or productivity</p>	There is moderate evidence that social support and limited evidence that supervisory quality interventions have a positive effect on work outcomes.	Best-Evidence Synthesis of Systematic Reviews

Author, year [Ref]	Population/kontext Syfte	Number of studies/participants	Intervention Outcome	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Ravallier et al. 2016 (71)</b>	Adult employees without clinical levels of psychological illness/Work To explore whether the implementation of complementary therapies in the workplace can aid in improvement of employee health and performance at work.	10 primary studies	Intervention: Workplace-based complementary therapies Outcome: Health and performance.	Mindfulness and meditation-based interventions were most effective in improving workplace health and work performance; the latter demonstrating some evidence of maintaining gains up to 3 months later. The evidence for relaxation interventions was inconclusive.	Aim broader than just psychosocial interventions.
<b>Luken et al. 2016 (63)</b>	Individuals with workplace burnout but otherwise healthy (mainly health care providers and teachers)/Work To investigate the evidence for the efficacy of practicing mindfulness to treat job burnout.	8 primary studies	Intervention: Mindfulness training Outcome: A range of outcomes including mindfulness stress reductions.	6 of the 8 studies demonstrated statistically significant decreases in job burnout after mindfulness training. There is strong evidence for the use of mindfulness practice to reduce job burnout among health care professionals and teachers.	Unclear if all interventions were work related.
<b>Brand et al. 2017 (92)</b>	Healthcare personnel/Health care To identify whole-system healthy workplace interventions in healthcare settings that incorporate (combinations of) these recommendations and determine whether they improve staff health and wellbeing.	11 primary studies	Intervention: interventions which were targeted at all staff within a healthcare setting, categorized as pre-determined, pre-determined and some choice of activities including a wide choice of a range of activities and adaptation. Outcome: Individual health behaviours, health outcomes, and psychosocial workplace environment.	Only five of the interventions included substantial involvement and engagement of leadership and efforts aimed at up-skilling the leadership of staff to support staff health and wellbeing. All studies were deemed by their authors to be at least partly effective. Two studies reported statistically significant improvement in objectively measured physical health (BMI) and eight in subjective mental health. Six studies reported statistically significant positive changes in subjectively assessed health behaviours.	Whole system approaches are broader concepts than psychosocial interventions.

Author, year [Ref]	Population/kontext Syfte	Number of studies/participants	Intervention Outcome	Results and/or conclusions as presented by the authors of the systematic review	Comments
Tan et al 2014. (88)	Workers/Workplace To assess evidence for work-based universal prevention of depressive illness.	9 primary studies	Intervention: preventive workplace interventions Outcomes: depressive symptoms	The majority of the included studies utilized cognitive behavioral therapy (CBT) techniques. The overall standardized mean difference (SMD) between the intervention and control groups was 0.16 (95% confidence interval (CI): 0.07, 0.24, P = 0.0002), indicating a small positive effect.  There is good quality evidence that universally delivered workplace mental health interventions can reduce the level of depression symptoms among workers.	
Stock et al. 2018 (95)	Non-sick-listed workers/Workplace To answer the following research question: compared to usual work activity (ie, no intervention), are workplace interventions that target work organization or the psychosocial work environment effective in preventing the onset of or reducing the incidence, prevalence or intensity of work-related musculoskeletal pain or of musculoskeletal disorders).	28 primary studies	Intervention: any intervention (organizational component or targeted organizational or psychosocial) in the workplaces.  Outcome: musculoskeletal health outcome (incidence, prevalence or intensity of such pain, specific disorders, or work absence/work disability due to such pain or disorders).	One before-after uncontrolled study provided very low-quality evidence that a participatory organizational intervention targeting psychosocial work exposures was more effective than work as usual in reducing the six-month prevalence of neck/shoulder and lower back pain with functional limitations.	Aim broader than just psychosocial work interventions.
Van Wyk et al. 2010 (64)	Professional health workers and health teams/Primary, secondary, tertiary, community, residential, and referral care settings. To determine the effects of preventive staff-support interventions for health workers.	10 primary studies/716 participants	Interventions: Interventions intended to improve health-workers' ability to cope or manage job stress. Outcomes: absenteeism; turnover; burnout; productivity; job stress; job satisfaction, staff morale or work motivation.	Three studies demonstrated a beneficial effect of stress management training intervention on job stress. Only one of these showed that this effect is sustainable over the medium-term. One study demonstrated the beneficial effect of a high intensity, stress management training intervention on burnout. Low and moderate intensity stress management training interventions failed to demonstrate benefit on burnout or staff satisfaction. Management interventions demonstrated increases in job satisfaction but failed to show effect on absenteeism.	

Author, year [Ref]	Population/kontext Syfte	Number of studies/participants	Intervention Outcome	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Palmer et al. 2012 (83)</b>	Workers/Workplace or community To assess the effectiveness of interventions in community and workplace settings to reduce sickness absence and job loss in workers with musculoskeletal disorders.	42 primary studies	Intervention: Workplace adaptations and provision of additional services. Outcome: Sickness absence, musculoskeletal disorder related job loss, RTW during follow-up or prevalence of work attendance at follow-up.	Most interventions appeared beneficial ... however, effects were smaller in larger and better-quality studies, suggesting publication bias.	Broader aim than just psychosocial interventions and workplace settings. The effects of psychosocial interventions available in table 4 of the publication.
<b>Wan Mohd Yunus et al. 2018 (89)</b>	Employees/Workplace based or related to application of skills in workplace. To evaluate the effectiveness of workplace interventions for depression in RCTs investigating the efficacy of different therapeutic approaches involving both universal and targeted interventions.	22 primary studies	Intervention: studies investigating the efficacy of prevention interventions, treatments, workshops, seminars or any interventions that were workplace-based or related to the application of skills in the workplace. Outcome: depression, and levels of depressive symptoms.	The cognitive behavioural therapy (CBT) approach is the most frequently used in the workplace, while interventions that combine different therapeutic approaches showed the most promising results. A universal intervention in the workplace that combines CBT and coping flexibility recorded the highest effect size (d=1.45 at 4 months' follow-up). Most interventions were delivered in group format and showed low attrition rates compared with other delivery formats.	Unclear if two individuals did the screening for inclusion.
<b>Ruotsalainen et al. 2008 (65)</b>	Health-care workers who had not actively sought help for stress, burnout, depression, or anxiety disorder/Workplace To ascertain the effectiveness of interventions in reducing stress in health care workers.	14 primary studies/2,812 participants	Intervention: Any stress intervention, characterized as person directed, person-work interface or organisational. Outcome: stress or burnout and all measures of the detrimental effects of stress or burnout.	Limited evidence is available for a small, but probably relevant reduction in stress levels from person-directed, person-work interface, and organizational interventions among health-care workers.	
<b>Zhang et al. 2016 (79)</b>	Newly graduated nurses/Health care To evaluate the effectiveness of a mentoring program on the mentor, mentee, and organization.	9 primary studies	Intervention: mentoring programs. Outcome: Various outcomes including: turnover, job satisfaction, costs, occupational stress etc.	These studies revealed that the turnover rate can be decreased through a mentoring program. Additionally, mentoring can enhance nursing competency and establish a supportive workforce environment, resulting in positive outcome.	

