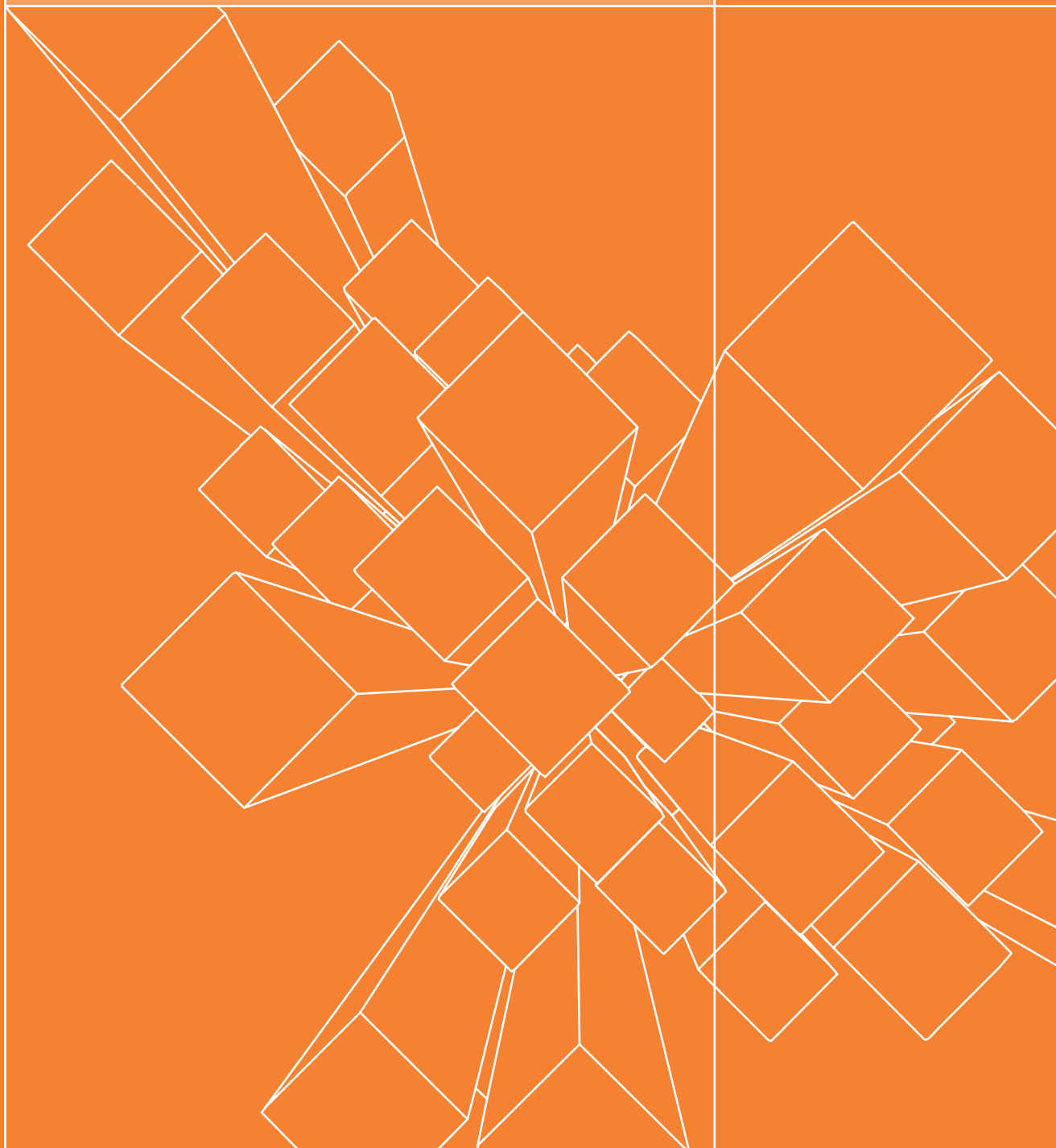
WHAT WORKS AT WORK?

Darcy Hill, Daniel Lucy, Claire Tyers and Laura James



What works at work?

Review of evidence assessing the effectiveness of workplace interventions to prevent and manage common health problems

Darcy Hill, Daniel Lucy, Claire Tyers and Laura James

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Abbreviations

BMI	Body Mass Index
CBT	Cognitive behavioural therapy
CCT	(Non-randomised) Controlled clinical trial
GP	General Practitioner
LBP	Low back pain
MSD	Musculoskeletal disorder
RCT	Randomised controlled trial
RTW	Return to work
SME	Small and medium-sized enterprises

Glossary of terms

Biopsychosocial model – Includes biological, psychological and social dimensions and the interaction between them. This model considers the individual, their health problem and their social context. Biological refers to the physical or mental health condition. Psychological recognises that personal and psychological factors also influence functioning and the individual must take some measure of personal responsibility for their behaviour. Social recognises the importance of the social context, pressures and constraints on behaviours and functioning (taken from Waddell and Burton, 2004).

Cochrane systematic reviews – Cochrane Reviews are systematic summaries of evidence of the effects of healthcare interventions, and adhere to a structured format that is described in the Cochrane Handbook for Systematic Reviews of Interventions.

Compliance – Adherence to a treatment regime (Waddell and Burton, 2004).

Cognitive-behavioural approaches – Designed to address *'all psychological aspects of the illness experience, in order to change beliefs, change behaviour, and improve functioning'* (Waddell and Burton, 2004, p33). This includes cognitive behavioural therapy as well as other specific approaches such as relaxation techniques.

Control group – The group that does not receive the treatment in experimental or intervention-based research.

Confounding variable – A factor that is associated with both an intervention (or exposure) and the outcome of interest (Cochrane Collaboration, 2005).

Cross-sectional research – Research design that measures a sample at one time point only (Lunt *et al.*, 2007).

Effect size – A generic term for the estimate of effect of treatment for a study (Cochrane Collaboration, 2005), or how big an effect a treatment can be seen to have on a given outcome.

Epidemiology – The study of the health of populations and communities, not just particular individuals (Cochrane Collaboration, 2005).

Ergonomics – Ergonomics is the application of scientific information concerning humans to the design of objects, systems and environment for human use (Ergonomics Society, 2007: www.ergonomics.co.uk).

Evidence-based review – These reviews attempt to appraise and summarise the evidence on a particular topic. They provide some detail on the studies reviewed. They may not be systematic in nature. A variety of terminology is used in naming these reviews. They include evidence summary, critical review and critical analysis.

Experimental research design – Research in which one intervenes or does something to one group of people but not to another, then compares results for the two groups (Neuman, 2000).

Follow-up period – The observation over a period of time of study/trial participants to measure outcomes under investigation (Cochrane Collaboration, 2005).

Health Circles – Health circles are designed to increase participation and empowerment, through involvement in the decision-making process (of organisational change) and learning experiences. They typically involve employees from a range of different hierarchical levels in the organisation and are, in effect, discussion groups formed at the workplace to develop change options for the improvement of potentially harmful working conditions. Discussions are moderated by a trained facilitator, and are informed by an analysis of sickness absence and other risk assessment data.

Incapacity Benefit – Benefit payable to people who have paid insufficient National Insurance Contributions (NICs) and are incapable of work. For most people, the first 28 weeks of incapacity is assessed against their usual occupation; after that time, the test of eligibility is whether someone is incapable of all work (taken from Meager and Hill, 2006).

Individual-level interventions – Interventions aimed at the individual, e.g. their attitudes, beliefs or skills.

Job redesign – Designing jobs to fit people. This means taking account of differences such as size, strength and ability to handle information for a wide range of users. Then the tasks, the workplace and tools are designed around these differences (Ergonomics Society, 2007: www.ergonomics.co.uk).

Literature/narrative review – These reviews usually provide an overview of a subject area but without assessing all the available evidence and normally do not provide the details of any studies referenced.

Longitudinal research – Research design that measures a sample more than once, at different points in time (Lunt *et al.*, 2007).

Meta-analysis – A statistical-based technique to combine the findings of more than one research study. Allows the combination of many studies in order to detect trends and patterns in a particular topic/area of study.

Modified duties – Normally involves temporary changes to the duties and/or hours of an employee's job.

Organisational-level interventions – Interventions aimed at organisational factors such as work organisation, policies and practices.

Primary prevention – Interventions in healthy people that seek to eliminate causal factors and so reduce the risk of onset of disease or injury (taken from Waddell and Burton, 2006).

Process evaluation – Verifies what the intervention is and whether or not it is delivered as intended to the targeted recipients.

Prospective cohort studies – An observational study in which a defined group of people (the cohort) is followed over time. The outcomes of people in subsets of this cohort are compared, to examine people who were exposed or not exposed (or exposed at different levels) to a particular intervention or other factor of interest. A prospective cohort study assembles groups of participants and follows them into the future (Cochrane Collaboration, 2005).

Psychosocial working conditions – Psychosocial risk factors are things that may affect workers' psychological response to their work and workplace conditions (including working relationships with supervisors and colleagues). Examples are: high workloads; tight deadlines; and lack of control of the work and working methods (HSE, 2007: www.hse.gov.uk).

Publication bias – A bias caused by only a subset of all the relevant data being available. The publication of research can depend on the nature and direction of the study results. Studies in which an intervention is not found to be effective are sometimes not published. Because of this, systematic reviews that fail to include unpublished studies may overestimate the true effect of an intervention. In addition, a published report might present a biased set of results (e.g. only outcomes or sub-groups where a statistically significant difference was found (Cochrane Collaboration, 2005).

Quasi-experimental – Variations on the classical experimental design that an experimenter uses in special situations or when there is limited control over the independent variable (Neuman, 2004).

Random allocation – Dividing study participants into groups at the beginning of experimental research using a random process, so the experimenter can treat the groups as equivalent (Neuman, 2004).

Randomised controlled trial – An experiment in which two or more interventions, possibly including a control intervention or no intervention, are compared by being randomly allocated to participants. In most trials, one intervention is assigned to each individual, but sometimes assignment is to defined groups of individuals (Cochrane Collaboration, 2005).

Risk factors – An aspect of a person's condition, lifestyle or environment that affects the probability of occurrence of a disease. For example, cigarette smoking is a risk factor for lung cancer.

Sample – A smaller set of cases a researcher selects from a larger pool and generalizes to the population.

Secondary prevention – Interventions (in the early stages) after symptoms and/or sickness absence occur, that seek to reduce the severity or duration of illness, and to prevent the development of more severe or chronic symptoms and disability, and long-term incapacity (taken from Waddell and Burton, 2006).

Self-report measures – Ratings provided by participants, and therefore, subjective in nature, rather than objectively assessed.

Self-selection bias – Where participation in an intervention is voluntary. Participants' decision to participate may be correlated with characteristics that affect outcomes.

Systematic review – A review of a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant research, and to collect and analyse data from the studies that are included in the review. Statistical methods (meta-analysis) may or may not be used to analyse and summarise the results of the included studies (Cochrane Collaboration, 2005).

Task modification – See job redesign.

Treatment group – The experimental group in an intervention study.

Workplace redesign – See job redesign.

Summary

Introduction

This document contains the results of a review of the evidence on the effectiveness of workplace interventions for common health problems. The research was commissioned by the Health, Work and Wellbeing Executive, which is an inter-departmental strategy group including representatives from the Department for Work and Pensions (DWP), the Health and Safety Executive (HSE), the Department of Health, the Scottish Executive and the Welsh Assembly Government.

The aims of the research were to provide the Executive with an indication of the best evidence provided by existing literature, as well as an overview of any gaps or weaknesses in the evidence base. This will help to collate evidence on what has been proved to be effective with regard to workplace practice and interventions for common health problems. It will also inform future research priorities and input to the development of evidence-based guidelines for the management of health at work. The review, thus, represents part of an ongoing process for the Executive.

Key findings

- Interventions which included some form of employer/employee partnership, and/or consultation, demonstrated improved results (compared to those which did not).
- The workplace can be an appropriate and effective setting for the prevention of common health problems.
- It is not only the employee's health condition that is important to consider, but also their attitudes and beliefs. Cognitive behavioural approaches are one way of effectively addressing this aspect of health and recovery.
- Interventions should be comprehensive, addressing both individual- and organisational-level factors. Specific interventions have also been shown to be effective if, for example, organisational interventions are combined with a complementary individual intervention.

- Improved communication, co-operation and common agreed goals between employers, employees, occupational health providers and primary care professionals can result in faster recovery, less re-occurrence of ill-health, and less time out of work overall.
- Current attendance management practice and policy is based on convention rather than evidence. There are lessons to be learnt through an examination of the medical and occupational health literature, especially where this literature makes use of work-related outcomes.
- More, and better quality, evaluations of workplace interventions are required to fully understand the complex interactions between workplace practices and employee health. However, there are others types of evidence already available which should also be considered, such as more recent individual studies, and evidence from other health areas.

Details of the research

The review included evidence from systematic and other high quality evidence reviews. It covered three common health areas: back pain and other musculoskeletal disorders (MSDs); common mental health problems (stress, anxiety and depression); and cardio-respiratory conditions. The specific research question driving the review was this:

> *'What workplace practices and interventions have been shown to be effective in reducing health-related negative work outcomes?'*

This question was addressed through a review of evidence on a range of interventions addressing multiple health problems in a range of different work settings. The effectiveness of these was considered mainly in relation to work outcomes such as sickness absence, staff turnover and return to work, although general health outcomes were also considered. The evidence identified comes from numerous international sources and overall, is drawn from controlled scientific study designs.[1]

Consultation and employer/employee partnerships make workplace interventions more effective

There was evidence that interventions that involved some form of employer/employee partnership or consultation of employees, showed a number of important outcomes. Such approaches could affect improved communication; a greater sense of control over the working environment amongst employees; and

[1] Systematic reviews assess the study design and execution of individual studies and weight the findings from these sources accordingly. Statements referring to the relevant weight of evidence, accorded by the authors of the systematic reviews, are used throughout the report.

increased availability of social support. An example drawn from the research is that of health circles, which are, effectively, discussion groups involving all levels of employees and which are designed to develop change options for the improvement of both physical and psychosocial working conditions. They involve employees in a decision-making process and focus on issues identified by employees themselves as being important. Further evidence from a review of evaluations of health promotion activities found that those interventions that considered employees' expressed needs through some form of employer/employee partnership were more effective than those that did not.