Author, year [Ref]	Population/kontext Syfte	Number of studies/ participants	Intervention Outcome	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Panagioti et al. 2017 (66)</b>	Physicians/Health care and other Firstly, to assess the effectiveness of interventions in reducing burnout. Secondly, what types of interventions are the most effective. Thirdly, are any differences in the effect of interventions in different health care settings (primary care, secondary or intensive care) and in physicians with different levels of working experience.	19 primary studies	Intervention: Interventions designed to relieve stress and/or improve performance of physicians and reported burnout outcomes including physician-directed interventions and organization-directed interventions. Outcome: Burnout	Interventions were associated with small significant reductions in burnout. Evidence from this meta-analysis suggests that recent intervention programs for burnout in physicians were associated with small benefits that may be boosted by adoption of organization-directed approaches. This finding provides support for the view that burnout is a problem of the whole health care organization, rather than individuals.	Potential quality issue on study selection (not clear that two independent persons did the screening). Aim broader than just workplace settings.
<b>West et al. 2016 (90)</b>	Physicians/Health care To examine the literature to date on interventions to prevent and reduce physician burnout.	52 primary studies/3,630 physicians	Intervention: interventions to prevent and reduce physician burnout. Outcome: Burnout, emotional exhaustion score, and depersonalisation score.	The literature indicates that both individual-focused and structural or organisational strategies can result in clinically meaningful reductions in burnout among physicians.	Many various types of interventions. Summed effects reported on different outcomes.
<b>Penalba et al. 2008 (91)</b>	Police officers/Police To assess the effectiveness of psychosocial interventions for the prevention of psychological disorders in law enforcement officers. This included primary prevention to reduce its incidence, secondary prevention and tertiary prevention.	10 primary studies	Intervention: Psychosocial interventions, as long as they were manualised or described by study's authors, allowing replication. Outcomes: Psychological disorders and/or psychological symptoms.	There is evidence only from individual small and low-quality trials with minimal data suggesting that police officers benefit from psychosocial interventions, in terms of physical symptoms and psychological symptoms such as anxiety, depression, sleep problems, cynicism, anger, PTSD, marital problems and distress. No data on adverse effects were available.	10 studies were included in the review but only 5 reported data that could be used. No meta-analyses were possible due to diversity of participants, interventions and outcomes.

Author, year [Ref]	Population/kontext Syfte	Number of studies/participants	Intervention Outcome	Results and/or conclusions as presented by the authors of the systematic review	Comments
<b>Taylor et al. 2018 (81)</b>	Health-care staff workers/Health care To synthesise the evidence-base for Schwartz Center Rounds to assess any impact on healthcare staff and identify key features. Second aim to scope evidence for interventions with similar aims, and compare effectiveness and key features to Rounds.	10 primary studies (from 12 publications)	Intervention: Schwartz Rounds (where staff could openly share and reflect on the emotional, social and ethical challenges faced at work). Scoping review also collected studies with comparative interventions. Outcome: Wellbeing (qualitative or quantitative assessment).	Findings showed the value of Rounds to attenders, with a self-reported positive impact on individuals, their relationships with colleagues and patients and wider cultural changes. The evidence for the comparative interventions was scant and also low/moderate quality. ... Evidence of effectiveness for all interventions considered here remains limited.	Unclear if two individuals did the screening for inclusion.
<b>Williams et al. 2018 (72)</b>	Employees within health care organizations/Health care To systematically review the literature regarding health and well-being interventions for health care employees to assess whether we are able to draw any conclusions as to which interventions are most effective in a health care setting.	44 primary studies	Intervention: Interventions intended to improve employee health and well-being within the context of a health care organization, conceptualized as changing ways of working, physical health promotion, complementary and alternative medicine, stress management interventions, and those employing multimodal interventions. Outcome: A range of different measures of health and wellbeing.	The majority of interventions reviewed here led to measurable improvements in health and well-being, but methodological shortcomings and a lack of standardization cloud our ability at this point to directly compare specific interventions with any clarity.	Some interventions not within our definition of psychosocial.
<b>Bambra, C. et al. 2007 (82)</b>	Workers/Workplace To systematically review the health and psychosocial effects (with reference to the demand-control-support model) of changes to the work environment brought about by task structure work reorganisation, and to determine whether those effects differ for different socioeconomic groups.	19 primary studies	Intervention: experimental and quasi-experimental studies that examined the effects on health of interventions which reorganised work task structures. The review included all task structure interventions that fell into one of Karasek's three clusters: task variety, teamworking and autonomous groups. Outcome: measures of the psychosocial work environment (demand, control or support) and health outcomes including specific diseases as well as more general measures of physical health and psychological well-being.	This systematic review suggests that task-restructuring interventions that increase demand or decrease control adversely affect the health of employees.	

Author, year [Ref]	Population/kontext Syfte	Number of studies/participants	Intervention Outcome	Results and/or conclusions as presented by the authors of the systematic review	Comments
Gilmartin, H. et al 2017 (73)	Health-care providers/Hospital setting To examine the effectiveness of brief mindfulness programs on health care providers in the hospital setting.	14 primary studies	Intervention: Studies that evaluated brief mindfulness-based interventions using dedicated content (eg. mindfulness-based stress reduction-based programs ≤ 4 hours). Outcome: Well-being, behavior etc.	Nine of 14 studies reported positive changes in levels of stress, anxiety, mindfulness, resiliency, and burnout symptoms. No studies found an effect on provider behavior. Brief mindfulness interventions may be effective in improving provider well-being.	
Guillaumie, L. et al 2017 (67)	Registered nurses and nursing students/Health care To review the effects of mindfulness-based interventions on Registered Nurses and nursing students.	32 primary studies	Intervention: Mindfulness-based interventions. Outcome: Range of physical and psychological outcomes both quantitative and qualitative.	Mindfulness appeared to improve nurses' mental health significantly. It could be used in worksite health promotion programmes. Only a few studies have explored the impact of mindfulness on nurses' professional behaviors and their relationships with patients and colleagues.	All kinds of mindfulness, meditation and relaxation techniques were included in this study. Unclear if all interventions were workplace initiated.
Kuster, A. T. et al 2017 (68)	Employees/Work To compare the effects of computer-based interventions to in-person interventions for preventing and reducing stress in employees.	2 primary studies/159 participants	Intervention: Worker-focused web-based stress management intervention, aimed at preventing or reducing work-related stress. Delivered via email, a website, or a stand-alone computer programme, and compared to a face-to-face stress management intervention with the same content. Outcome: Stress, burnout, sick leave, absenteeism, return to work.	We found very low-quality evidence with conflicting results, when comparing the effectiveness of computer-based stress management interventions with in-person stress management interventions in employees. We could include only two studies with small sample sizes. We have very little confidence in the effect estimates. It is very likely that future studies will change these conclusions.	
Lee, H. F. et al 2016 (56)	Nurses/Health care To integrate the effects of coping strategies designed to decrease burnout and the time they were incorporated (that is the time frame).	7 primary studies	Intervention: Interventions on coping strategies to reduce nurse burnout. Outcome: Burnout scores	The primary findings of the present study reveal that coping strategies can decrease nurses' work-related burnout. The emotional exhaustion, depersonalization, and personal accomplishment were reduced in the intervention group but increased or remained unchanged in the control group. In the emotional exhaustion and depersonalization dimensions, the effects could be maintained for 1 year, and personal accomplishment was only effective for 6 months.	