There is potential for the workplace to be an effective setting for health promotion and prevention

There is evidence to show that the workplace can be an effective setting for health promotion, although effectiveness varies widely between different types of intervention approaches. Good quality evidence in support of prevention and health promotion activities for cardio-respiratory disease in the workplace is limited, with observed effect sizes small. However, interventions to increase levels of physical activity amongst employees are effective at increasing activity levels (although evidence as to the effect this had on work outcomes was limited). Considering that evidence elsewhere has shown that exercise is the only consistently recommended approach for both primary and secondary prevention of lower back pain (LBP) and other MSDs, despite small effect sizes, there is a definite potential for employers to aid employees in preventing these conditions. Stress management interventions have also been shown to be effective in reducing stress, improving psychological well-being and coping skills, for employees who had not manifested common mental health problems in the past. Overall, there is potential for prevention of common health problems in the workplace, however, the level of effectiveness will depend on the quality and nature of the intervention.

Interventions need to address attitudes and beliefs in addition to health problems

There was evidence that educational interventions for back pain, designed to address an individual's beliefs and attitudes about that pain, were effective. There was also evidence that educational interventions may increase the uptake, implementation and maintenance of workplace interventions to treat musculoskeletal disorders through tackling individual attitudes, beliefs and behavioural intentions. Cognitive behavioural approaches in general and cognitive behavioural therapy (CBT) in particular, were effective in addressing attitudes and beliefs and in reducing health-related negative work outcomes.

Interventions should be joined-up, targeting individual- and organisational-level factors

Consistent with the biopsychosocial model, the health condition of the employee is only one of a number of factors in their rehabilitation. Interventions should also address employees' attitudes and beliefs, as well as the policies and practices of the organisation where they are employed. Evidence was also found to suggest the importance of tackling potential organisational barriers to promoting and maintaining health at work, and promoting recovery through work. The timely provision of modified duties was found to be effective in managing back pain at work and in helping those with back pain to return to work. Although only limited evidence was found to support changes in work organisation in preventing and reducing psychological ill-health, there was some suggestion that this may have been due to a lack of interventions which combined such a change with an accompanying effort to enhance employees' ability to make use of the opportunity for increased control.

Communication and co-operation between employers and healthcare professionals is key in improving return-to-work outcomes

Improved communication, co-operation and common agreed goals between an employee, employer, occupational health care team and primary health care professionals was found to be effective in improving outcomes. Specifically, employers need to know what can be done to help accommodate workers' health problems; however, better understanding of the particular issues relating to timing, return to work or other interventions can also be achieved through greater communication with the relevant health care professionals.

Attendance management policy and practice have lessons to learn from medical and occupational health evaluation literature

Evidence on attendance management policy and practice showed that much of current practice is guided by convention rather than an evidence base, suggesting that employers could benefit from considering lessons in the existing medical and occupational health evaluation literature. For example, evidence regarding the effectiveness of organisational practices with regard to managing cases of ill-health at work. Early contact with employees on sick leave, early referral to an occupational health team and improved communication, co-operation and common agreed goals between employees, managers, supervisors, occupational health providers and primary health care professionals were all found to improve work outcomes. These practices should, therefore, be incorporated into organisation policy, with space for specific guidance related to individual health conditions.

More and better evaluation evidence is needed, although there are already other types of evidence to consider

There is a sparseness of good quality evaluation evidence on workplace interventions for common health problems. However, this review focused on evidence presented in systematic reviews, and those limited to three specific health areas. It does not, therefore, summarise all current evidence. The foundation provided by this review could be furthered by an examination of good quality single studies and by looking at evidence on other health problems.

In the future, evaluations would benefit from greater rigour in implementation and reporting, in order to assess the effectiveness of different interventions in improving health and work outcomes, and also the key elements of effective interventions more generally. Potential areas for improvement include: the use of experimental and control groups, particularly those based on random allocation; the use of longitudinal designs that track outcome measures over a significant period of time; and the collection of qualitative information that may shed light on process and implementation aspects of workplace interventions, exploring why some interventions are effective while other similar interventions are not.

Evidence from specific health areas can be used to help guide employers and occupational health care professionals

This review identified very little evidence in relation to the management or rehabilitation of workers with cardio-respiratory health problems in the workplace. However, there is some evidence from the workplace which aims to prevent and reduce cardio-respiratory health problems and other serious health conditions, through general health promotion. The majority of health promotion and preventive interventions in this research were aimed at reducing personal health risk factors such as weight, diet, high blood pressure and cholesterol levels. These used a combination of individual and organisational level approaches, although there was a limited amount of good quality evaluation evidence on their effectiveness. However, several positive improvements were observed in relation to physical activity, diet, blood pressure and cholesterol levels (in response to a range of different activities). Interventions which made use of employer/employee partnerships and consultation were seen to be particularly effective, through improved participation and compliance.

A considerable amount of evidence is available on the topic of MSDs and LBP at work, including existing evidence reviews and occupational health management guidelines. It is estimated that 60 to 80 per cent of the working age population will experience low back pain or some other musculoskeletal condition at least once during their working life. Exercise appears to be the best known prevention, although only limited effect sizes have been observed. In terms of treatment, recovery statistics suggest that efforts are best concentrated on those who are still

experiencing pain after one month, as the vast majority of sufferers recover to full function without treatment. At this stage, evidence suggests that interventions designed around the biopsychosocial model of LBP are the most effective in terms of work outcomes. In particular, interventions aimed at improving communication and co-operation between healthcare providers, employers and workers have shown good results. Similarly, return-to-work interventions addressing workers' attitudes and beliefs are effective.

Common mental health problems have been addressed in the workplace using a wide range of intervention types, however, there is only a limited amount of good quality evaluation evidence on the effectiveness of these interventions. The available evidence also mainly relates to individual-level intervention types, showing that cognitive behavioural approaches in general, and CBT in particular, can be effective in reducing ill-health and absenteeism. There were contradictory results for organisational-level interventions, although this is largely influenced by the sparseness of good quality data.

Conclusions: addressing multiple barriers

One of the key themes to emerge from this research is the importance of addressing multiple barriers in ill-health prevention, management of health problems, and promotion of recovery from ill-health. Evidence from this review highlights the importance of employee involvement in decisions about the focus of interventions. It is also clear that interventions need to take account of employees' attitudes and beliefs, and move beyond just treating the health problem. Policies and practices in the workplace are also important, and if carefully considered and adapted, can positively impact upon prevention, management and recovery. Interventions addressing both individual and organisational factors have also been shown to benefit from increased effectiveness. Finally, it is important that employees, employers, occupational health teams and primary health care providers, are communicating and working to commonly agreed goals.

It is clear that there are multiple variables at play when considering health and well-being at work. The biopsychosocial model of health and rehabilitation offers a useful framework for understanding these multiple interactions, and may serve as a useful foundation when considering and designing future recommendations to employers and occupational health practitioners. This review has brought together a wide range of international evidence, which has been assessed and weighted according to the rigour of evaluation methods employed, providing a comprehensive foundation on which to build the understanding of workplace practice and interventions for health. Going forward, this knowledge could be furthered by an examination of additional health areas and other high quality individual studies.

Note to the reader

Evidence ratings

The following rating system represents the highest standard used for the qualitative analysis of individual studies in systematic reviews.[2] The exact wording varies between systematic reviews, to the extent that 'strong' evidence could be provided by generally consistent findings in multiple, high quality scientific studies. The exact criteria used in each review are provided in the review summaries in Appendix A.

As an approximation, however, the following classifications of evidence are generally used in this report:

Strong research-based evidence: generally consistent findings in multiple high-quality Randomised Control Trials (RCTs).

Moderate research-based evidence: generally consistent findings in one high quality RCT and in one or more low quality RCT, or generally consistent findings in multiple low quality RCTs.

Limited research-based evidence: one RCT (either high or low quality) or inconsistent or contradictory evidence in multiple RCTs.

No research-based evidence: no RCTs.

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2 This assessment framework is taken from Karjalainen *et al.* (2003), which is a Cochrane Collection systematic review.

1 Introduction

This research was commissioned by the Health, Work and Wellbeing Executive which is an inter-departmental strategy group including representatives from the Department for Work and Pensions (DWP), the Health and Safety Executive (HSE), the Department of Health, the Scottish Executive and the Welsh Assembly Government.

The joint publication entitled 'Health, Work and Well-being: Caring for our future' lists the overall objectives of the strategy and details a number of initiatives already in place to improve the health and well-being of working age people in the UK.

1.1 Project aims

The purpose of this research was to identify evidence (positive, negative, and neutral) for the effectiveness of workplace and work-related interventions in reducing health-related negative work outcomes. Working with the advisory board and peer reviewers, the study agreed the following research question:

> *'What workplace practices and interventions have been shown to be effective in reducing health-related negative work outcomes?'*

Findings identified in this review will help to inform the Health, Work and Wellbeing Executive in their work determining future research, policies and guidelines for the improvement of health at work amongst the working age population. It represents the start of an ongoing process and is a response to the need for timely, indicative information to be shared with the Executive at this stage in their work. This review is, therefore, meant to serve as part of the foundation on which the Executive can build in the future. It is not, and was never designed to be, a comprehensive or systematic review of all literature in this field. Instead, it mainly draws on the work of other reviews in providing an indication of what is currently known regarding the research question and an overview of potential gaps in the evidence base.

1.2 Methodology

The method selected to find evidence which could begin to answer the research question was a focused review of existing literature. In order to complete such a review, there were three main stages to the research:

- defining the scope of the research and operationalising the concepts;
- searching for relevant material;
- the selection of material for inclusion in the review.

1.2.1 Operationalising the review

Before translating the research question into a practical search strategy, it was necessary to define the exact parameters of the investigation.

Key words in the research question, such as 'workplace practices and interventions' and 'work outcomes' were clarified to ensure a tight focus for the research. The main terms involved were the following:

- 'Workplace practices and interventions'. In this review, both system/organisational interventions and individual-focused interventions are covered. For example, sickness absence management policies, return to work interventions, and occupational health provision or services.
- 'Work outcomes'. The review focuses on absenteeism and sickness absence; staff retention and turnover; return-to-work; and long-term incapacity and ill-health retirement.

The review also limited itself to coverage of the three most common health problems affecting the working age population. These are back pain/musculoskeletal disorders (MSDs), common mental health problems and cardio-respiratory diseases. On this basis, studies which examine workplace accidents and injuries in general, or specific occupational diseases such as mesothelioma, are excluded from this review.

The population of interest is exclusively those of working age; however, those not of working age are naturally excluded from the evidence through the use of work outcomes and the selection of studies based on workplace interventions and practices.

1.2.2 Search phase

Using the concepts defined above, searching was conducted in several phases between January and May 2007. The research has aimed to be international in its coverage, but is limited to publications in the English language.

The main focus of the review, given time and resource constraints, was material contained in electronic databases. Databases were selected which were felt to represent a wide range of potentially relevant fields and disciplines. Searched

databases included the following: PubMed (Medline), HSE Research Reports, Cochrane Collection, Ingenta Connect, Web of Science, and PsychInfo.

Within these databases, a variety of search strategies were employed, including the use of Boolean operators (i.e. those which link key words together to allow greater control over searching) where possible. Appropriate search terms were identified for each database, but overall included the following:

- 'work/workplace/worksite', 'corporate health', 'sickness absence', 'occupational health support', 'work and well-being', 'working age health', 'health promotion', 'healthy choices', 'healthy eating', 'smoking', 'health care', 'workplace health promotion', 'ill-health', 'early intervention', 'health insurance', 'wellness', 'disability', 'attendance management', 'health management', 'vocational rehabilitation', 'early rehabilitation', 'return-to-work support', 'staying in work', 'workplace adjustments', 'ageing', 'workplace health', 'stress management', 'mental health', 'mental health interventions', 'workplace intervention'.

Where it was possible to use detailed search strings, the following formula was used:

- ('work-place' **or** 'work-related') **and** ('intervention' **or** 'practice') **and** 'systematic review' **and** ('musculoskeletal disorders' **or** 'mental health' **or** 'mental well-being' **or** 'stress' **or** 'anxiety' **or** 'high blood pressure' **or** 'cardio-respiratory' **or** 'weight loss' **or** 'smoking cessation' **or** 'physical activity' **or** 'physical fitness' **or** 'back pain').

In the Cochrane Collection, the following search string was used: 'Occupational health', (interventions **or** practices) **and** (workplace **or** work-related).

1.2.3 Applying inclusion criteria

Search results were sifted using the title and abstract to identify relevant study subjects and methodologies. This included scanning more than 1,000 titles. Full text articles were then retrieved for all relevant titles, where, on further examination, the final selection of reviews was made. Selected studies represented mostly systematic reviews and some evidence-based reviews which were felt to have relevance to the operationalised research question (see Section 1.2.1).

The selected studies were predominantly featured in academic journals. Those not featured in academic journals were either the product of not-for-profit research institutes and subject to external review, or reports for public bodies such as the HSE. Reviews which did not attempt to assess the available evidence in a particular field and were more conceptual in nature were useful in providing a background to the topic in question.

Reviews which dealt exclusively with evaluations of American organisations and interventions were excluded on the grounds that the organisational and individual health behaviours have limited potential for transfer to the UK, based on the lack of state-funded health and welfare provision. However, some US literature will have been included in reviews of an international nature.

In some of the reviews, it was also clear that interventions were work-related either in terms of outcomes or in application. However, it was not always clear where interventions took place. This is, in part, due to a lack of description of individual study components and implementation, but also in relation to reviews covering a broad range of trials with different interventions in some cases. As a result, a range of practices and interventions have been included in this research. While most of these have included at least one element that is work-based, it has not been possible to be purely exclusive on this criteria.

1.3 Scope of this research

In order to provide timely advice, this review adopted a methodology that has both strengths and limitations. There are fundamentally three points which need to be considered. These are:

- the reliance on systematic reviews to form the evidence base;
- the nature of search terms and databases used;
- the focus on work outcomes.

It should also be noted that the review looks only at common health problems and not at wider health and safety or other health and work issues. However, given the time constraints, the review itself will provide valuable indicative findings for the Executive which can be used to structure more in-depth work as required in the future.