## Appendix 3 Excluded studies based on relevance, research question 1– associations

**Studies that were included in screening procedure but excluded after full text reading because deemed not being relevant to the research question as it was formulated according to PICO/PEO and inclusion and exclusion criteria.**

Reference	Reason for exclusion
1 Crawford JO, MacCalman L, Jackson CA. The health and well-being of remote and mobile workers. <i>Occupational Medicine</i> 2011; 61:385–394.	Wrong exposure
2 Eijkelhof BH, Huysmans MA, Bruno Garza JL, Blatter BM, van Dieen JH, Dennerlein JT, et al. The effects of workplace stressors on muscle activity in the neck-shoulder and forearm muscles during computer work: a systematic review and meta-analysis. <i>Eur J Appl Physiol</i> 2013; 113:2897-2912.	Wrong outcome
3 Gershon RR, Stone PW, Zeltser M, Faucett J, MacDavitt K, Chou SS. Organizational climate and nurse health outcomes in the United States: a systematic review. <i>Ind Health</i> 2007; 45:622–636.	Wrong context
4 Salvagioni DAJ, Melanda FN, Mesas AE, Gonzalez AD, Gabani FL, Andrade SM. Physical, psychological and occupational consequences of job burnout: A systematic review of prospective studies. <i>PLoS One</i> 2017; 12:e0185781.	Wrong exposure
5 Trudel X, Brisson C, Gilbert-Ouimet M, Milot A. Psychosocial Stressors at Work and Ambulatory Blood Pressure. <i>Curr Cardiol Rep</i> 2018; 20:127.	Not a systematic review
6 Wilson G, Larkin V, Redfern N, Stewart J, Steven A. Exploring the relationship between mentoring and doctors' health and wellbeing: a narrative review. <i>J R Soc Med</i> 2017; 110:188–197.	Wrong study question
7 Weberg D. Transformational leadership and staff retention: an evidence review with implications for healthcare systems. <i>Nursing Administration Quarterly</i> 2010; 34:246–258.	Wrong exposure
8 Donnelly E, Siebert D. Occupational risk factors in the emergency medical services. <i>Prehosp Disaster Med</i> 2009; 24:422–429.	Wrong study question
9 Hillier D, Fewell F, Cann W, Shephard V. Wellness at work: enhancing the quality of our working lives. <i>Int Rev Psychiatry</i> 2005; 17:419-431.	Wrong study question
10 Kivimaki M, Nyberg ST, Batty GD, Fransson EI, Heikkila K, Alfredsson L, et al. Job strain as a risk factor for coronary heart disease: a collaborative meta-analysis of individual participant data. <i>Lancet</i> 2012; 380:1491–1497.	Not a systematic review
11 Labrague LJ, McEnroe-Petitte DM, Leocadio MC, Van Bogaert P, Cummings GG. Stress and ways of coping among nurse managers: An integrative review. <i>J Clin Nurs</i> 2018; 27:1346–1359.	Wrong study question
12 Lamiani G, Borghi L, Argentero P. When healthcare professionals cannot do the right thing: A systematic review of moral distress and its correlates. <i>J Health Psychol</i> 2017; 22:51–67.	Wrong study question
13 Lim J, Bogossian F, Ahern K. Stress and coping in Australian nurses: a systematic review. <i>Int Nurs Rev</i> 2010; 57:22–31.	Wrong population and context
14 Sakuraya A, Watanabe K, Kawakami N, Imamura K, Ando E, Asai Y, et al. Work-related psychosocial factors and onset of metabolic syndrome among workers: a systematic review and meta-analysis protocol. <i>BMJ Open</i> 2017; 7:e016716.	Not a systematic review
15 Siegrist J, Li J. Work Stress and Altered Biomarkers: A Synthesis of Findings Based on the Effort-Reward Imbalance Model. <i>Int J Environ Res Public Health</i> 2017; 14.	Not a systematic review

Reference		Reason for exclusion
16	Szerencsi K, van Amelsvoort LG, Viechtbauer W, Mohren DC, Prins MH, Kant I. The association between study characteristics and outcome in the relation between job stress and cardiovascular disease – a multilevel meta-regression analysis. <i>Scand J Work Environ Health</i> 2012; 38:489–502.	Wrong study question
17	Tang K. A reciprocal interplay between psychosocial job stressors and worker well-being? A systematic review of the “reversed” effect. <i>Scand J Work Environ Health</i> 2014; 40:441–456	Wrong study question

## Appendix 4. Excluded studies based on high risk of bias (assessed using AMSTAR) – research question 1: associations

Reference	
1	Abramis DJ. Work role ambiguity, job satisfaction, and job performance: Meta-analyses and review. <i>Psychological Reports</i> 1994; 75:1411–1433.
2	Adriaenssens J, De Gucht V, Maes S. Determinants and prevalence of burnout in emergency nurses: a systematic review of 25 years of research. <i>Int J Nurs Stud</i> 2015; 52:649-661.
3	Azam, K., et al. (2017). "Causes and Adverse Impact of Physician Burnout: A Systematic Review." <i>J Coll Physicians Surg Pak</i> 27(8): 495–501.
4	Bonde, J. P. (2008). "Psychosocial factors at work and risk of depression: a systematic review of the epidemiological evidence." <i>Occup Environ Med</i> 65(7): 438–445.
5	Campbell P, Wynne-Jones G, Muller S, Dunn KM. The influence of employment social support for risk and prognosis in nonspecific back pain: a systematic review and critical synthesis. <i>Int Arch Occup Environ Health</i> 2013; 86:119–137.
6	Chan DK, Lam CB, Chow SY, Cheung SF. Examining the job-related, psychological, and physical outcomes of workplace sexual harassment: a meta-analytic review. <i>Psychology of Women Quarterly</i> 2008; 32:362–376.
7	Duijts SF, Kant I, Swaen GM, van den Brandt PA, Zeegers MP. A meta-analysis of observational studies identifies predictors of sickness absence. <i>J Clin Epidemiol</i> 2007; 60:1105–1115.
8	Duquette A, Kerouac S, Sandhu BK, Beaudet L. Factors related to nursing burnout: a review of empirical knowledge. <i>Issues in Mental Health Nursing</i> 1994; 15:337–358.
9	Eller NH, Netterstrom B, Gyntelberg F, Kristensen TS, Nielsen F, Steptoe A, et al. Work-related psychosocial factors and the development of ischemic heart disease: a systematic review. <i>Cardiol Rev</i> 2009; 17:83–97.
10	Faragher EB, Cass M, Cooper CL. The relationship between job satisfaction and health: a meta-analysis. <i>Occup Environ Med</i> 2005; 62:105–112
11	Fernandes C, Pereira A. Exposure to psychosocial risk factors in the context of work: a systematic review. <i>Rev Saude Publica</i> 2016; 50:24.
12	Friganovic A, Kovacevic I, Ilic B, Zulec M, Kriksic V, Grgas Bile C. Healthy Settings in Hospital – How to Prevent Burnout Syndrome in Nurses: Literature Review. <i>Acta Clin Croat</i> 2017; 56:292–298.
13	Halim UA, Riding DM. Systematic review of the prevalence, impact and mitigating strategies for bullying, undermining behaviour and harassment in the surgical workplace. <i>Br J Surg</i> 2018; 105:1390–1397.
14	Hartvigsen J, Lings S, Leboeuf-Yde C, Bakkevig L. Psychosocial factors at work in relation to low back pain and consequences of low back pain; a systematic, critical review of prospective cohort studies. <i>Occup Environ Med</i> 2004; 61:e2.
15	Hausser JA, Mojzisch A, Niesel M, Schulz-Hardt S. Ten years on: a review of recent research on the Job Demand-Control (Support) model and psychological well-being. <i>Work &amp; Stress</i> 2010; 24:1–35.
16	Heinrichs K, Angerer P, Loerbroks A. Psychosocial working conditions as determinants of asthma self-management at work: A systematic review. <i>J Asthma</i> 2018; 55:1095–1104.
17	Henning MA, Zhou C, Adams P, Moir F, Hobson J, Hallett C, et al. Workplace harassment among staff in higher education: A systematic review. <i>Asia Pacific Education Review</i> 2017; 18:521–539.
18	Hwang, Hong. Work-related cardiovascular disease risk factors using a socioecological approach: implications for practice and research. <i>Eur J Cardiovasc Nurs</i> 2012; 11:114–126.
19	Hünefeld L, Gerstenberg S, Hüffmeier J. Job satisfaction and mental health of temporary agency workers in europe: A systematic review and research agenda. <i>Work &amp; Stress</i> 2019.

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- 63 Cosgrove MP, Sargeant LA, Caleyachetty R, Griffin SJ. Work-related stress and Type 2 diabetes: systematic review and meta-analysis. *Occup Med (Lond)* 2012; 62:167–173.
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- 70 Cooper SL, Carleton HL, Chamberlain SA, Cummings GG, Bambrick W, Estabrooks CA. Burnout in the nursing home health care aide: A systematic review. *Burnout Research* 2016; 3:76–87.
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- 72 Hoogendoorn WE, van Poppel MN, Bongers PM, Koes BW, Bouter LM. Systematic review of psychosocial factors at work and private life as risk factors for back pain. *Spine (Phila Pa 1976)* 2000; 25:2114–2125.
- 73 Robbins JM, Ford MT, Tetrick LE. Perceived unfairness and employee health: a meta-analytic integration. *J Appl Psychol* 2012; 97:235–272.
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## Appendix 5 Excluded studies based on relevance, research question 2 – interventions

Studies that were included in the screening procedure but excluded after full text reading because deemed not being relevant to the research question as it was formulated according to PICO/PEO and inclusion and exclusion criteria.

Reference	Reason for exclusion
1 Ahola K, Toppinen-Tanner S, Seppänen J. Interventions to alleviate burnout symptoms and to support return to work among employees with burnout: Systematic review and meta-analysis. <i>Burnout Research</i> . 2017; 4:1–11.	Not workplace
2 Basu S, Qayyum H, Mason S. Occupational stress in the ED: a systematic literature review. <i>Emerg Med J</i> . 2017; 34(7):441–7.	Association study
3 Bercier ML, Maynard BR. Interventions for secondary traumatic stress with mental health workers: A systematic review. <i>Research on Social Work Practice</i> . 2015; 25(1):81–9.	Not workplace
4 Bigos SJ, Holland J, Holland C, Webster JS, Battie M, Malmgren JA. High-quality controlled trials on preventing episodes of back problems: systematic literature review in working-age adults. <i>Spine J</i> . 2009; 9(2):147–68.	Not workplace
5 Braun SE, Kinser PA, Rybarczyk B. Can mindfulness in health care professionals improve patient care? An integrative review and proposed model. <i>Transl Behav Med</i> . 2019; 9(2):187–201.	Not workplace care?
6 Burton A, Burgess C, Dean S, Koutsopoulou GZ, Hugh-Jones S. How Effective are Mindfulness-Based Interventions for Reducing Stress Among Healthcare Professionals? A Systematic Review and Meta-Analysis. <i>Stress Health</i> . 2017; 33(1):3–13.	Not workplace
7 Busireddy KR, Miller JA, Ellison K, Ren V, Qayyum R, Panda M. Efficacy of Interventions to Reduce Resident Physician Burnout: A Systematic Review. <i>J Grad Med Educ</i> . 2017; 9(3):294–301.	Not workplace
8 Chan Osilla K, Van Busum K, Schnyer C, Wozar Larkin J, Eibner C, Mattke S. Systematic Review of the Impact of Worksite Wellness Programs. <i>American Journal of Managed Care</i> . 2012; 18(2):e68–81.	Not psychosocial
9 Daniels K, Gedikli C, Watson D, Semkina A, Vaughn O. Job design, employment practices and well-being: a systematic review of intervention studies. <i>Ergonomics</i> . 2017; 60(9):1177–96.	Not psychosocial
10 Dharmawardene M, Givens J, Wachholtz A, Makowski S, Tjia J. A systematic review and meta-analysis of meditative interventions for informal caregivers and health professionals. <i>BMJ Support Palliat Care</i> . 2016; 6(2):160–9.	Not workplace
11 Elliott KE, Scott JL, Stirling C, Martin AJ, Robinson A. Building capacity and resilience in the dementia care workforce: a systematic review of interventions targeting worker and organizational outcomes. <i>Int Psychogeriatr</i> . 2012; 24(6):882–94.	Not psychosocial
12 Gillman L, Adams J, Kovac R, Kilcullen A, House A, Doyle C. Strategies to promote coping and resilience in oncology and palliative care nurses caring for adult patients with malignancy: a comprehensive systematic review. <i>JBIR Database System Rev Implement Rep</i> . 2015; 13(5):131–204.	Not possible to distinguish intervention results from association studies
13 Guzzo RA, Jette RD, Katzell RA. The effects of psychologically based intervention programs on worker productivity: A meta-analysis. <i>Personnel Psychology</i> . 1985; 38(2):275–91.	Not a systematic literature review
14 Harden A, Peersman G, Oliver S, Mauthner M, Oakley A. A systematic review of the effectiveness of health promotion interventions in the workplace. <i>Occup Med (Lond)</i> . 1999; 49(8):540–8.	Not psychosocial
15 Howarth A, Quesada J, Silva J, Judycki S, Mills PR. The impact of digital health interventions on health-related outcomes in the workplace: A systematic review. <i>Digit Health</i> . 2018; 4:2055207618770861.	Not psychosocial

Reference		Reason for exclusion
16	Jongen C, McCalman J, Bainbridge R. Health workforce cultural competency interventions: a systematic scoping review. <i>BMC Health Serv Res.</i> 2018; 18(1):232.	Geographic limitation
17	Li H, Zhao M, Shi Y, Xing Z, Li Y, Wang S, et al. The effectiveness of aromatherapy and massage on stress management in nurses: A systematic review. <i>J Clin Nurs.</i> 2019; 28(3):372–85.	Not psychosocial
18	McLeod J. How effective is workplace counselling? A review of the research literature. <i>Counselling &amp; Psychotherapy Research.</i> 2001; 1(3):184–90.	Only voluntary "interventions" included
19	McLeod J. The effectiveness of workplace counselling: A systematic review. <i>Counselling &amp; Psychotherapy Research.</i> 2010; 10(4):238–48.	Not intervention studies
20	Montano D, Hoven H, Siegrist J. A meta-analysis of health effects of randomized controlled worksite interventions: does social stratification matter? <i>Scand J Work Environ Health.</i> 2014; 40(3):230–4.	Not psychosocial
21	Robbins R, Jackson CL, Underwood P, Vieira D, Jean-Louis G, Buxton OM. Employee Sleep and Workplace Health Promotion: A Systematic Review. <i>Am J Health Promot</i> 2019:890117119841407.	Not psychosocial
22	Romppanen J, Haggman-Laitila A. Interventions for nurses' well-being at work: a quantitative systematic review. <i>J Adv Nurs</i> 2017; 73:1555–1569	Not psychosocial
23	Ryan C, Bergin M, Chalder T, Wells JS. Web-based interventions for the management of stress in the workplace: Focus, form, and efficacy. <i>J Occup Health</i> 2017; 59:215–236.	Not workplace
24	van der Klink JJ, Blonk RW, Schene AH, van Dijk FJ. The benefits of interventions for work-related stress. <i>Am J Public Health</i> 2001; 91:270–276.	Not workplace stress
25	Van Hoof W, O'Sullivan K, O'Keefe M, Verschueren S, O'Sullivan P, Dankaerts W. The efficacy of interventions for low back pain in nurses: A systematic review. <i>Int J Nurs Stud</i> 2018; 77:222–231.	Not workplace, not psychosocial
26	Van Laethem M, Beckers DG, Kompier MA, Dijksterhuis A, Geurts SA. Psychosocial work characteristics and sleep quality: a systematic review of longitudinal and intervention research. <i>Scand J Work Environ Health</i> 2013; 39:535–549.	Not intervention studies
27	van Vilsteren M, van Oostrom SH, de Vet HC, Franche RL, Boot CR, Anema JR. Workplace interventions to prevent work disability in workers on sick leave. <i>Cochrane Database Syst Rev</i> 2015:Cd006955.	Wrong population
28	Berg-Beckhoff G, Nielsen G, Ladekjaer Larsen E. Use of information communication technology and stress, burnout, and mental health in older, middle-aged, and younger workers – results from a systematic review. <i>Int J Occup Environ Health</i> 2017; 23:160–171.	Not psychosocial
29	Cooper SL, Carleton HL, Chamberlain SA, Cummings GG, Bambrick W, Estabrooks CA. Burnout in the nursing home health care aide: A systematic review. <i>Burnout Research</i> 2016; 3:76–87.	Not psychosocial
30	Durand MJ, Vézina N, Loisel P, Baril R, Richard MC, Diallo B. Workplace interventions for workers with musculoskeletal disabilities: a descriptive review of content. <i>Journal of Occupational Rehabilitation</i> 2007; 17:123–136.	Not psychosocial
31	Edwards D, Burnard P. A systematic review of stress and stress management interventions for mental health nurses. <i>J Adv Nurs</i> 2003; 42:169–200.	Wrong population
32	Edwards D, Burnard P, Owen M, Hannigan B, Fothergill A, Coyle D. A systematic review of the effectiveness of stress-management interventions for mental health professionals. <i>J Psychiatr Ment Health Nurs</i> 2003; 10:370–371.	Not intervention studies
33	Edwards D, Hannigan B, Fothergill A, Burnard P. Stress management for mental health professionals: A review of effective techniques. <i>Stress and Health: Journal of the International Society for the Investigation of Stress</i> 2002; 18:203–215.	Not interventions studies