1.3.1 Systematic reviews

In order to bring some consistency to the quality of research evidence to be included in the review, a decision was taken to limit the main focus of the review to evidence available in systematic and other high quality evidence reviews. This enabled a broad examination of interventions aimed at different types of health problems, all of which have the common feature of having been conducted in the workplace.

In addition, most systematic reviews are international, which means that the evidence presented here is from the UK, as well as Norway, Sweden, the Netherlands, Germany, Australia, the USA and Canada among others. This breadth of coverage would have been impractical given the constraints of this review if individual studies were included, given the scale of existing literature available. The international dimension is important, as it has the potential to allow new, or previously less well known, intervention strategies to be taken into consideration alongside more conventional practices in the UK.

An additional advantage of utilising existing evidence reviews is that they employ generally consistent and rigorous selection criteria, which typically give priority to evidence from good quality randomised controlled trials (and progressively less priority to evidence from other types of studies). This allows us to quickly isolate

the findings of the strongest available evidence in a number of specific fields of inquiry. However, as many workplace interventions are not evaluated using scientific study designs, there is a dearth of good quality evaluation evidence available in this arena. This lack of evidence should not be interpreted as a negative finding; rather, the existing evidence should be taken merely as a sample of what is potentially effective or ineffective in the workplace.

However, it should be noted alongside these advantages of the approach adopted that there are also disadvantages. Not all different types of intervention are represented by systematic reviews, and therefore, this research is not an exhaustive representation of all available evidence. There are also likely to be a number of good quality single study evaluations of occupational health interventions. These could add to our knowledge of the effectiveness or use of such interventions with respect to a variety of specific work environments or health problems. The methodology used in this review means that such studies are not represented in this research.

By their methodology, systematic reviews are always dated, even by the time of their publication. The conclusions of a systematic review in a particular field can be quickly rendered out-of-date with the publication of a new, good quality evaluation which presents surprising or contradictory evidence. If more recent individual studies were added to existing reviews, it may be found that the balance of evidence has shifted towards a new conclusion. Further work on specific topics of interest to the Executive could potentially be used to investigate new and emerging work of this nature in more detail at a later date.

Finally, the reliance on systematic reviews imposes one additional limitation. While the inclusion standards for systematic reviews are generally consistent and of high quality, systematic reviews are not immune to reviewer bias or conjecture. The resource constraints have not been extended to allow a systematic evaluation of the quality of the systematic reviews represented, which would assess such weaknesses. As a result, the authors of this report present the evidence as summarised and assessed by the respective authors of the reviews represented. The appropriate interpretation of the weight of evidence presented, therefore, needs to be considered by the reader.

1.3.2 Search terms and strategies used

As with any review, there is a risk that the search terms employed have not predicted all potentially relevant terms in use in existing publications. The review may, therefore, have failed to pick up work of potential relevance which defines the subjects covered using alternative terminology to that employed in this review.

Additionally, there are a great number of specialist and generalised databases in which systematic reviews are contained. This review does provide coverage of a range of data sources, but due to constraints has not been able to consider a comprehensive identification of all appropriate databases. This, thereby, increases the risk that some relevant reviews are not included. However, as the search terms

and searching process yielded in excess of 30 reviews, including four reviews of systematic reviews, it is likely that the material identified meets the requirements of this initial investigation.

1.3.3 Focus on work outcomes

One final point is that the review represents an analysis of evidence primarily in terms of work outcomes. Work outcomes can be seen as both a strength and a weakness as output measures. They focus the level of observation on a specific set of measurements that directly relate to key objectives for both employers and policy makers. At the same time, an exclusive focus on work outcomes may overlook the positive effects on health outcomes of some interventions. Such improved health outcomes may lead, in time, to improved work outcomes.

The broadening of this review to include non-work health outcomes may have identified intermediate or short-term benefits on a range of outcome measures which could potentially impact on work outcomes in the longer-term (outside the scope of most evaluation timescales). While this may be an avenue to explore in future research, the additional time and resources required were outside the parameters of this research exercise. However, in order to present an accurate reflection of the efficacy of the interventions summarised in this review, health outcomes are briefly discussed where there is an absence of work outcomes to report. Additionally, the relationship between health outcomes and work outcomes is also explored to some degree.

1.4 Overview of the report structure

The remainder of this report is structured as follows:

- Chapter 2 explores background issues which are common to each of the three main health problems covered, as well as methodological issues which relate to systematic reviews and the complexities of conducting evaluations of the impact of workplace interventions on health.
- Chapter 3 discusses the main findings from evidence presented in systematic reviews on cardio-respiratory health, although the work-related evidence in this health area is limited. Health promotion and general prevention at work are also discussed in this chapter, as there is a significant overlap between the aims of health promotion and cardio-respiratory health more generally.
- Chapter 4 deals with back pain and other MSDs. It introduces the main concepts and current issues in dealing with back pain and MSDs, and presents and discusses the evidence on work interventions to prevent and manage these health problems.
- Chapter 5 covers the area of common mental health problems. Associations between common mental health problems and work factors are discussed, followed by a discussion of interventions aimed at reducing the impact of such problems on work.

- Conclusions are presented in the final chapter. Findings are summarised for each of the three main health problems, along with a review of final points for further discussion.

Appendix A presents summaries of the overall and main relevant findings for each of the reviews included in this research.

Appendix B provides full bibliographic details for reviews and other reference documents.

2 Background

Understanding the drivers of health and the relationships between health and work are a priority for policy makers in the UK and beyond. The impact of ill-health on the economy, employers and the social welfare system are pronounced and expensive. There is also a moral obligation to safeguard workers from any potential ill-effects of work on health, and ensure that the positive benefits of work are open to the widest possible section of society. Behind the interest in workplace health interventions driving this review are, therefore, a range of policy and research issues. Some of these are discussed in this chapter as a background and introduction to the results of the review.

2.1 The scale of health problems

It is important, firstly, to discuss the scale of the problem of ill-health in relation to the working population of the UK. An estimated two million UK workers suffered from an illness during 2005/06 that they believed was caused or made worse by work, and approximately 24 million working days were lost in this period due to work-related ill-health, with a further six million lost to workplace injury (Health and Safety Commission (HSC), Health and Safety Statistics, 2005/06, using data from the Labour Force Survey (LFS)).

Musculoskeletal disorders[3] (MSDs) are the most common occupational illness in Britain and affect around one million people each year. Stress, anxiety or depression affected just under half a million employees in 2005/06 (HSC, 2006). Taken together, MSDs and common mental health problems, like anxiety and depression, account for approximately 75 per cent of those suffering from work-related ill-health (HSC, 2006).

Aside from the problems facing those who are currently at work is the issue of how the UK economy copes with future demands on its workforce. Headline predictions about the scale of this demand are that 1.3 million new jobs will be created by 2014 (Wilson *et al.*, 2006). The main issue, however, is the replacement

[3] Musculoskeletal disorders here refers to bone, joint or muscle problems affecting the back, lower limbs, upper limbs and neck.

demand caused by the need to fill posts left vacant by retirees, giving an overall net figure of 13.5 million jobs. There is, therefore, a possible shortfall in the number of workers available to fill these jobs. To help minimise the impact of these changes on business, older workers will increasingly be encouraged to remain working for longer and employers encouraged to employ more disadvantaged groups, particularly those who are currently inactive in the labour market (for example, the estimated 2.6 million currently on Incapacity Benefit).

2.2 Work and health

There is a wide body of research examining the relationships between work and health. The focus of most of this has been, until recently, almost exclusively on the negative impact that work can have on individual health and on ill-health at work. However, we are beginning to develop a more balanced view of the relationships between work and health.

One of the most well known research studies in this area is the longitudinal Whitehall II cohort study of civil servants which examined the influence of work-related factors on self-reported ill-health, including alcohol dependence, psychiatric morbidity and health functioning (Stansfeld, Head and Marmot, 2000). This concluded that work environment is an important influence on health, although the importance of different aspects of work varies according to health outcome. For example, they found that reward imbalance is associated with increased risk of alcohol dependence, psychiatric disorder, long spells of sickness absence and poor health functioning, whilst high job demands predict poor health functioning and psychiatric disorder. Work social supports and control over work have a protective effect on mental health and health functioning and reduce the risk of spells of sickness absence. Therefore, work can be a negative and/or positive influence on health.

The evidence relating to the impact of work on health was considered in a Department for Work and Pensions (DWP)-sponsored review (Waddell and Burton, 2006). The conclusion of this was that work can be, and is generally, good for most individuals. More specifically, the review concludes that work can be therapeutic and reverse the adverse health effects of unemployment. This holds true for healthy workers, disabled people, people with common health problems and those in receipt of benefits. However, the review does attach a range of caveats to these conclusions. The nature and quality of the work in question must be taken into account (i.e. working environments must be safe and the nature of work should be accommodating).

This more complex relationship is summarised by other authors in a discussion of the links between health, work and productivity: *'work is better than worklessness and a good job is better than a bad job. Whilst the experience of paid work remains positive for most people, "bad jobs", that is, those characterised by insecure employment, monotonous and repetitive work, a lack of autonomy, control and*

task discretion, an imbalance between a worker's effort and the rewards they receive, and an absence of procedural justice in the workplace, are associated with negative health outcomes. Poor quality work is associated with lower levels of well-being, a higher incidence of physical or mental illness, low levels of self-esteem and a sense of powerlessness' (Coats and Max, 2005, p11).

Halting the movement of people into worklessness is, therefore, an important priority for the government, not only due to the costs of benefits payments to the treasury, but also in terms of keeping individuals engaged with work and the potential health benefits related to work. Although, for some individuals, finding access to the 'right' work, i.e. that which provides a positive environment, can be difficult due to their labour market capital, or lack of it. It is also relatively clear that it is some of the most disadvantaged groups in the labour market, in terms of both their work situation (e.g. short job tenure, poor employment protection) and personal characteristics (e.g. women, lack of qualifications), that are most likely to leave employment following the onset of sickness or disability (Burchardt, 2003, using LFS data). Understanding the role that workplace interventions can have in protecting and supporting such workers is therefore an important policy and social consideration.

2.3 Health and business performance

Employers have a legal obligation to safeguard the health and safety of their workers by minimising the harm that work can cause. However, there are arguments that employers can benefit from going beyond mere compliance by taking more proactive steps which maximise the positive benefits that work can offer to individuals and vice versa. A meta-analysis of Gallup studies for example, examined the links between core aspects of employees' satisfaction, engagement and performance across organisations. This analysis showed that the *'presence of positive workplace perceptions and feelings are associated with higher business-unit customer loyalty, higher profitability, higher productivity and lower rates of turnover.'* (Harter, Schmidt and Keyes, 1999, p1).

There are also consequences for employers in terms of the costs of employee absence. The overall cost of absence due to sickness is approximately £12 billion each year (HM Government, *Health, work and well-being*, 2005). A not insignificant proportion of these costs are related to absence due to common health problems. The Health and Safety Executive's (HSE's) analysis of LFS data shows that common mental health problems and musculoskeletal conditions are the two leading causes of self-reported days of sickness absence due to work-related ill-health (HSC, 2006).

Effective preventative strategies and absence/attendance management policies are therefore not only an important part of good management practice, but also make business sense. However, a review of evidence of effectiveness of attendance management policies conducted by Spurgeon (2002) identified only

eight scientific studies on the subject, four of which dated back to the 1970s and 1980s. Overall, it found some evidence that policies involving early contact with absent individuals and early referral to occupational health can reduce the duration of absence, particularly among those with longer-term absence.[4] Little else about the effectiveness of absence management policies was located, as most of the published literature in the field was described as being primarily concerned with identifying causes of absence or evaluating intervention programmes which aimed to address the causes of absence. Spurgeon concluded that the published literature in the field of attendance management is dominated by papers advocating approaches unsupported by evaluative evidence. Current good practice appeared to be consensus-based, rather than evidence-based.

The consensus suggests that return-to-work interviews, trigger mechanisms to identify frequent short-term absences and the use of disciplinary procedures are some of the most effective methods of managing short-term absence. Occupational health professionals and rehabilitation programmes have been rated as the most effective approaches to managing long-term absence (Bevan, 2003). Differences have been identified in the way that absence is managed between private and public sectors (ibid.). The public services are more likely to address high levels of absence as a matter of health and capability, while private sector organisations are more likely to manage absence as an issue of conduct. Suggestions for ways to improve overall attendance include: improving individual health, for example, through smoking cessation initiatives; flexible working arrangements; help with travel; and improving the working environment (ibid.).

2.4 Current policy aims

Work and health have resonance across almost all government departments. To reflect this, the Government's health, work and well-being strategy[5] brings together all those with a role in relation to improving the health of working age people. It represents a strong commitment to cross-departmental working on the issue and has led to the appointment of a new national director for health and work. The strategy aims to benefit those of working age by:

- creating healthier workplaces and preventing people from becoming ill or being injured as a result of their work;
- maximising the opportunity that workplaces provide to help people make healthy lifestyle choices;

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4 The review by Spurgeon (2002) included evidence from one study by Malcolm *et al.* (1993) which is included in another review by Michie and Williams (2003) covered in Chapter 5 of this report on common mental health problems.

5 HM Government (2005) 'Health, work and well-being – Caring for our future: A strategy for the health and well-being of working age people'. DWP, Department of Health (DH), HSE.

- intervening early when health problems arise;
- ensuring the necessary interventions and treatments are easily and speedily available when people fall ill, especially for those with common mental health and musculoskeletal problems;
- encouraging the provision of good quality occupational health services and giving people with health problems or disabilities the support they need to manage their conditions and remain in work;
- encouraging the provision of effective rehabilitation and return-to-work support, as well as the workplace adaptations necessary to help those who have been absent or out of work because of ill health;
- engaging with and educating people, and particularly employers, employees and healthcare professionals, so that they understand the links between work and health and that work can often be beneficial to people with health problems or disabilities;
- seeking to have the public sector lead by example in becoming an exemplar in the provision of support for its own workforce.

By working through these aims the strategy anticipates achieving a range of improvements for the working age population in terms of their health, employment, and productivity. It also hopes to reduce health inequalities and social exclusion, enabling people to work to a later age if they wish, whilst also optimising the work opportunities available to people with health problems and/or disabilities.