	Reference	Reason for exclusion
34	Fothergill A, Edwards D, Burnard P. Stress, burnout, coping and stress management in psychiatrists: findings from a systematic review. <i>Int J Soc Psychiatry</i> 2004; 50:54–65.	Not intervention studies
35	Halim UA, Riding DM. Systematic review of the prevalence, impact and mitigating strategies for bullying, undermining behaviour and harassment in the surgical workplace. <i>Br J Surg</i> 2018; 105:1390–1397.	Not intervention studies
36	Hall BJ, Xiong P, Chang K, Yin M, Sui Xr. Prevalence of medical workplace violence and the shortage of secondary and tertiary interventions among healthcare workers in China. <i>Journal of Epidemiology and Community Health</i> 2018; 72:516–518.	Geographic limitation
37	Heckemann B, Zeller A, Hahn S, Dassen T, Schols JMGA, Halfens RJG. The effect of aggression management training programmes for nursing staff and students working in an acute hospital setting. A narrative review of current literature. <i>Nurse Education Today</i> 2015; 35:212–219.	Not psychosocial
38	Jamieson SD, Tuckey MR. Mindfulness interventions in the workplace: A critique of the current state of the literature. <i>Journal of Occupational Health Psychology</i> 2017; 22:180–193.	Wrong study question
39	Korea ME, Purohit S. Interventional Studies to Support the Spiritual Self-Care of Health Care Practitioners. <i>Holistic Nursing Practice</i> 2014; 28:291–300.	Not psychosocial
40	Kuoppala J, Lamminpää A, Husman P. Work health promotion, job well-being, and sickness absences – A systematic review and meta-analysis. <i>Journal of Occupational and Environmental Medicine</i> 2008; 50:1216–1227.	Not psychosocial
41	Michie S, Williams S. Reducing work related psychological ill health and sickness absence: a systematic literature review. <i>Occup Environ Med</i> 2003; 60:3–9.	Not psychosocial
42	Oakman J, Neupane S, Proper KI, Kinsman N, Nygard CH. Workplace interventions to improve work ability: A systematic review and meta-analysis of their effectiveness. <i>Scand J Work Environ Health</i> . 2018; 44(2):134–46.	Not psychosocial
43	Proper KI, van Oostrom SH. The effectiveness of workplace health promotion interventions on physical and mental health outcomes – a systematic review of reviews. <i>Scand J Work Environ Health</i> . 2019.	Not psychosocial
44	Odeen M, Magnussen LH, Maeland S, Larun L, Eriksen HR, Tveito TH. Systematic review of active workplace interventions to reduce sickness absence. <i>Occup Med (Lond)</i> . 2013; 63(1):7–16.	Not psychosocial
45	Trowbridge K, Mische Lawson L. Mindfulness-based interventions with social workers and the potential for enhanced patient-centered care: A systematic review of the literature. <i>Soc Work Health Care</i> . 2016; 55(2):101–24.	Not workplace
46	Ttofi MM, Farrington DP. What works in preventing bullying: Effective elements of anti-bullying programmes. <i>Journal of Aggression, Conflict and Peace Research</i> . 2009; 1(1):13–24.	Not workplace
47	Varatharajan S, Cote P, Shearer HM, Loisel P, Wong JJ, Southerst D, et al. Are work disability prevention interventions effective for the management of neck pain or upper extremity disorders? A systematic review by the Ontario Protocol for Traffic Injury Management (OPTIMa) collaboration. <i>J Occup Rehabil</i> . 2014; 24(4):692–708.	Not psychosocial

## Appendix 6 – Excluded studies based on high risk of bias (assessed using AMSTAR) – research question 2: interventions

Referens	
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2	Bhui KS, Dinos S, Stansfeld SA, White PD. A synthesis of the evidence for managing stress at work: a review of the reviews reporting on anxiety, depression, and absenteeism. <i>J Environ Public Health.</i> 2012; 2012:515874.
3	Cooklin A, Joss N, Husser E, Oldenburg B. Integrated Approaches to Occupational Health and Safety: A Systematic Review. <i>Am J Health Promot.</i> 2017; 31(5):401–12.
4	Dalgren AS, Gard GE. Soft values with hard impact -- a review of stress reducing interventions on group and organisational level. <i>Physical Therapy Reviews.</i> 2009; 14(6):369–81.
5	Dietrich S, Deckert S, Ceynowa M, Hegerl U, Stengler K. Depression in the workplace: a systematic review of evidence-based prevention strategies. <i>Int Arch Occup Environ Health.</i> 2012; 85(1):1–11.
6	Duhoux A, Menear M, Charron M, Lavoie-Tremblay M, Alderson M. Interventions to promote or improve the mental health of primary care nurses: a systematic review. <i>J Nurs Manag.</i> 2017; 25(8):597–607.
7	Egan M, Bamba C, Thomas S, Petticrew M, Whitehead M, Thomson H. The psychosocial and health effects of workplace reorganisation. 1. A systematic review of organisational-level interventions that aim to increase employee control. <i>J Epidemiol Community Health.</i> 2007; 61(11):945–54.
8	Escartin J. Insights into workplace bullying: psychosocial drivers and effective interventions. <i>Psychol Res Behav Manag.</i> 2016; 9:157–69.
9	Goldgruber J, Ahrens D. Effectiveness of workplace health promotion and primary prevention interventions: A review. <i>Journal of Public Health.</i> 2010; 18(1):75–88.
10	Hanisch SE, Twomey CD, Szeto AC, Birner UW, Nowak D, Sabariego C. The effectiveness of interventions targeting the stigma of mental illness at the workplace: a systematic review. <i>BMC Psychiatry.</i> 2016; 16:1.
11	Ivancic I, Freeman A, Birner U, Nowak D, Sabariego C. A systematic review of brief mental health and well-being interventions in organizational settings. <i>Scand J Work Environ Health.</i> 2017; 43(2):99–108.
12	Klingbeil DA, Renshaw TL. Mindfulness-based interventions for teachers: A meta-analysis of the emerging evidence base. <i>Sch Psychol Q.</i> 2018; 33(4):501–11.
13	Knight C, Patterson M, Dawson J. Building work engagement: A systematic review and meta-analysis investigating the effectiveness of work engagement interventions. <i>J Organ Behav.</i> 2017; 38(6):792–812.
14	Knight C, Patterson M, Dawson J. Work engagement interventions can be effective: A systematic review. <i>European Journal of Work and Organizational Psychology.</i> 2019; 28(3):348–72.
15	Lamontagne AD, Keegel T, Louie AM, Ostry A, Landsbergis PA. A systematic review of the job-stress intervention evaluation literature, 1990–2005. <i>Int J Occup Environ Health.</i> 2007; 13(3):268–80.
16	Lees T, Elliott JL, Gunning S, Newton PJ, Rai T, Lal S. A systematic review of the current evidence regarding interventions for anxiety, PTSD, sleepiness and fatigue in the law enforcement workplace. <i>Ind Health.</i> 2019.
17	Lomas T, Medina JC, Ivtzan I, Rupprecht S, Eiroa-Orosa FJ. A systematic review of the impact of mindfulness on the well-being of healthcare professionals. <i>J Clin Psychol.</i> 2018; 74(3):319–55.
18	Lomas T, Medina JC, Ivtzan I, Rupprecht S, Eiroa-Orosa FJ. A systematic review and meta-analysis of the impact of mindfulness-based interventions on the well-being of healthcare professionals. <i>Mindfulness.</i> 2018.
19	Lomas T, Medina JC, Ivtzan I, Rupprecht S, Eiroa-Orosa FJ. Mindfulness-based interventions in the workplace: An inclusive systematic review and meta-analysis of their impact upon wellbeing. <i>The Journal of Positive Psychology.</i> 2018.

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- 21 McCray LW, Cronholm PF, Bogner HR, Gallo JJ, Neill RA. Resident physician burnout: is there hope? *Fam Med*. 2008; 40(9):626–32.
- 22 Milner A, Page K, Spencer-Thomas S, Lamotagne AD. Workplace suicide prevention: a systematic review of published and unpublished activities. *Health Promot Int*. 2015; 30(1):29–37.
- 23 Mimura C, Griffiths P. The effectiveness of current approaches to workplace stress management in the nursing profession: an evidence based literature review. *Occup Environ Med*. 2003; 60(1):10–5.
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- 25 Pallavicini F, Argenton L, Toniazzi N, Aceti L, Mantovani F. Virtual Reality Applications for Stress Management Training in the Military. *Aerosp Med Hum Perform* 2016; 87:1021–1030.
- 26 Parks KM, Steelman LA. Organizational wellness programs: a meta-analysis. *J Occup Health Psychol* 2008; 13:58–68.
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- 29 Quinlan E, Robertson S, Miller N, Robertson-Boersma D. Interventions to reduce bullying in health care organizations: a scoping review. *Health Serv Manage Res* 2014; 27:33–44
- 30 Regehr C, Glancy D, Pitts A, LeBlanc VR. Interventions to reduce the consequences of stress in physicians: a review and meta-analysis. *J Nerv Ment Dis* 2014; 202:353–359.
- 31 Richardson KM, Rothstein HR. Effects of occupational stress management intervention programs: a meta-analysis. *J Occup Health Psychol* 2008; 13:69–93.
- 32 Rohlf VI. Interventions for occupational stress and compassion fatigue in animal care professionals—A systematic review. *Traumatology* 2018; 24:186–192.
- 33 Smith SA. Mindfulness-Based Stress Reduction: An Intervention to Enhance the Effectiveness of Nurses' Coping With Work-Related Stress. *International Journal of Nursing Knowledge* 2014; 25:119–130.
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- 35 Stewart W, Terry L. Reducing burnout in nurses and care workers in secure settings. *Nurs Stand* 2014; 28:37–45.
- 36 Theeboom T, Beersma B, van Vianen AEM. Does coaching work? A meta-analysis on the effects of coaching on individual level outcomes in an organizational context. *Journal of Positive Psychology* 2014; 9:1–18.
- 37 Wright EM, Matthai MT, Warren N. Methods for Alleviating Stress and Increasing Resilience in the Midwifery Community: A Scoping Review of the Literature. *J Midwifery Womens Health* 2017; 62:737–745.
- 38 Cocker F, Joss N. Compassion Fatigue among Healthcare, Emergency and Community Service Workers: A Systematic Review. *Int J Environ Res Public Health* 2016; 13.
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- 42 Pomaki G, Franche RL, Murray E, Khushrushahi N, Lampinen T. Workplace-Based Work Disability Prevention Interventions for Workers with Common Mental Health Conditions: A Review of the Literature. *Journal of Occupational Rehabilitation*. 2012; 22(2):182–95.
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- 44 Wagner SL, Koehn C, White MI, Harder HG, Schultz IZ, Williams-Whitt K, et al. Mental Health Interventions in the Workplace and Work Outcomes: A Best-Evidence Synthesis of Systematic Reviews. *Int J Occup Environ Med*. 2016; 7(1):1–14.
- 45 Westermann C, Kozak A, Harling M, Nienhaus A. Burnout intervention studies for inpatient elderly care nursing staff: systematic literature review. *Int J Nurs Stud*. 2014; 51(1):63–71.
- 46 Williams-Whitt K, White MI, Wagner SL, Schultz IZ, Koehn C, Dionne CE, et al. Job demand and control interventions: a stakeholder-centered best-evidence synthesis of systematic reviews on workplace disability. *Int J Occup Environ Med*. 2015; 6(2):61–78.
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- 51 Lomas T, Medina JC, Ivtzan I, Rupprecht S, Hart R, Eiroa-Orosa FJ. The impact of mindfulness on well-being and performance in the workplace: An inclusive systematic review of the empirical literature. *European Journal of Work and Organizational Psychology*. 2017; 26(4):492–513.
- 52 Robertson IT, Cooper CL, Sarkar M, Curran T. Resilience training in the workplace from 2003 to 2014: A systematic review. *Journal of Occupational and Organizational Psychology*. 2015; 88(3):533–62.
- 53 Rothenberger DA. Physician Burnout and Well-Being: A Systematic Review and Framework for Action. *Dis Colon Rectum*. 2017; 60(6):567–76.
- 54 Tonini Goulart C, de Azevedo Guido L, Marques da Silva R, Bublitz S, da Silva Grazziano E. Effects of Stress Management Programs in Health Workers: Integrative Review. *Journal of Nursing UFPE/Revista de Enfermagem UFPE*. 2015; 9(4):7431–8.
- 55 Tricco AC, Rios P, Zarin W, Cardoso R, Diaz S, Nincic V, et al. Prevention and management of unprofessional behaviour among adults in the workplace: A scoping review. *PLoS One*. 2018; 13(7):e0201187.
- 56 Wassell JT. Workplace violence intervention effectiveness: A systematic literature review. *Safety Science*. 2009; 47(8):1049–55.