2.5 Government interventions

To support these aims, the Government has introduced a number of interventions, most notably in terms of returning people to work after a period of absence or worklessness.

2.5.1 Pathways to Work

Pathways to Work has been developed to provide greater support to help people claiming incapacity benefits back into, or closer to, the labour market. Pilot provision for Pathways to Work started in October 2003 and from December 2006 has been available in further districts, now covering 40 per cent of the UK. This work-focused initiative targets individuals making a new or repeat claim at a pilot office for either Incapacity Benefit (IB), Income Support (IS) (either on the grounds of incapacity or because IB is not payable), or Severe Disablement Allowance (SDA). The initiative provides regular, focused interviews (non-attendance at which can result in deductions from benefits) with trained personal advisers, during which customers are encouraged to identify future life and work goals and any barriers to achieving them. The adviser also provides support in achieving these goals using action plans. However, individuals must, by definition, have been off work for at least six months before such support becomes available.

An additional facility is an incentive – Return to Work Credit – which is a payment of £40 a week for people starting work of at least 16 hours a week and earning no more than £15,000 per year. Applicants must have been receiving an incapacity benefit (including Statutory Sick Pay (SSP)) for 13 weeks immediately prior to starting work. It is payable for up to 52 weeks. These measures are therefore, by definition, focused on rehabilitation following absence from, rather than prevention of absence within, the workplace. A number of interim evaluations have been conducted, reports of which are available through the DWP website.

2.5.2 Job Retention and Rehabilitation Pilot

Another government endeavour focused more on actions to aid the return of those still in work to their jobs. The Job Retention and Rehabilitation Pilot (JRRP) was a randomised controlled trial designed to test three alternative interventions, all aimed at increasing the return to work rate of those off work sick for six weeks or more. It ran for two years to 2005 and involved 2,845 participants within six areas of the UK. It was aimed at people who were in employment of 16 hours a week or more but who had been absent from work due to sickness for between six and 26 weeks, with the aim that they return to work for 13 consecutive weeks, with the start of this return to work being no later than the 28th week after first going off sick.

The three interventions were:

- a workplace intervention, aimed at achieving a return to work by addressing issues in the workplace;
- a health intervention, aimed at achieving a return to work by addressing the health issues of the individual; and
- a combined intervention; this being a mix of the above two interventions (the appropriate mix per individual being left to the judgement of the intervention provider).

An evaluation of the trial (Purdon *et al.*, 2006) found that there were almost identical return to work rates for each of the three intervention groups and the control group, suggesting that none of the interventions tested were successful in improving the return to work rates of those off sick. There was no impact on a range of other employment-related outcomes, such as number of weeks in work, number of weeks out of work, receipt of IB and pay.

Analysis of the JRRP suggests that this failure was due to a number of possible factors: interventions were too late, between six and 26 weeks after the individual had gone off sick; the quality of interventions inconsistent; and the screening tool may have left the JRRP with only the most difficult cases, such as people already dissatisfied with their jobs or those whose employers didn't want them back (Pickvance, 2006). Many of the interventions lacked an evidence base, with 30 per cent of the healthcare interventions described as 'alternative or complementary'. The experience of running JRRP, therefore, provides insights into some of the

factors which can affect the success of workplace health interventions, and which make their evaluation extremely difficult. Recognising these difficulties, further analysis of the JRRP data is being conducted by the DWP to gain further insights from the evaluation.

2.6 Models of occupational health

There is still some way to go if the UK is to match its extremely successful record in tackling safety issues with regard to occupational health. It has been argued that the reliance on a philosophy of regulation may have contributed to the lack of progress on health (Lunt *et al.*, 2005, in HSE consultation exercise). A risk assessment model may not be the most appropriate one to tackle health issues such as stress and MSDs, where risk factors are more complex, the cause-effect relationship is not straightforward and there are multifaceted interactions. Therefore, traditional risk assessment approaches may need to be enhanced to deal with emerging health problems. Other models from a range of disciplines, and a biopsychosocial approach may be more appropriate to use when dealing with more complex health issues that cross the boundaries of home and work.

Lunt *et al.*'s 2005 review also suggests that working life and occupational health should be situated in the wider context of health, work and well-being. The review concluded that evaluation should take place to establish a baseline of evidence against which to judge the effectiveness of the risk assessment approach and future initiatives. Indicators such as disease incidence and prevalence rates, biomarkers and quality of life measures should be chosen to allow this monitoring to take place.

A more recent review by the same lead author (Lunt *et al.*, 2007) however, suggests that the uptake of biopsychosocial approach is hampered by a range of difficulties. These include the practical difficulties inherent in assimilating the model into aspects of medical practice; a lack of intra- and inter-disciplinary working; and difficulties in model construction (i.e. taking complex interactions between biological, psychological and social and reducing these into something workable). Despite this, the review asserts that biopsychosocial mechanisms have some bearing on most occupational health conditions, although there is a distinction drawn between whether the condition is mainly related to physical or psychosocial hazards, with common mental health problems tending to fall into the latter category. The review does, however, also conclude that there is a *'predominance of cross-sectional research, over-reliance of self-report measures, and wide variations in the way by which well-being is defined and measured.'* (pg viii).

In any discussion of emerging health issues, particularly in the context of the biopsychosocial model of health, it is necessary to consider stress. However, simply defining stress is difficult. There are a variety of stress theories linking a range of environmental factors with stress responses. These include both job demand-job

control (Karasek, 1979 – as reported in Warr, 1987) and effort-reward imbalance (Siegrist, 1998 – as reported in Warr, 1987). Suggested environmental factors acting as stressors have also been put forward (e.g. Rick, 2002 for the HSE; Warr,1987). The assumption behind such definitions is that stressors are necessarily harmful to health and they fail to acknowledge that psychosocial work characteristics may also be beneficial to mental health and well-being.

In trying to take account of the potential positive influences on mental health of psychosocial work characteristics, both dose-response and person-environment interaction theories have been suggested. The dose-response argument suggests that certain psychosocial work characteristics and 'stress', are beneficial up to a given threshold, after which they become harmful. An alternative argument is that an individual interacts with a range of work characteristics and experiences, which have both beneficial and harmful effects. Other non-work-related factors can also influence how an individual interacts with, and reacts to, stressors at work. Whether or not, and to what degree, an individual experiences adverse health outcomes is dependent upon the individual, the work characteristics, and the interaction between the two.

This role of individual factors on health is an important one. Lunt *et al.* (2007) clearly highlight the importance of an individual's social gradient (i.e. expectations of social capital and wealth, and perceptions of their relative position on such measures) as an external deerminant of well-being at work. Additionally, the way that the organisation and individual 'match' is important (e.g. in terms of values and/or individual expectations/actual job). In their review of the impact of work on health, Waddell and Burton (2006) found that *'emotional symptoms and minor psychological morbidity are very common in the working age population; most people cope with these most of the time without healthcare or sickness absence from work'*. The impact of work on mental health cannot, therefore, be seen as purely a passive process from the perspective of individuals. Individuals can shape their own well-being. Warr (2005 – in Barling *et al.*, 2005) identifies both personality characteristics and person-specific processes of judgment as potentially affecting mental well-being.

The individual, their work environment and the relationship between them are all important in considering possible interventions aimed at improving psychological health and work outcomes.

2.7 Evaluating occupational health interventions

The concept of evidenced-based practice is widely accepted in general medicine, in contrast to the traditional authority-based (or tradition-based) practice. Evidence from research is used to guide physicians' decisions in practice rather than on the basis of derived expertise or in accordance with established procedural patterns (Ruotsalainen *et al.*, 2006). While this has been borrowed by other applied fields such as policy making, it has yet to be fully accepted in the area of occupational health.

This is, in part, a result of a lack of good quality evaluation evidence, despite a growing trend of conducting systematic reviews to evaluate the effectiveness of a range of occupational health interventions. For example, Hulshof *et al.* (1999) noted that the methodological quality of the studies identified in their systematic review of evaluation research in occupational health services was not high.

There are a number of explanations for this absence of evidence, including limitations posed by conducting evaluations of interventions in the workplace. In addition to these limitations, however, researchers in this field have yet to adopt standard scientific protocol in reporting results of their evaluations, apart from the quality of research design. These problems are explored in this section.

Conducting good quality scientific evaluation studies requires, ideally, that a range of design features and methodological elements are in place. These include:

- the use of experimental and control groups which are similar in occupational profile and other relevant socio-demographic characteristics and separate from the experimental group to avoid cross-contamination of the intervention;
- a stable work environment within which the effects of the intervention can be isolated;
- access to the research participants over a sufficient length of time, to capture starting points, short-term and long-term results (including good retention and compliance of study participants); and
- sufficiently large samples in both the experimental and control groups in order to accurately capture the strength of observed effects.

These can, however, be difficult to implement in relation to workplace interventions. The fact is that most workplaces do not lend themselves easily to these conditions. There can also be practical and ethical barriers to implementing an intervention to a restricted group of employees when it is believed to be of beneficial value (Karsh *et al.*, 2001). Both public and private employers can also hesitate to provide unlimited access for scientific researchers to their employees, with gatekeepers being concerned about issues such as data protection and commercial competition.

3 Cardio-respiratory health and health promotion

This chapter explores the background to health promotion and prevention activities at work and considers evidence from evaluations of workplace health promotion interventions. Interventions which are aimed at, or are seen to impact upon, cardio-respiratory health are included in this review, although these are limited in number and generally tend to be linked to primary prevention interventions, as opposed to secondary prevention and rehabilitation in the workplace.

3.1 Background

Health promotion activities may focus on targeting specific identified risk groups or may be concerned, more broadly, with improving general health. Often, these aims can be complementary to reducing risk and improving health. Health promotion may help prevent ill-health and provide cost savings to both employers and the taxpayer.

The appropriateness of the workplace as a setting for health promotion is also widely accepted: it provides easy and regular access to a large number of people as most adults are in employment. Additional benefits are said to stem from peer support and positive peer pressure provided through work social networks, as well as in the reduction of workplace accidents and illness which can be an important determinant of health (Ibid).

The exact nature and features of health promotion can be difficult to define, as it can include a wide variety of activities, with a corresponding wide range of specific benefits. Health promotion can be directed at individual or organisational level and can address physical or psychological factors.

3.2 Evidence review

There is a significant amount of evidence from systematic reviews on the effectiveness of workplace health promotion. The particular interest of this research

in work outcomes, however, happens to exclude much of the available evidence, as the success of a given health promotion intervention is usually measured in terms of health outcomes.

While a significant change in health outcomes may be indicative of the potential of a given intervention to ultimately impact on sickness absence or employee retention, the ability to capture changes in these outcomes, in part, depends on the intention of the study. Similarly, it is difficult to assess the efficacy of various health promotion approaches by terms other than those presented in the aims of each systematic review. As such, work outcomes are explored alongside health outcomes, to give an overall indication of the efficacy of different approaches in health promotion. Details of the research papers considered are provided in Table A.1 in Appendix A.

3.2.1 General health and exercise

Several reviews have demonstrated that health promotion interventions which include components designed to increase physical activity at work, are effective in increasing levels of physical activity amongst employees (Proper *et al.*, 2003; Disham *et al.*, 1998; Shephard, 1996; Blue and Conrad, 1995, as in Kallestal, 2004). These interventions are based on evidence which shows that regular physical activity is associated with a decrease in risk factors for several chronic diseases, including coronary heart disease and cancer (Stampfer *et al.*, 2000; Lee *et al.*, 2000; and Ueji *et al.*, 1998, as in Proper *et al.*, 2002). However, the reviews reported in Kallestal *et al.* (2004) showed only limited evidence of positive effects on direct health outcomes such as improved blood fat levels, lower blood pressure and reduced fatigue. Physical activity programmes supported by environmental changes, resulted in inconclusive results with regard to levels of physical activity, and no evidence for an effect on cholesterol levels and body mass index (Engbers *et al.*, 2005).

The extent to which physical activity programmes effected absenteeism was explored in an earlier publication by Proper *et al.* (2002), focusing exclusively on work outcomes. They concluded that there was limited evidence of an effect for absenteeism, with additional inconclusive evidence on other work outcomes such as job satisfaction, job stress and employee turnover. No effect was found on productivity. Other research, commissioned by the Health and Safety Executive (HSE), however, does point to evidence supporting worksite fitness programmes in terms of reducing absenteeism from work (Shephard, 1992; Cady *et al.*, 1985; Dishman *et al.*, 1998, as in Lock and Colford, 2005)[6].

Like physical exercise, diet has also been linked to several chronic diseases, with obesity being a particular risk factor for diabetes, cancer, stroke and heart disease. Although no systematic reviews focused exclusively on diet interventions or results

[6] Two of their reference sources to support this statement were also used to support a similar statement by Kallestal (2004).

of interventions on diet and weight, it is a common feature in comprehensive interventions as well as being a common intermediate outcome of effectiveness with regard to health education and environmental changes. The recently published National Institute for Health and Clinical Excellence (NICE) guidelines on obesity[7] are supported by several systematic evidence reviews, including a review of workplace interventions and the workplace as a setting for the management of obesity. No work outcomes were reported here; however, a range of evidence was presented linking workplace interventions to weight outcomes and diet and activity outcomes. Behaviour modification programmes that included health screening with counselling or education were effective with regard to weight outcomes and diet and activity outcomes. Additional specific interventions such as provision of healthy food choices, workplace activity programmes and environmental improvements in stairwells (such as decoration, motivational signs and music) were all shown to be effective with regard to diet and activity outcomes.

Only one review examined and compared the specific content of various health promotion interventions (Harden *et al.*, 1999), and successfully tested the theory that those which consulted with employees, or included some type of employer/employee partnership were more effective than those that did not. Most studies included in this review were aimed at changing clinical and/or behavioural risk factors for cardio-vascular disease (alongside a range of other aims). Interventions represented included education, behavioural risk assessments and/or medical screening, personalised advice and improved social support.[8] Intervention effectiveness was rated in aggregate for each intervention type, taking into account all reported outcomes, and placed into one of three categories based on the 'reviewer's judgements' of the methodological quality of evidence. Of the 11 interventions that included some form of employer/employee partnership and which were evaluated with sufficient rigour, ten were considered effective or partly effective. The overall conclusions suggest that, taken together, worksite health promotion interventions have limited effectiveness on work and other outcomes, but that the use of partnerships is a promising strategy for increasing the effectiveness of interventions.