## Appendix 7 – Literature searches

Pubmed 2019-06-11

No	Description		Items found (approx.)
1	Psychosocial work environmental terms	Social Support[Majr] OR Stress, Psychological[Majr] OR Employee Performance Appraisal[Mesh] OR Employee Grievances[Mesh] OR Bullying[Mesh] OR Communication/psychology[Mesh] OR Interpersonal Relations[Mesh] OR Job Satisfaction[Mesh] OR Occupational Stress[Mesh] OR Organizational Culture[Mesh] OR Personnel Downsizing[Mesh] OR Prejudice[Mesh] OR Return to Work[Mesh] OR Social Discrimination[Mesh] OR Social Justice/psychology[Mesh] OR Social Support[Mesh] OR Staff Development[Mesh] OR Work Schedule Tolerance[Mesh] OR workplace violence[Mesh]	509 351
2	Psychosocial work environmental terms	demand resource*[Title] OR job security[Title] OR flexible work*[Title] OR full-time[Title] OR job insecurity[Title] OR lean production[Title] OR organizational change[Title] OR organizational change[Title] OR part-time[Title] OR shift work*[Title] OR temporary work[Title] OR work shift*[Title] OR boredom[Title] OR day-time[Title] OR harass*[Title] OR injustice*[Title] OR interaction*[Title] OR job satisfaction[Title] OR justice*[Title] OR staff development[Title] OR work satisfaction[Title] OR working hour*[Title] OR working time[Title] OR work-place conflict*[Title] OR work-role*[Title] OR night-time[Title] OR decision latitude[Title] OR high demand*[Title] OR interpersonal relation*[Title] OR job control[Title] OR job demand*[Title] OR job strain[Title] OR lack of control[Title] OR psychosocial[Title] OR social network*[Title] OR support system*[Title] OR work demand*[Title] OR work strain[Title] OR workstrain*[Title] OR absenteeism[Title] OR ageism[Title] OR bullying[Title] OR coping[Title] OR discrimination[Title] OR effort reward*[Title] OR healthy work*[Title] OR homophobia[Title] OR low control[Title] OR on-the-job stress[Title] OR presenteeism[Title] OR racism[Title] OR recovery[Title] OR recuperation*[Title] OR role ambiguity[Title] OR role-conflict*[Title] OR sexism[Title] OR silent workplace*[Title] OR skill discretion*[Title] OR social support[Title] OR stress in the work place[Title] OR support system*[Title] OR time pressure*[Title] OR victimization*[Title] OR work ability[Title] OR work control[Title] OR work influence*[Title] OR work load*[Title] OR workload*[Title] OR work overload*[Title] OR work over-load*[Title] OR work stress*[Title] OR workplace violence*[Title] OR work-place violence*[Title] OR work-related fatigue[Title] OR psychosomatic[Title] OR retention*[Title] OR social network*[Title] OR turnover*[Title]	478 637
3		1 OR 2	941 495
4	Psychosocial work intervention terms	Stress, Psychological[Majr] OR bullying[Mesh] OR Primary Prevention[Mesh] OR Social Work[Mesh] OR Psychotherapy[Mesh] OR Health Promotion[Mesh] OR Mentoring/organization and administration[Mesh] OR Psychosocial Support System[Mesh] OR Mentoring[Mesh] OR Counseling[Mesh] OR Return to Work[Mesh] OR Occupational Stress[Mesh] OR Secondary Prevention[Mesh] OR prevention and control[sh:noexp]	1 648 814
5	Psychosocial work intervention terms	emotional support[Title] OR on-the-job stress[Title] OR stress in the workplace[Title] OR cognitive-behavioural programme*[Title] OR mentor*[Title] OR Psychosocial support system*[Title] OR retention*[Title] OR intervention*[Title] OR coaching[Title] OR health campaign[Title] OR Psychosocial intervention*[Title] OR Health Promotion[Title]	178 843
6		5 OR 6	1 776 675

No	Description		Items found (approx.)
7	Work context terms	Employment[Mesh:NoExp] OR Occupational Groups[Mesh] OR Occupational Health[Mesh] OR Burnout, Professional[Mesh] OR Women, Working[Mesh] OR Occupations[Mesh] OR Occupational Exposure[Mesh] OR Occupational Diseases[Mesh] OR Work[MeSH] OR Workplace[Mesh] OR Workload[Mesh]	826 593
8	Work context terms	work*[Title] OR occupation*[Title] OR employ*[Title] OR job*[Title] OR professional*[Title] OR organi?ational*[Title]	366 784
9		7 OR 8	1 029 192
10	Systematic reviews	Systematic Review[Publication Type] OR Meta-analysis[Publication Type] OR mapping review*[Title/Abstract] OR systematic review*[Title/Abstract] OR systematic literature analysis[Title/Abstract] OR scoping review*[Title/Abstract] OR rapid review*[Title/Abstract] OR evidence map*[Title/Abstract] OR systematic mapping[Title/Abstract] OR Systematically review[Title/Abstract] OR Systematic literature review*[Title/Abstract] OR HTA[Title/Abstract] OR HTA report[Title/Abstract] OR HTA-report[Title/Abstract]	224 871
11	Psychosocial work environmental terms	3 AND 9 AND 10	2 140
12	Psychosocial work intervention terms	6 AND 9 AND 10	2 774
13		11 NOT 12	1 191
14	Psychosocial work environmental terms	11 AND Filters activated: (Danish), English, Norwegian, (Swedish).	2 068 (dubletter ej borttagna)
15	Psychosocial work intervention terms	10 AND Filters activated: (Danish), English, (Norwegian), Swedish.	2 704 (dubletter ej borttagna)

No	Description		Items found (approx.)
1	Psychosocial work environmental terms	DE "Organizational Climate" OR DE "Social Support" OR DE "Social Networks" OR DE "Interpersonal Relationships" OR DE "Person Environment Fit" OR DE "Organizational Change" OR DE "Downsizing" OR DE "Organizational Behavior" OR DE "Employee Interaction" OR DE "Organizational Effectiveness" OR DE "Supervisor Employee Interaction" OR DE "Working Conditions" OR DE "Job Enrichment" OR DE "Work Rest Cycles" OR DE "Work Week Length" OR DE "Workday Shifts" OR DE "Working Space" OR DE "Work Scheduling" OR DE "Job Performance" OR DE "Quality of Work Life" OR DE "Social Discrimination" OR DE "Age Discrimination" OR DE "Disability Discrimination" OR DE "Employment Discrimination" OR DE "Race and Ethnic Discrimination" OR DE "Sex Discrimination" OR DE "Diversity in the Workplace" OR DE "Harassment" OR DE "Sexual Harassment" OR DE "Bullying" OR DE "Victimization" OR DE "Workplace Violence" OR DE "Psychological Stress" OR DE "Boredom" OR DE "Monotony" OR DE "Employee Turnover" OR DE "Equity (Payment)" OR DE "Employee Absenteeism" OR DE "Ageism" OR DE "Homosexuality (Attitudes Toward)" OR DE "Occupational Stress" OR DE "Racism" OR DE "Role conflicts" OR DE "Role expectations" OR DE Sexism OR DE "Psychosocial Factors" OR DE "Work Load" OR DE "Work related illnesses" OR DE "Retention"	97 291
2	Psychosocial work environmental terms	TI ((work OR job OR high) w1 demand*) OR TI "low control" OR TI "work control" OR TI "job control" OR TI (lack w1 control) OR TI "decision latitude" OR TI "work influence*" OR TI "demand resource*" OR TI "effort reward*" OR TI "time pressure*" OR TI recuperation* OR TI "work overload*" OR TI recovery OR TI coping OR TI "work abilit*" OR TI "social support" OR TI "support system*" OR TI "social network*" OR TI "emotional support" OR TI "interpersonal relation*" OR TI interaction* OR TI justice* OR TI injustice* OR TI "work satisfaction" OR TI "job satisfaction" OR TI boredom OR TI "skill discretion*" OR TI "staff development" OR TI discrimination OR TI harass* OR OR TI "workplace conflict*" OR TI "work strain" OR TI "job strain" OR TI "workplace violen*" OR TI bullying OR TI victimization OR TI "role conflict*" OR TI "work role*" OR TI "working hour*" OR TI "work hour*" OR TI "working time" OR TI "day-time" OR TI "night-time" OR TI (shift n1 work) OR TI "temporary work" OR TI "full-time" OR TI "part-time" OR TI "flexible work" OR TI "organi?ational change*" OR TI "lean production" OR TI "job security" OR TI "job insecurity" OR OR TI "work schedul*" OR TI "healthy work*" OR TI homophobia OR TI ((work OR job) w1 stress*) OR TI presenteeism OR TI absenteeism OR TI "role ambiguity" OR TI "stress in the work place" OR TI psychosocial OR TI workload OR TI "work overload*" OR TI "work-related fatigue" OR TI psychosomatic	190 419
3	Psychosocial work environmental terms	1 OR 2	423 774
4	Psychosocial work intervention terms (DE)	DE "Professional Supervision" OR DE "Supervisor Employee Interaction" OR DE "Retention" OR DE "Executive Coaching" OR DE "Coaching Psychology" OR DE "Mentor" OR DE "Workplace Intervention" OR DE "Prevention" OR DE "Health promotion" OR DE "Occupational stress"	105 747
5	Psychosocial work intervention terms	TI "Psychosocial support*" OR TI "health campaign" OR TI supervision* OR TI retention* OR TI coaching OR TI mentor* OR TI intervention* OR TI "Psychosocial intervention*" OR TI "Health Promotion" OR TI "emotional support" OR TI "on-the-job stress" OR TI "stress in the workplace" OR TI "cognitive-behavioural programme*"	96 333
6	Psychosocial work intervention terms	4 OR 5	177 591