A non-systematic review of evidence on workplace health promotion and prevention (Kreis and Bodeker, 2004) concluded that programmes on occupational health promotion lead to a 'demonstrable' reduction in absenteeism.[9] There

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7 See www.guidance.nice.org.uk/CG43/guidance/section3/word/English for full guidance and evidence review on prevention; see www.guidance.nice.org.uk/CG43/guidance/section4/word/English for full guidance and evidence reviews on management of obesity in non-clinical settings.

8 Studies which focused on smoking cessation or non-smoking workplaces were excluded from this review.

9 This review included three sources discussed elsewhere in this report, including: Dugdill and Springett, 2001; Proper *et al.*, 2002; and Harden *et al.*, 1999.

was a caveat to this conclusion due to several methodological weaknesses in the evidence included in the review: First, it was noted that evidence for the effectiveness of health promotion in reducing health risks was strong, but overall low participation rates in American studies (most of the studies were American) made it difficult to generalise findings to whole worksite populations. Those that took part in programmes were considered to represent a small, health-conscious minority. In practical terms, programmes of multi-factorial design were seen to have a greater chance of enticing high-risk employees to participate. They offer the possibility of various employees being able to profit in different ways from the same programme, depending on which risk factor they are concentrating on; however, this recommendation was not based on evidence using a single intervention programme as a control group.

One final review explored the effectiveness of health circles in Germany, discussing them in the context of comprehensive health promotion interventions at the workplace (Aust and Ducki, 2004). Health circles are designed to increase participation and empowerment, through involvement in the decision-making process (of organisational change) and learning experiences. They typically involve employees from a range of different hierarchical levels in the organisation and are in effect, discussion groups, formed at the workplace, to develop change options for the improvement of potentially harmful working conditions. Discussions are moderated by a trained facilitator and are informed by an analysis of sickness absence and other risk assessment data. Unlike other approaches to health promotion and prevention at work, discussed above, health circles are a bridge between health and safety risk assessment and modification and other health and well-being activities. While the authors acknowledge that the quality of available data is limited, they nonetheless found health circles to be an effective tool for the improvement of physical and psychosocial working conditions, with favourable effects for workers' health and sickness absence levels.

3.2.2 Smoking cessation

As with other types of health promotion and preventive interventions, the worksite is a preferred setting for smoking cessation research and interventions, as it provides access to a relatively large number of people in relatively stable environments, and has the potential to reach a larger proportion of the smoking population than in non-workplace environments (Smedslund *et al.*, 2004). The benefits of non-smoking and smoking cessation are now widely known and accepted, and include reduced risk for cancer, cardio-respiratory and cardiovascular disease, among others.

The effectiveness of smoking cessation interventions in the workplace is, however, a separate matter. Evidence identified in reviews for this research presents contradictory results. A meta-analysis of workplace smoking cessation programmes (Ibid.), showed that worksite interventions had some initial effectiveness, but that the effect decreased over time and had disappeared after 12 months. The authors did note, however, that the analysis included a range of different specific

interventions and that insufficient reporting of key variables prevented them from making conclusions about the most effective components of interventions.

Other research has explored the effects of non-smoking workplaces on smoking. Fichtenburgh and Glanz (2002)[10] conducted a meta-analysis of non-smoking workplaces and concluded that these workplaces were effective in reducing smoking amongst employees, in one case leading to a 29 per cent reduction in total cigarette consumption. While neither of the reviews exploring smoking in the workplace presented the results in terms of work outcomes, the evidence identified here suggests that policies for non-smoking workplaces may have a greater impact on smoking than smoking cessation interventions.

3.3 Discussion of findings

Despite limited measurement and reporting of work outcomes in evaluations of the effectiveness of health promotion and preventive interventions in the workplace, a range of practices and activities have been identified which may be useful for employers and policy makers in improving health and reducing health risks among those in work.

3.3.1 Interventions to promote health and reduce health risk factors

There is some evidence (of unclear methodological merit) that the majority of health promotion interventions in the workplace, in general, are ineffective or only partially effective. Considering the range of activity which can be included under the heading of health promotion, this finding perhaps blurs the actual contribution any specific health promotion intervention may have on workers' health. There was a range of evidence identified which explored the effects of numerous specific components of interventions. For example, there is strong evidence that efforts to increase physical activity through the workplace succeed in increasing physical activity amongst employees. The impact that this increased physical activity has on health is still unclear, as there is only limited evidence of positive effects on health risk factors such as improved blood fat levels, lower blood pressure and reduced fatigue. There is also some evidence which supports the benefits of general physical activity through worksite fitness programmes, showing a positive effect on sickness absence. Evaluations of health promotion generally have also been shown to lead to a reduction in absenteeism amongst research participants.

Workplace health promotion interventions which include some consultation with employees or include some other type of employee-employer partnership, have been shown to be more effective on a range of outcomes, than those interventions which did not involve employee consultation. Health circles are a good example of this type of partnership. Potentially important elements of health circles include the

[10] As in Kallestal *et al.*, 2004.

focus on employee empowerment and increased control over working conditions through involvement in a decision-making process; assessment of the specific needs and problems of a particular workplace; and improved communication and social support. However, there is only limited evidence from Germany that they are an effective tool for the improvement of physical and psychosocial working conditions, with favourable effects for workers' health and sickness absence levels.

Other evidence has found that non-smoking workplaces were effective in reducing smoking amongst employees by almost one-third. On the other hand, there was strong evidence showing that worksite smoking cessation programmes had decreased ineffectiveness over time, and had no lasting effect after 12 months, despite some initial effectiveness. This suggests that interventions which address the environment may be more effective with regard to smoking, than those aimed at the individual.

3.3.2 Strength and weaknesses of available evidence

Almost all of the reviews referenced here commented on the overall poor methodological quality of evaluation data on worksite health promotion interventions. Criticisms included a lack of use of control groups, lack of, or poorly implemented, randomised allocation and poor, or insufficient, description of interventions and study design, including an absence of participation and compliance statistics.

Participation and compliance in health promotion interventions is a particularly relevant point, as some authors point out that participants are often a health conscious minority. Furthermore, employees with the highest number of health risk factors may also be the least likely to take part in health promotion activity and the most likely to develop a common (or severe) health problem. Random allocation to treatment and control groups would help to counter the effects of self-selection in health promotion; however, it can be difficult to implement this in the work setting.

Even where health promotion activities achieve a good participation rate, the level of compliance with the requirements of the intervention may be low. For example, interventions aimed at increasing physical activity or changing diet, must use methods to measure the degree to which participants follow the prescribed exercise or dietary regime. Both participation and compliance must be reported in order for the effects (or lack thereof) of interventions to be understood. If health promotion activities are found to be ineffective because of poor levels of compliance, future activities can be designed to enhance this component.

Several authors have noted that the majority of evidence on health promotion comes from American studies. This puts a significant restriction on the ability to generalise the results of the evidence to other countries, particularly to the UK where, according to one report, only 40 per cent of workplaces in 1992 *'undertook at least one major health related activity'*. This is compared to 81 per cent of workplaces in the US in 1996 (Harden *et al.*, 1999). In the US, many employers bear the health care costs of their employees. As a result, workplace health promotion arises in a very different context from that in the UK and other European countries. To counter this, evaluations of health promotion in UK workplaces are required.

4 Back pain and musculoskeletal disorders

This chapter explores the nature and incidence of back pain and musculoskeletal disorders (MSDs) in the workplace, before going on to present the evidence identified from systematic reviews on the effectiveness of interventions to prevent and manage back pain and MSDs at work.

4.1 Background

Musculoskeletal disorders are the most common occupational illness in Great Britain, affecting one million people a year.[11] They include low back pain (LBP), joint injuries and repetitive strain injuries of various sorts.[12] LBP is the most common type of MSD, with 60 to 80 per cent of adults experiencing it at some point in their lives (Waddell and Burton, 2001). It is often persistent or recurrent, and is one of the most common reasons for seeking healthcare. Also, it is now the commonest health reason given for work loss (ibid.).

The nature of the link between back pain and work has been widely debated. Traditional models of risk assessment and injury prevention have tended to suggest that back pain is largely preventable, at least in theory. Current thinking has taken a wider view of back pain and other MSDs, drawing links between it and biological, psychological and social factors. The biopsychosocial model takes all of these components into consideration in trying to understand and treat 'work-related' back pain. Intervention components in this model may address any number of specific factors, including:

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11 See www.hse.gov.uk/msd/index.htm

12 According to Waddell and Burton (2004), MSDs include a wide variety of conditions, ranging in severity. Severe medical conditions such as rheumatic diseases and advanced osteoarthritis are common causes of long-term incapacity but do not fit the definition of common health problems.

- health condition (and health care);
- capacity and activity level;
- personal and/or psychological factors;
- psychosocial aspects of work;
- organisational and system obstacles;
- attitudes to health and disability.[13]

A more detailed summary of issues relating to disability models and LBP and MSDs can be found in Waddell and Burton's *'Concepts of rehabilitation for the management of common health problems'* (2004).

4.2 Evidence review

This section presents the evidence available from systematic reviews and European management guidelines (which are also based on systematic evidence reviews) on interventions to prevent and manage back pain and MSDs in the workplace. Thirteen reviews and two Health and Safety Executive (HSE) research reports assessing interventions on back pain and MSDs were identified, and are reviewed here. Together, these represent a vast amount of individual studies on the subject, coming from a range of disciplines and countries. Details of the research papers considered are provided in Table A.2 in Appendix A.

Areas covered include primary prevention, secondary prevention and rehabilitation and return to work, although some reviews cut across these boundaries. All identified reviews include an examination of workplace-based, or work-related interventions, and all have considered at least some work outcomes. The most common work outcomes used to assess the effectiveness of interventions in this field are sickness absence and return to work; however, as the reviews include a heterogeneous set of research aims, work outcomes are not consistently used or reported on within, or between, studies.

Due to the large volume of systematic evidence available on LBP, results are categorised into three main intervention stages and are presented for each review. This approach has been taken in an effort to present the evidence as closely as possible to the original objectives of each of the reviews. In doing this, we have avoided imposing an additional analytic structure to findings from systematic reviews, which may have resulted in a misrepresentation of the evidence. Overall findings on various different intervention types are then summarised in Section 4.3.

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[13] These factors are described in Waddell and Burton (2004), in their model of biopsychosocial rehabilitation interventions.

4.2.1 Evidence for prevention

Several different types of intervention have been used to prevent the initial occurrence of LBP and MSDs among the general population and at the workplace. These include unimodal and multi-dimensional approaches, but tend to include one or more well-known components: back belts or lumbar supports; education or 'back schools'; exercise, and ergonomic interventions. Ergonomic interventions are typically directed toward occupational risk factors such as: lifting; physically heavy work; a static work posture; frequent bending and twisting; repetitive work; and exposure to vibration. They can also include a range of other tools and strategies, as well as workplace redesign.

Evidence evaluating the effectiveness of these different interventions exists in numerous single studies and a variety of evidence reviews. Four systematic reviews were identified which address preventive interventions; however, because each review uses different specific research questions, it is difficult to identify the effect of each individual intervention in isolation. For example, Linton and van Tulder (2001) examined evidence for preventive interventions for back and neck pain, whilst Gatty *et al.* (2003) focus on prevention programmes for back pain and injury. A further review by Maher (2000) looked exclusively at LBP. The COST European guidelines for prevention in low back pain brings together the broadest range of evidence for primary and secondary prevention in low back pain, making recommendations for all population groups (2006).

Gatty *et al.* (2003) reviewed nine studies published between 1995 and 2000, representing a range of preventive interventions, but which could be categorised into three main approaches: back belts; education and task modification; or education and task modification with workstation redesign. The effectiveness of back belts to prevent back pain and injury was deemed to be inconclusive, although positive outcomes were associated with studies reporting high compliance with the intervention, and with those that used job-specific and individualised/small group education and training approaches. Only four of the studies reported on work outcomes, which in all cases was a variation of sickness absence or time lost due to back pain or injury. Unfortunately, the review only reported on the **overall** strength of the findings, blurring the results on work outcomes with those achieved for health outcomes.

Another review of Randomised Controlled Rials (RCTs) identified 13 trials which were considered to be of moderate quality overall (Maher, 2000). The evidence from these trials suggest that workplace exercise is effective, braces and education are ineffective, and workplace modification plus education is of unknown value in preventing LBP. With respect to sick leave due to LBP, there was moderate positive evidence in support of exercise (based on three studies), and strong evidence that braces were ineffective. Comparing the effect of education with no education, and in addition to a brace, moderate evidence revealed it as being ineffective in reducing leave taken due to LBP.

A third review by Linton and van Tulder (2001) included 27 studies, covering a similar range of intervention types to the previous two reviews. Strong evidence was found in support of the claim that both back schools and lumbar supports are ineffective in preventing back and neck pain. Only exercises provided sufficient evidence to conclude that they are an effective preventive intervention, both in terms of experiences of back pain and reduced absenteeism. Measured outcomes varied between the studies, but included sick leave due to back pain, initial sick leave and other measures of back pain incidence and duration. Data on all reported outcomes were used in aggregate to assess overall effect and evidence strength.

Covering a broad range of interventions, study populations and outcome measures, a review by Tveito *et al.* (2004) summarised evidence in terms of the effectiveness of primary and secondary prevention of LBP. The effects are described for three groups of outcomes, including sick leave, costs, and episodes of LBP. In terms of sick leave, there was no evidence for the effect of educational interventions, back belts, or pamphlets. No, or only limited, effects were identified in relation to multi-disciplinary interventions, while exercise showed limited evidence for a positive effect on sick leave.

While most of the identified reviews on prevention focus on LBP, one review by Karsh *et al.* (2001) provides a critical analysis of ergonomic interventions to control all MSDs. Over 101 experimental and quasi-experimental studies were identified. Interventions ranged from: back belt use; training in ergonomics and/or lifting techniques; use of tools or technologies; exercise interventions; and job redesign. Considering the heterogeneity of the interventions represented, including single and multimodal combinations, it is not surprising that, across the whole range of studies, there were mixed results. When the results of only the most methodologically rigorous studies were considered (those with randomised experimental designs), the extent of effectiveness for back belts and training interventions was reduced, with three out of four studies on back belts showing no positive effect and four out of seven studies on training showing no positive effects. Results in terms of work outcomes were not included in their discussion.