No	Description		Items found (approx.)
7	Work context terms (DE)	DE "Work (Attitudes Toward)" OR DE "Occupations" OR DE "Occupational Attitudes" OR DE "Job Characteristics" OR DE "Work Load" OR DE "Occupational Exposure" OR DE "Occupational Health" OR DE "Occupational Safety" OR DE "Work Related Illnesses" OR DE "Occupational Stress" OR DE "Employment Status" OR DE "Personnel" OR DE "Working Conditions" OR DE "Working Space" OR DE "Working Women"	95 205
8	Work context terms	TI work* OR TI occupation* OR TI employ* OR TI job* OR TI professional* OR TI organi?ational	228 090
9	Work context terms	7 OR 8	266 242
10	Systematic reviews (DE)	DE "Systematic Review" OR DE "Meta Analysis"	4 475
11	Systematic reviews	TI "Systematic Review*" OR TI "mapping review*" OR TI "systematic literature analysis" OR TI "scoping review*" OR TI "rapid review*" OR TI "evidence map*" OR TI "systematic mapping" OR TI "Systematically review" OR TI "Systematic literature review*" OR TI "HTA" OR TI "HTA report" OR TI "HTA-report" OR AB "Systematic Review" OR AB "mapping review*" OR AB "systematic review*" OR AB "systematic literature analysis" OR AB "scoping review*" OR AB "rapid review*" OR AB "evidence map*" OR AB "systematic mapping" OR AB "Systematically review" OR AB "Systematic literature review*" OR AB "HTA" OR AB "HTA report" OR AB "HTA-report"	28 750
12	Systematic reviews	10 OR 11	32 812
13	Psychosocial work environmental terms	3 AND 9 AND 12	712
14	Psychosocial work intervention terms	6 AND 9 AND 12	524
15		13 NOT 14	438
16	Psychosocial work environmental terms	13 AND Filters activated:  Source type: Academic journals Language: English (inga nordiska språk förekom)	613 (dubletter ej borttagna)
17	Psychosocial work intervention terms	14 AND Filters activated:  Source type: Academic journals Language: English (inga nordiska språk förekom)	486  (dubletter ej borttagna)



No	Descripton	Items found (approx.)
1	Psychosocial work environmental terms	292 866
	DE "Stress, Psychological" OR DE "Support, Psychosocial" OR DE "Job Satisfaction" OR DE "Employee Performance Appraisal" OR DE "Employee Grievances" OR DE "Social Justice" OR DE "Social Justice/PF" OR DE "Downsizing, Organizational" OR DE "Staff Development" OR DE "Organizational Culture" OR DE "Bullying" OR DE "Prejudice" OR DE "Discrimination" OR DE "Discrimination, Employment" OR DE "Interpersonal Relations" OR DE "Communication" OR DE "Stress, Occupational" OR DE "Workplace Violence" OR DE "Job Re-Entry"	
2	Psychosocial work environmental terms	95 190
	TI "psychosocial" OR TI "psychosomatic" OR TI "job strain" OR TI "work strain" OR TI "work demand*" OR TI "job demand*" OR TI "high demand*" OR TI "low control" OR TI "lack of control" OR TI "work control" OR TI "job control" OR TI "decision latitude" OR TI "work influence*" OR TI "demand resource*" OR TI "effort reward*" OR TI "time pressure*" OR TI "recuperation*" OR TI "work overload*" OR TI "work over-load*" OR TI "recovery" OR TI "coping" OR TI "work ability" OR TI "social support" OR TI "support system*" OR TI "social network*" OR TI "emotional support" OR TI "interpersonal relation*" OR TI "interaction*" OR TI "justice*" OR TI "injustice*" OR TI "job satisfaction" OR TI "work satisfaction" OR TI "boredom" OR TI "skill discretion*" OR TI "staff development" OR TI "discrimination" OR TI "harass*" OR TI "work-place conflict*" OR TI "workplace violen*" OR TI "work-place violen*" OR TI "bullying" OR TI "ageism" OR TI "homophobia" OR TI "racism" OR TI "sexism" OR TI "victimization*" OR TI "silent workplace*" OR TI "role ambiguity" OR TI "role-conflict*" OR TI "workrole*" OR TI "working hour*" OR TI "working time" OR TI "day-time" OR TI "night-time" OR TI "shift work*" OR TI "work shift*" OR TI "temporary work" OR TI "full-time" OR TI "part-time" OR TI "flexible work*" OR TI "organizational change" OR TI "organizational change" OR TI "lean production" OR TI "job security" OR TI "job insecurity"	
3		356 236
	1 OR 2	
4	Psychosocial work intervention terms	189 646
	DE "Support, Psychosocial" OR DE "Health Promotion" OR DE "Counseling" OR DE "Mentorship" OR DE "Psychotherapy" OR DE "Social Work" OR DE "Mentorship" OR DE "Early intervention"	
5	Psychosocial work intervention terms	104 955
	TI "Psychosocial support system*" OR TI "health campaign" OR TI "supervision*" OR TI "retention*" OR TI "coaching" OR TI "mentor*" OR TI "intervention*" OR TI "Psychosocial intervention*" OR TI "Health Promotion" OR TI "emotional support" OR TI "on-the-job stress" OR TI "stress in the workplace" OR TI "cognitive-behavioural programme*"	
6		271 070
	4 OR 5	
7	Work context terms	110 867
	DE "Work" OR DE "Work/PF" OR DE "Workload" OR DE "Work environment" OR DE "Occupational Health" OR DE "Occupational Diseases" OR DE "Named Groups by Occupation" OR DE "Occupational Exposure" OR DE "Occupations and Professions" OR DE "Women, Working" OR DE "Employment" OR DE "Burnout, Professional"	

No	Descriptor		Items found (approx.)
8	Work context terms	TI work* OR TI occupation* OR TI employ* OR TI job* OR TI professional* OR TI organi?ational	218 823
9		7 OR 8	284 207
10	Systematic reviews (DE)	(DE "Systematic Review" OR DE "Meta Analysis" OR DE "Scoping Review") OR (CF Y)	95 149
11	Systematic reviews	TI "Systematic Review*" OR TI "mapping review*" OR TI "systematic literature analysis" OR TI "scoping review*" OR TI "rapid review*" OR TI "evidence map*" OR TI "systematic mapping" OR TI "Systematically review" OR TI "Systematic literature review*" OR TI "HTA" OR TI "HTA report" OR TI "HTA-report" OR AB "Systematic Review*" OR AB "mapping review*" OR AB "systematic literature analysis" OR AB "scoping review*" OR AB "rapid review*" OR AB "evidence map*" OR AB "systematic mapping" OR AB "Systematically review" OR AB "Systematic literature review*" OR AB "HTA" OR AB "HTA report" OR AB "HTA-report"	83 842
12	Systematic reviews	10 OR 11	128 209
13	Psychosocial work environmental terms	3 AND 9 AND 12	1 313
14	Psychosocial work intervention terms	6 AND 9 AND 12	1 045
15		13 NOT 14	934
16	Psychosocial work environmental terms	13 AND Filters activated: Source type: Academic journals Language: English, Danish (inga andra nordiska språk förekom)	625 (dubletter ej borttagna)
17	Psychosocial work intervention terms	14 AND Filters activated: Source type: Academic journals Language: English, Danish	569 (dubletter ej borttagna)

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