One of the most comprehensive reviews of the evidence comes from Waddell and Burton (2000) and has since been used to formulate occupational health guidelines for the management of LBP at work. The evidence they examined on preventive interventions have led to several conclusions of varying strength. They conclude that there is contradictory evidence regarding the effectiveness of general exercise and physical fitness programmes in reducing future LBP and work loss, with any possible effect size appearing to be modest. As with other reviews, Waddell and Burton conclude that there is strong evidence that lumbar supports are ineffective in reducing work loss due to LBP. Educational interventions based on the traditional bio-medical model were considered unsuccessful due to strong evidence that they are ineffective in reducing future LBP and work loss. On the other hand, there is preliminary evidence that educational interventions which specifically address beliefs and attitudes, may reduce future work loss due to LBP.

While most of the interventions described in relation to prevention are aimed at individuals, Waddell and Burton (ibid.) identify limited evidence in support of joint employer-worker initiatives in reducing the number of reported back 'injuries' and sickness absence, although no clear evidence on the optimum strategies or effect sizes. This approach generally involves identifying and controlling occupational risk factors with the support of, and commitment from, stakeholders or a consideration of organisational culture. This type of intervention might also include efforts to improve safety and surveillance measures, or other efforts to address and improve an organisation's safety culture.

Evidence from all of the above mentioned systematic reviews as well as other sources, has been most recently compiled by the COST European working group. Their recommendations are presented in *'European guidelines for prevention in low back pain: November 2004'* and make particular note of guidelines for workers, mainly in regard to secondary prevention. Interestingly, evidence for physical exercise features more predominantly in their guidelines and is recommended for prevention of LBP (with strong evidence), for prevention of recurrence of LBP (with strong evidence), and for prevention of recurrence of sick leave due to LBP (limited evidence). As with other reviews, lumbar supports or back belts were not recommended (strong evidence), and the same was true of shoe inserts or orthoses. Additional preventative interventions were considered such as in-soles, soft shoes, soft flooring and anti-fatigue mats; however, there was insufficient evidence for or against these approaches.

One further review, commissioned by the HSE to explore English and Japanese literature investigating the benefits of 'limbering up' exercises at work (Lock and Colford, 2005), was identified. An analysis of the literature revealed insufficient quantitative or reliable scientific evidence to support recommendations to industry about implementing limbering up exercises as a means of reducing work-related MSDs. However, evidence on the effects of physical exercise in general, did point to a reduction in absenteeism, and a general improvement of cardio-vascular physical health, suggesting that recommendations could be made on these grounds.

4.2.2 Evidence for interventions to manage LBP at work

Five reviews identified in this research considered the effectiveness of interventions aimed at preventing recurrence of LBP or preventing deterioration of symptoms and work status in the occupational setting. Most of the reviews in this section have explored intervention types which could be said to fit more with the biopsychosocial model of back pain. They have included studies with intervention components which address psychological and social obstacles to recovery at the individual and/or organisational level (Frank *et al.*, 1998; Waddell and Burton, 2000; and Schonstein *et al.*, 2003; COST, 2006). Such obstacles include dysfunctional attitudes and expectations about pain and disability; lack of modified work; and suitable policies and practices and return-to-work procedures. Further details of the various potential obstacles to recovery are presented in Waddell and Burton's *'Concepts of rehabilitation for the management of common health problems'*

(2004). The exact nature of interventions represented in the fifth review, Tveito *et al.* (2004) are ambiguous.

Covering a heterogeneous range of interventions, study populations and outcome measures, the review by Tveito *et al.* (ibid.) summarises evidence for the effectiveness of primary and secondary prevention of LBP; however, interventions to treat employees with low back pain are dealt with in aggregate. These interventions are described as being comprehensive, and *'usually combining medical, psychosocial and ergonomic interventions for employees on sick leave with LBP'*.[14] Taken together, this broad group of interventions was shown to have a positive effect on sick leave, a statement supported by what was considered to be moderate evidence. Results for other outcomes were mixed, with limited evidence to support an effect on new episodes of LBP (the direction of the effect is not specified), but no evidence for effect on level of pain. The lack of detailed description of the interventions to treat employees with LBP gives this finding limited use in understanding what interventions work.

The earliest source represented in this section is a narrative review by Frank *et al.* (1998). It presents intervention studies published between 1994 and 1999, and is based on what was, at the time, a new approach to categorising the studies: according to the stage or phase of back pain at the time of intervention. Evidence is discussed which supports the argument that the greatest reductions in time lost from work are achieved by implementing interventions at the sub-acute stage (3-4 to 12 weeks after onset of pain). Improved results are based largely on the different population groups, as there is already a very high rate of recovery in the acute stage (0 to 3-4 weeks after the onset of pain). Strong evidence is also presented indicating that employers who promptly offer appropriately modified duties can reduce time lost per episode of back pain by at least 30 per cent. Overall, the authors point to the use of guidelines-based approaches for the workplace which use a combination of interventions and practices to achieve the best results for both health and work outcomes.

The evidence review conducted by Waddell and Burton (2000) also identifies evidence to support the use of treatment interventions aimed at workers with LBP in the sub-acute stage. The guidelines based on their review made several clear statements regarding the management of workers presenting with back pain. There is moderate evidence that communication, co-operation and common agreed goals between the worker with LBP, the occupational health team, supervisors, management and primary health care professionals is fundamental for improvement in clinical and occupational health management and 'outcomes'. Advice to continue ordinary activities as normally as possible, is supported by strong clinical and epidemiological evidence and so, in theory, should also apply to advice given at work, although there is limited evidence available which focuses on the impact of advice on occupational outcomes in particular.

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[14] Ibid. (p5).

One recent review of this group of interventions is by Schonstein *et al.* (2003) which uses the Cochrane systematic review protocol, and also includes a meta-analysis. Reviewing 19 studies on the effectiveness of physical conditioning programmes for back and neck pain, a clear trend emerged in favour of programmes which included cognitive-behavioural approaches. These approaches aimed primarily to draw subjects' attention away from pain and disability and focus them on returning to function. They mainly took the form of cognitive behavioural therapy (CBT) sessions as an integral part of a multi-dimensional treatment programme. When evidence from programmes which included cognitive-behavioural approaches was aggregated in the meta-analysis, a 'clinically worthwhile'[15] reduction in the number of sick days taken at 12 months was observed. These results were significant when compared to General Practitioner (GP) care or advice.

The COST Guidelines also considered evidence regarding 'back schools' and concluded that those based on traditional biomedical/ biomechanical information, advice and instruction should not be recommended for prevention of LBP (supported by strong evidence). With regard to psychosocial information delivered at the worksite, there was insufficient evidence to recommend for or against this; however, they also found that information oriented toward promoting activity and improving coping may promote a positive shift in beliefs (supported by limited evidence).

Organisational interventions were also examined by COST with the resulting guidelines suggesting that individual level interventions could be more effective if provided in tandem with organisational adjustments. For example, there was some evidence that in order for a physical ergonomics programme to be successful, there would need to be an organisational dimension and involvement from workers (moderate evidence). However, there was insufficient evidence to recommend precisely which components contributed to making such interventions effective. At the same time, there was insufficient consistent evidence to recommend stand-alone work organisational interventions, despite the potential of these to enhance the effectiveness of physical ergonomics programmes, at least in principle.

One further publication was identified, which, although not a review, demonstrates convincing evidence of the effectiveness of education and information on the uptake, implementation and maintenance of interventions aimed at reducing the risks of MSDs in the workplace (Whysall *et al.*, 2005). Organisations and employees were assessed using a specially designed questionnaire, which placed them into one of five 'state of change' groups. Interventions were then supplemented by tailored education and information according to an organisation's or employee's identified state of change. For example, in cases where managers and/or workers were identified as being in the 'pre-contemplation' stage (characterised by resistance to recognising or modifying problem behaviour) the organisation was

[15] A mean saving of ten sick days per year or a number needed to treat to return one person to work out of ten, was nominated by the author as the smallest treatment effect that would be clinically worthwhile.

advised of the importance to first educate and promote risk awareness among both employee groups, by highlighting the detrimental effects of MSDs. The effects of interventions with tailored education or information were compared with the effects of 'standard' interventions with no such education or information, and were found to be significantly more effective on a number of levels. The authors concluded that tailored approaches were effective in increasing the uptake, implementation and maintenance of risk-reducing interventions through tackling the attitudes, beliefs and behavioural intentions that underpin an individual's current stage.

4.2.3 Evidence for rehabilitation and return to work

Six reviews are discussed which relate to rehabilitation and return to work, including one Cochrane systematic review and one systematic review of qualitative evidence.

Reviewing intervention strategies for return to work after sickness absence due to back disorders, Elders *et al.* (2000) identified nine RCT studies and three prospective cohort studies. Studies included represented a range of intervention types, and were heterogeneous in terms of sample selection, compliance, and also in terms of the sustainability of results. Few conclusions were reached, apart from the observation that back school type interventions showed more effect after 60 days of sickness absence than other non-back school type interventions, suggesting that intervention in the sub-acute phase is preferable (due to the already strong recovery among patients in the early phase of LBP). The authors called for future study protocols to include factors such as compliance, compliance sustainability and effect sustainability in order to better understand the effectiveness of interventions.

A Cochrane systematic review of multi-disciplinary biopsychosocial rehabilitation for sub-acute LBP among working age adults, applied the highest standards of study selection practiced amongst systematic reviewers (Karjalainen *et al.*, 2003). As a result, only two studies were included which met the criteria and were, nonetheless, described as low quality RCTs. Despite this, the studies were included on the basis of their clinical relevance. The reviewers concluded that there was moderate evidence that the multi-disciplinary rehabilitation strategies, which include a workplace visit or other more comprehensive occupational health care intervention, were effective in returning patients to work faster than patients in the control group, and in reducing sick leaves (sic) and subjective disability.

Evaluations of workplace-based return-to-work interventions for MSD and other pain-related conditions from ten studies, are summarised by Franche *et al.* (2005). They found strong evidence that work disability duration is significantly reduced by work accommodation offers and contact between the healthcare provider and workplace. Also that there is moderate evidence that work disability duration is reduced by interventions including early contact with the worker by their workplace ('early' defined as in the first three months after onset of pain), ergonomic worksite visits and the presence of a return-to-work co-ordinator.

Guidelines produced by the Faculty of Occupational Medicine for the management of LBP at work, also provide summaries of evidence with regard to rehabilitation (Waddell and Burton, 2000). There was moderate evidence for two interventions aimed at helping workers return to work in cases where they had experienced difficulty in returning to normal occupational duties at the chronic stage (i.e. four to 12 weeks after the onset of pain). The first of these was concerned with changing the focus from symptomatic treatment to a 'back school' type approach, and this was found to produce a faster return to work, less chronic disability and less sickness absence. The second implemented the temporary provision of lighter or modified duties and was found to facilitate a return to work and reduce time off work. At the same time, however, evidence from two non-scientific sources suggested that advice for restricted duties may act as a barrier to return to work where no lighter or modified duties were available.

The COST Guidelines (2006) which have summarised many of the above mentioned sources, also commented on return to work in relation to secondary prevention. They concluded that temporary modified work and ergonomic workplace adaptations could be recommended to facilitate earlier return to work for workers 'sick-listed' due to LBP (strong evidence).

Finally, one systematic review by MacEachern *et al.* (2006) presented an examination of the dimensions, processes and practices of return-to-work after 'injury' using qualitative evidence. This represents the only systematic review of qualitative evidence and sheds important light on the complexities inherent in the implementation of return to work strategies and interventions. 'Outcomes' are not identified as such but key concepts of 'goodwill' and trust are highlighted as overarching conditions which were found to be central to the success of return-to-work arrangements.

4.3 Discussion of findings

A wide range of evidence has been identified regarding interventions to prevent the occurrence of LBP amongst working people, to manage the impact of LBP and MSDs on individuals and the workplace, and to return individuals who have been incapacitated with LBP or an MSD to acceptable levels of function, thus enabling a return to work.

4.3.1 Interventions to prevent LBP

There was general consensus that exercise is an effective preventive intervention for incidence of LBP and MSDs, as well as being effective in reducing absence, although there was a range of opinions regarding the strength of evidence in this area. Only one review suggested that the evidence in support of exercise was contradictory with regard to reducing LBP and work loss, noting that observed effect sizes were modest at best.

On the whole, training and education interventions were found to be ineffective. However, there were exceptions to this identified by three reviews. In one review, job-specific and individualised or small group education and training that reported high compliance, was associated with positive outcomes regarding prevention of back pain and injury; however, the effect on work outcomes was not clear. A more detailed examination of training content elsewhere revealed preliminary evidence that educational interventions addressing beliefs and attitudes may reduce future work loss due to LBP. It was, therefore, concluded that educational interventions based on the traditional biomedical models are ineffective in reducing future LBP and work loss. On the other hand, information oriented towards promoting activity and improving coping was felt to be able to promote a positive shift in beliefs.

There was little effect observed with regard to back belts in preventing sick leave due to LBP. Most of the reviews concluded that this ineffectiveness was supported by strong evidence; however, one review deemed the evidence on back belts to be inconclusive.[16]

4.3.2 Interventions to control and manage LBP at work

Two reviews identified strong evidence to support the effectiveness of interventions being implemented at the sub-acute stage of LBP, defined as three or four to 12 weeks after the onset of pain. The success of this approach is based on the already very high rate of recovery amongst patients in the acute phase; many patients will recover to normal levels of activity and function in the first month. Focusing interventions on the sub-acute phase concentrates resources on those who have an increased risk of LBP developing into a long-term problem.[17]

Interventions around the work organisation and the employer can also be helpful in getting workers with LBP back to work early. For example, there is strong evidence that a prompt offer of appropriately modified duties can reduce the amount of time lost per episode of back pain by at least 30 per cent. There was also moderate evidence that supporting the communication, co-operation and common agreed goals between workers with LBP and the occupational health team, supervisors, management and primary health care professionals, was effective in improving 'outcomes'.

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16 While it is possible that contradictory findings between systematic reviews can be explained by sequence (for example, an earlier review being contradicted by more current reviews which include newer and/or better evidence), each of the reviews presented here is based on studies from a similar period (1995/2000).

17 None of the reviews considered suggested that interventions should not also be applied to workers presenting with LBP in the acute phases. Clinical guidelines as well as occupational health guidance suggests that important preventive and rehabilitative advice can be provided in the acute stages, including advice to stay active.

Finally, it is possible that one effective way of supporting the communication between workers and employers is through CBT. One review identified that physical conditioning programmes for adults with disability related to back or neck pain, which included cognitive-behavioural approaches, such as CBT sessions, were found to have a 'clinically-worthwhile' reduction in the number of sick days taken at 12 months, when compared to GP care and advice.

Some interventions were identified which had limited evidence for effectiveness. For example, interventions which consisted solely of physical ergonomic approaches had insufficient consistent evidence of their effectiveness in preventing recurrence of LBP. Similarly, while evidence was identified which supported the pairing of ergonomic approaches with organisational interventions, there was an absence of evidence to specify the exact content of successful multimodal interventions.

4.3.3 Interventions to help employees with LBP return to work

There is moderate evidence that multi-disciplinary interventions, which include a workplace visit or other more comprehensive occupational health care intervention, resulted in returning patients to work faster, as well as reducing sickness absence and subjective disability. On a similar point, strong evidence was found in support of contact between healthcare providers and the workplace, in reducing the duration of work disability duration. There was also moderate evidence that interventions including contact with workers by the workplace in the first three months of absence, ergonomic visits, and the presence of a return-to-work co-ordinator, were also effective in reducing work disability duration. In particular, there was a mix of strong and moderate evidence in support of work accommodation offers reducing duration of work disability.

Two reviews commented on education for return to work, one identifying moderate evidence to support a change of focus from symptomatic treatment to a back school type approach, which was seen to produce a faster return to work, less chronic disability and less sickness absence overall. The second review found that back school type interventions showed more effect in the sub-acute phase than other non-back school type interventions. The reviews highlight two key factors in effective interventions: stage of LBP, and education. Focusing intervention activity towards those with LBP who have an increased risk of not returning to work (sub-acute stage) increases the effectiveness of an intervention by virtue of the fact that those who will recover without treatment have often done so by this stage. Education is also important for the management and rehabilitation of workers with LBP, although the term 'back school' can be used to describe two very different approaches to education about LBP. Across the evidence it has been used to describe education based on both models of prevention and recovery, and can include components aimed at addressing ergonomic and/or psychosocial risk factors. While the distinction is not always clear between reviews, those reviews which have compared back school by content type, suggest that education informed by the biopsychosocial model of LBP and which addresses psychosocial risk factors is more effective for return to work.

4.3.4 Strengths and weakness in the available evidence

Elders *et al.* (2000) found that their review of evidence on return-to-work was severely limited due to an absence of essential study features. They called for future study protocols to include factors such as compliance, compliance sustainability and effect sustainability in order to better understand the effectiveness of interventions. The ability and willingness of study participants to comply with the intervention is a key factor in assessing its effectiveness: this applied to both the duration of the intervention and for the longer-term. Likewise, if the aim of a return to work intervention is to keep workers with LBP in work, the effectiveness of these interventions can only be captured with several longitudinal outcome measures.

Similar calls for improved methodology in study designs and execution were made by others, in some cases reporting that overall results were influenced by the fact that too few studies met the inclusion criteria. This point relates to two separate difficulties: First, inclusion criteria which restrict non-experimental study designs may be excluding evaluation evidence which could shed important light on the implementation process and overall effects. Some authors argued for the inclusion of evidence from non-experimental studies in considering the overall effectiveness of interventions. For example, this would enable qualitative evidence to improve the understanding of intervention components and key differences between successful and unsuccessful interventions. The second point about inclusion criteria relates to subject focus. A few of the reviews identified were based on a very narrow scope of intervention type. The Cochrane systematic review on biopsychosocial rehabilitation for subacute LBP among working age adults, for example, was so specific that only two relevant studies were identified for inclusion. While this specific approach may be suitable for exploring the particular benefits or deficiencies of a given approach, reviews which consider a range of intervention types have a greater potential to improve understanding of the subject as a whole.

It is worth noting that beyond the prevention stage, there were very few reviews which highlighted interventions which were ineffective. It was more likely that insufficient evidence was identified, or that insufficient consistent evidence was found. This may relate to the prevalence of different intervention types and the availability of good quality evaluations of these interventions. On the other hand, one must also consider the effect of publication bias, which suggests that evaluations of interventions which observe no effect or indeed result in a negative effect, may be less likely to result in publication.

Finally, points made at the beginning of this report, may be usefully recalled in relation to interventions for LBP. Namely, this research has focused almost exclusively on presenting the results from systematic reviews. There are likely to be various individual studies, which are of good methodological quality and which may contribute to a discussion on the effectiveness of workplace practices and interventions for LBP. These, however, are not included in the scope of this research.

5 Common mental health problems

In this chapter the focus is on common mental health problems (i.e. mild to moderate conditions). They affect a large number of working individuals, and are the second most common cause of self-reported work-related illness (Health and Safety Commission (HSC), 2006). Providing interventions which can prevent the onset of such conditions, manage and treat the symptoms and help sufferers to return to work successfully, is therefore of great importance to UK employers, individuals and the economy.

5.1 Background

Before presenting the evidence available on workplace interventions and their impact, it is first necessary to discuss some of the background to this area, particularly given current difficulties in reaching a consensus on what is constituted by 'stress' and 'well-being' for example. Both these concepts potentially have direct relevance to common mental health problems.

5.1.1 Common mental health problems

Common mental health problems are dominated by anxiety, depression or a combination of both (Fryers *et al.*, 2003 – reported in Waddell and Burton, 2006) and are seen as distinct from severe mental illnesses such as schizophrenia, psychosis or bipolar disorder. As such, they are more prevalent (one estimate suggests ten per cent of the full-time workforce have a diagnosis of depression and/or anxiety; Carter, 1999 – as reported in Seymour and Grove, 2005), more successfully treated in primary rather than secondary care settings and least disabling in terms of stigmatising and discriminatory behaviour (Ibid.). The estimated impact on the economy of these common health problems varies, but it has been estimated that 91 million working days are lost each year and that £12 billion is lost in terms of employment and productivity through mental health problems (Gray, 1999; Mental Health Foundation, 2000 – both cited in Seymour and Grove, 2005).

5.1.2 Stress

Despite its common usage in the literature, there is variation in the use of the term 'stress'. There are also a number of problems, both conceptual and methodological, with 'stress'. In essence, the debate centres on:

- whether 'stress' is a psychosocial characteristic of work (a stressor), an adverse health outcome (stress response), a mediating construct or a process of interaction between an individual and their environment;
- the subjective nature of measurement of both stressors and stress response, leaving open the possibility that any perceived relationship between the two may be confounded by a mental state identified as 'stress', whatever its cause;
- a lack of clear definitions, and the circular nature of the definitions in use. Essentially, a stressor is anything that leads to a stress response and anything that is a stress response is attributed to a stressor.

Perhaps a more fundamental issue is that there are no objective or agreed criteria for the definition or measurement of any clinical syndrome of 'stress'. Work-related stress is not included in the previous definitions of common mental health problems. In spite of this, occupational stress has been identified as the most common mental health problem in the working population (Economic and Social Research (ESRC), 2006). Stress is included with depression and anxiety as the second most common cause of occupational illness in Health and Safety Executive (HSE) compiled statistics of self-reported illness and injury and it has also been termed the *'best modern exemplar of common mental health problems'* (Waddell and Burton, 2006, pg 22). Despite the complexities in defining and measuring stress, there is no doubt that it represents a major issue in the workplace. Prolonged exposure to occupational stress can lead to anxiety and depression in many workers (ESRC, 2006).

With this relationship in mind, interventions that are aimed at reducing or preventing work-related stress and which include work-based outcomes, are covered by this review. As such, the literature included on stress will use different definitions of what 'stress' means within the context of individual studies included in, and the conclusions of, the reviewers.

5.1.3 Mental health, well-being and work

There has traditionally been a focus on the treatment of **mental ill-health** but increasingly there are moves to a broader view which considers **mental health**. Mental health is not simply the absence of ill-health but a continuum from good to poor health. Both stress and common mental health problems can be considered within broader constructs of mental health and well-being. Well-being, however, has also proved difficult to define. Lunt *et al.* (2007) notes (as part of a review of other literature) how well-being is more commonly defined by individuals themselves rather than the medically qualified and that it is a subjective concept of health which also relates to general quality of life.

One definition of well-being (Warr, 2005, as in Barling *et al.*, 2005) considers three measurement axes: displeasure to pleasure; anxiety to comfort; and depression to enthusiasm. The first axis corresponds, in job-related terms, with an individual's overall feelings about their job and thus, with the concept of job satisfaction. Different aspects of well-being, according to this definition, are associated in different ways with different job characteristics.

It may be expected that employees with more positive mental well-being behave differently from those with lower well-being and there is some evidence linking aspects of mental well-being to work-related outcomes such as absence and turnover (e.g. ibid.), as well as evidence of an association between job-related depression and absence (Hardy *et al.*, 2003 – reported in Warr, 1987). It should be noted, however, that social and family pressures, organisational policies and culture can all affect decisions to attend work and that such associations say nothing about the direction of causality.

Cross-sectional studies have shown an association between various psychosocial characteristics of work and various subjective measures of general health and well-being (van der Doef and Maes, 1999; Viswesvaran *et al.*, 1999; de Lange *et al.*, 2003; Tsutsumi and Kawakami, 2004; van Vegchel *et al.*, 2005; Faragher *et al.*, 2005 – all reported in Waddell and Burton, 2006). Longitudinal studies show support for a causal relationship between certain psychosocial work characteristics and mental health, although the effects are generally small (Viswesvaran *et al.*, 1999; de Lange *et al.*, 2003; Tsutsumi and Kawakami, 2004; van Vegchel *et al.*,2005; Faragher *et al.*, 2005; Bond *et al.*, 2006 – ibid.).

This review will cover interventions aimed at changing the above work characteristics where these are shown to influence work-based outcomes. Interventions aimed at changing work practices are considered attempts at primary prevention. In other words, these interventions are aimed at reducing the sources of psychological ill-health rather than training individuals who are already experiencing work-related stress to cope more effectively.

5.1.4 Individual characteristics and mental health

Interventions to reduce psychological ill-health and potentially influence work outcomes, may focus on the individual rather than the characteristics of work. Such person-directed, or individual-level, interventions may seek to change the way individuals appraise environmental stressors, build their ability to cope with or mitigate the impact of such stressors. Interventions of this type include cognitive-behavioural therapy (CBT) and training in relaxation techniques. Some interventions may include both CBT and training in relaxation techniques, and therefore, be said to encourage the development of both active and passive coping skills. These interventions are often referred to as multi-modal. This review considered any of these individual interventions that include work-based outcomes.

5.2 Evidence review

The evidence presented focuses first on reviews including work-based outcomes, but also considers reviews which did not include work-based outcomes. The latter were included due partly to the paucity of evidence available using work outcomes. In addition, much of the evidence available focused on interventions designed to impact on mental health outcomes. An intervention that is shown to have a positive impact on such outcomes may have the potential to ultimately impact on work outcomes such as absence and retention. In each section, evidence relating to interventions aimed at the individual are discussed first followed by organisational-level interventions. Details of the research papers considered are provided in Table A.3 in Appendix A.

5.2.1 Reviews including work outcomes

Within the scope of this review, a number of work outcomes were felt to be relevant to the research question (see Chapter 1 for further details). However, very few are picked up in the evidence which was considered. Only four of the eight evidence reviews located by this review included studies detailing workplace interventions for common mental health problems that considered work outcomes. Even then, in the majority of studies covered by these reviews, non-work-related outcomes were predominant. Of the work outcomes that were identified in the research question, only absenteeism, return to work and turnover were mentioned in the intervention studies reviewed.

Individual interventions

A review of workplace interventions for common mental health problems found that stress management interventions were effective in reducing stress, improving psychological well-being and coping skills for employees who had not manifested common mental health problems and were not considered at high risk of developing them (Seymour and Grove, 2005)[18]. The evidence was inconclusive with regard to organisational-level interventions for this group of employees. However, the authors note that it is not clear to what extent any of the interventions considered may prevent common mental health problems.

The same review also found strong evidence supporting the use of individual-level interventions for employees considered to be at risk of developing common mental health problems. Programmes focused on personal support, individual skills and coping skills training reduced levels of psychological ill-health. The authors conclude that it is important that 'at risk' populations are identified accurately so that interventions can be correctly targeted. For employees already experiencing psychological ill-health at work, the review found that brief (less than eight weeks)

[18] The review by Seymour and Grove (2005) included evidence from two reviews (Michie and Williams, 2003; and Mimura and Griffiths, 2003) covered elsewhere in this report.

forms of individual therapy, particularly of a cognitive-behavioural design, were the most effective form of intervention, particularly for those workers with a high degree of control over how they work.

Another review (Bamberg and Busch, 1996 – reported in Kreis and Bodeker, 2004) specifically assessed interventions including cognitive-behavioural training courses[19]. Positive effects were observed at both the individual and organisational level, but without reported significance. Effects at the organisational level (including absence and intention to quit) were much lower than that at the individual level (including mental and somatic symptoms). Kreis and Bodeker (2004) note that no indication of specific effects of individual training processes were given. Additionally, they reported that the framework of the training courses lacked any description of special consideration of job activity, thereby limiting the 'occupational' component of the intervention to the actual setting (the respective company) and the research participants (those in employment).

Stress management interventions were considered in a further review (Murphy, 1996, reported in Kreis and Bodeker, 2004), specifically those aimed at helping employees change their appraisal of stressful situations and/or handle stress symptoms in a more effective manner. The review found that muscle relaxation appeared to be the most effective technique in respect of physiological outcomes related to stress, whilst cognitive-behavioural approaches were more effective for stress-related psychological symptoms. With respect to absenteeism, results were contradictory when measures were considered individually. However, a combination of muscle relaxation and cognitive-behavioural training showed positive effects on all result variables (including absenteeism).

Determining the causes of psychological ill-health was the focus of another review (Michie and Williams, 2003). This found that the most common work factors associated with such ill-health were work demand (long hours, workload and pressure), lack of control over work, and poor support from managers. The review found that these factors were also associated with sickness absence. In addition, it noted that the associations were found to be broadly consistent across sectors and cultural contexts, suggesting that a generic approach to reducing psychological ill-health may be appropriate. The authors conclude that *'successful interventions that improved psychological ill-health and levels of sickness absence used training and organisational approaches to increase participation in decision making and problem solving, increase support and feedback, and improve communication'*. However, the review details work outcomes in relation to only two out of the six experimental interventions presented. One of these is an individual-level intervention (where communication skills development was found to have a positive influence on the absence rates of direct care psychiatric staff (Smoot and Gonzales, 1995); the other is an organisational-level intervention (Michie and Williams, 2003, covered in the next section).

[19] The training courses considered were Meichenbaum's stress immunisation training, multi-component stress management training and stress management workshops.

A review of stress and stress management interventions for mental health nurses by Edwards and Burnard (2003) found that a great deal was known about sources of stress at work but found that most interventions were based on individual strategies, suggesting a failure to translate this knowledge into practice. The review found that stress management interventions were effective in reducing levels of psychological distress, burnout, ability to cope and sickness absence. However, absenteeism was an outcome measure in respect of only one of the interventions described. In this individual study (Milne *et al.*, 1986), reduced absenteeism, reduced strain, improved work satisfaction, increased confidence and work skills followed a training intervention (but without any reporting of effect sizes, and a small undefined sample of a tightly defined occupational group – mental health nurses). The intervention in question included behavioural assessment and learning/behavioural therapy.

A quantitative meta-analysis of 48 experimental or quasi-experimental studies (Van der Klink *et al.*, 2001) considered both individual and organisational-level interventions. The results were that individual-level interventions, particularly those cognitive-behavioural in nature, were more effective than organisational-level interventions in reducing psychological ill-health, increasing coping skills, and improving quality of work life. The authors conclude that interventions conducted with employees at high levels of baseline stress appeared to be at least as effective as those conducted with employees at low baseline levels. In addition, the authors conclude that cognitive-behavioural interventions were particularly effective for employees with high job control suggesting that *'employees profit most when they are provided with individual coping skills in a job that allows them to exercise those skills'*. Absenteeism was included as an outcome measure, however, in only three of the individual-level interventions, and was found to be non-significant.

Organisational-level interventions

This review also tried to identify evidence on interventions aimed at organisational practice, but little was available. The items discussed have also been used to provide information on individual-level interventions.

A quantitative meta-analysis (ibid.) found a non-significant effect of organisational-level interventions for outcome variables including absenteeism. The authors note that this lack of effect is surprising given the reported successes of such interventions in uncontrolled evaluations and provide two possible reasons for it. These are:

- Organisational interventions are focused primarily on affecting aspects of the workplace. However, apart from absenteeism, all of the outcome variables included in the meta-analysis focused on the individual. For organisational interventions to have an effect at an individual level, an intermediate effect is required and, therefore, it may take time for individual-level outcomes to be observed.

- Many organisational interventions are aimed at increasing job control. It may be that supporting interventions aimed at enhancing the ability of employees to take advantage of that extra control are required for positive results to be observed. The authors note that only one of the organisational interventions included used such a dual approach but that this intervention produced positive results (Jones *et al.*, 1988).

Within another review (Michie and Williams, 2003) there was one study (Malcolm *et al.*, 1993) which involved an organisational-level intervention (reduction of referral time to occupational health from six to two/three months for local authority staff) and which used absenteeism as an outcome measure. The duration of sickness absence reduced from 40 weeks in the control period to 25 weeks in the intervention period (although no statistical results were reported).

5.2.2 Reviews not including work outcomes

It is far more common for studies to focus on outcomes that do not directly relate to work. However, there are likely to be complex indirect relationships between non-work outcomes and a range of work outcomes. Therefore, it is worth considering some of the non-work factors in this review. Some of the reviews considered have also contributed to earlier sections on work outcomes, and a number focus on healthcare workers/professionals.

Individual-level interventions

A systematic review of interventions aimed at preventing occupational stress in healthcare workers (Marine *et al.*, 2006) found that individual-level interventions that included a cognitive-behavioural approach, combined with relaxation techniques or not, can be effective in reducing burnout, anxiety, stress and general symptoms. The authors note that the results of these interventions may still be apparent six months to two years after the end of the interventions. Although the authors only included Randomised Controlled Trials (RCTs) in their review, they conclude that most of the studies were small and of poor quality. They also note that although the interventions were effective in reducing stress and burnout, the clinical relevance of the changes observed in some of the measures is not clear.

In a review of the effectiveness of approaches to workplace stress management for nurses (Mimura and Griffiths, 2003) more evidence was found for the effectiveness of programmes based on providing personal support rather than those based on making changes to the work environment. However, as the quality of research identified was considered to be weak, it is not possible to say definitively which, if any, of the approaches considered are more effective. The authors make the point that it is difficult to judge the clinical significance of any changes observed on the stress scales used. They also note that the multi-faceted nature of stress makes it unlikely that a single approach would provide optimal stress management in the workplace.

A review of stress and stress management for those working in the psychiatric profession (Fothergill *et al.*, 2004) identified a number of stressors but did not locate any studies that evaluated the use of stress-management interventions for psychiatrists. However, the review found some evidence of the effectiveness of individual-level interventions in reducing burnout in mental health professionals. No details were provided concerning the quality of the studies concerned or the strength of the evidence.

Another review (Murta *et al.*, 2007) focused on evaluations aimed not only at finding out whether an intervention works but why and how it works, and for whom (i.e. considering both process and outcomes). The authors conclude that the number of studies and quality of process evaluation in this field is very incomplete and that the link between process and outcome evaluation has not been systematically addressed. In consequence, they conclude that there is insufficient evidence to reliably identify the process predictors of outcomes from stress management interventions in work organisations.

Organisational-level interventions

A review which considered both individual and organisational interventions (Marine *et al.*, 2006) found that organisational-level interventions that included communication or changes in work organisation can be effective in reducing burnout, stress and general symptoms. The results of the organisational-level interventions (as for individual-level interventions) may still be apparent six months to two years after they have ceased to be in place. The authors conclude that studies are needed which compare different individual- and organisational-level interventions with one another.

Another review (Mimura and Griffiths, 2003) found less evidence for the effectiveness of organisational-level interventions in reducing stress in nurses compared to individual-level interventions.

In the HSE research report, *'Best practice in rehabilitating employees following absence due to work-related stress'* (Thomson *et al.*, 2003), a range of practices are presented which organisations have identified as being effective in their view, or which experts have identified as examples of good practice. However, the majority of this good practice is not underpinned by research and has not been the subject of formal, robust evaluation. The authors note that *'rehabilitation for work-related stress has yet to enjoy the thorough research attention devoted to other areas of stress'*.

5.3 Discussion of findings

The evidence available on the effectiveness of workplace interventions on common mental health problems is limited, particularly with respect to work outcomes. The evidence does show, however, that there are some potentially effective individual-level and organisational-level interventions for improving work outcomes.

5.3.1 Individual-level interventions

The analysis for this review found more evidence for individual-level interventions for common mental health problems than for organisational-level interventions. Evidence was found to support the use of individual-level interventions in both reducing psychological ill-health and improving work outcomes, principally absenteeism. There is diversity in the techniques used in individual-level interventions, although there do appear to be some commonalities in those that have been shown to be successful. In addition, there is evidence for some specific techniques.

Cognitive-behavioural therapy was found to be effective in reducing both psychological ill-health and absenteeism. It was found to be effective for employees already experiencing common mental health problems at work as well as employees more generally. It also appeared to be more effective for those employees with a high degree of control over the way they work and when brief (up to eight weeks) in nature.

There is some evidence for the effectiveness of multi-modal approaches. These typically combine a psychological technique such as CBT with a technique such as relaxation training aimed at reducing physiological symptoms. Where such combinations have been used, it does appear that CBT is effective at reducing psychological ill-health, and relaxation is effective at reducing physiological complaints. There is mixed evidence as to whether this combination approach is more or less effective than the use of CBT alone.

Other forms of individual-level intervention that were successful in reducing psychological ill-health and absenteeism focused on developing individual skills, such as those in communication, and may also offer personal support.

5.3.2 Organisational-level interventions

This review found less evidence relating to the effectiveness of organisational-level interventions and what does exist presents a variable picture of outcomes.

Evidence from one review suggested that organisational-level interventions were not effective in reducing psychological ill-health or improving work outcomes. However, there are potential explanatory reasons for such a finding (discussed in Section 5.4).

In contrast, a second review found limited evidence that organisational-level interventions (which included communication or changes in work organisation) reduced burnout, stress and general symptoms. However, the extent (or whether in fact) the outcomes of these interventions would, over time, lead to positive work outcomes, is unclear.

Finally, evidence from a single study found that a change in organisational practices with regard to absence management led to reduced absenteeism among those employees on long-term sick leave.

5.3.3 Strengths and weakness of the available evidence

There is a range of issues affecting the type, quality and quantity of evidence available in this area and its ability to contribute to this review.

Common mental health conditions and work outcomes not covered

Previous reviews (e.g. Seymour and Grove, 2005) have pointed out that although common mental health problems are widespread, the bulk of the evidence relating to employment and mental health is focused on severe and enduring mental illness. This review has similarly found a lack of research relating to common mental health problems.

This review has also prioritised work outcomes such as absenteeism, employee turnover,and return to work. This focus appears to have severely restricted the amount of evidence available. The majority of studies uncovered by the review have focused on either measures of stress, burnout or health-related outcomes such as measures of anxiety, depression or general health. It may be that positive changes in the above measures may eventually lead to positive work outcomes but little firm evidence exists to support this so far. In addition, appropriately considering the efficacy of interventions in relation to such outcome measures could necessitate longer follow-up periods over which to detect meaningful change, presenting a significant challenge to evaluators.

Focus on evidence-based reviews

The present review also focused exclusively on existing evidence-based reviews, particularly systematic reviews, which further limited the available evidence in two ways: Firstly, systematic reviews are common to the medical literature but not to the occupational and psychological literature. Secondly, the focus on reviews excluded a number of promising individual studies uncovered in the initial search phase of this review. None of these studies were represented in the reviews we found. As an example, a longitudinal, quasi-experimental study (Bond and Bunce, 2001) investigating the effectiveness of a work reorganisation in giving employees greater job control, which found improvements in employees' mental health, sickness absence rates and self-rated performance at one year follow-up, was excluded from this research.

Lack of robust evaluations

Another aspect of this review was its focus on interventions. Much of the literature refers to a lack of robust evaluations of workplace interventions aimed at mental well-being or stress, regardless of whether those interventions include work outcomes. Michie and Williams (2003) call for more randomised controlled trials and longitudinal studies of interventions. They also call for such evaluations to include an assessment of the economic costs and benefits of such interventions with a view to facilitating the decision-making of employers.

Lack of focus on the role of organisations

The majority of the interventions that were covered by reviews, regardless of whether or not they included work outcomes, focused on individual-level rather than organisational-level interventions. Researchers (ibid.) have called for more studies to evaluate interventions based on employment practices and management style. This would allow greater understanding of attempts at primary prevention and reducing the sources of psychological ill-health, rather than secondary prevention aimed at developing employees' ability to cope more effectively with work pressures.

The judgment of this review is that the evidence for both work- and non-work-related outcomes seemed to show that individual-level interventions were more effective than organisational-level interventions. However, the lack of observed effectiveness of organisational-level interventions may be explained in two ways: First, a focus on individual-level outcome variables may conceal intermediate effects observed at the organisational level. Second, a lack of studies combining organisational interventions designed to enhance job control with a complementary intervention aimed at enabling employees to make use of that extra control. To help resolve this issue, some authors have called for more evaluations of combined organisational and individual-level interventions.

Relative merit of generic or occupational/role specific interventions not clear

This review uncovered an interesting question as to whether a generic approach to managing psychological ill-health is feasible or whether it may be better to consider the effectiveness of specific interventions for particular occupational groups and particular work settings. Some of the reviews considered suggest that the consistency with which particular work characteristics are associated with psychological ill-health across sectors and cultural contexts makes a generic approach feasible. Other authors point out that if an intervention's effectiveness is to be maximised, it should be designed with an appreciation of specific occupational risk factors in mind.

Some occupational groups are more at risk of developing common mental health problems than others. There appears to be evidence for the effectiveness of particular interventions in reducing psychological ill-health for some of these groups. It is important that these groups are targeted accurately to optimise the effectiveness of the interventions identified.

Lack of process information and a need to disentangle effects

There appears to be a lack of evidence about the reasons why and how certain interventions work and for whom they are most effective. As noted by some authors, future studies of interventions could usefully consider incorporating evaluations of process and not just outcome (Murta *et al.*, 2007).

Related to the previous point, many of the individual-level interventions encountered tend to use a combination of techniques. It is not always easy to identify from the literature, the specific contribution of these techniques to the final outcome. It may be that in some cases the effects of a beneficial component are diluted by other components. Future research may benefit from either examining single components or specifying the expected interaction of multiple components.

A number of the studies investigated focused on stress outcomes. As noted by some authors, there are issues with the use of such scales. Firstly, there are lots of them – which makes comparisons between studies difficult – and secondly, the clinical relevance of any change in scores observed is often unclear.

6 Conclusions

This research has set out to identify evidence for the effectiveness of workplace practice and interventions in reducing health-related negative work outcomes. In this concluding chapter, the main findings from the evidence are summarised within the context of the research scope and limitations. The implications of these results are then explored, highlighting points for further discussion and research.

6.1 Main findings in the evidence reviewed

This paper has identified the evidence from a range of reviews. The main findings in terms of workplace interventions and the effect on work outcomes are summarised below.

6.1.1 Health promotion and cardio-respiratory health

Overall, the quality of evidence available on health promotion (according to authors of the reviews covered here) was limited. There was even less evidence directly related to cardio-respiratory health at work. A lack of randomisation in allocation to control and treatment groups, and an absence of measured/reported compliance statistics, undermined the resuls of several studies. There were mixed views about the effectiveness of health promotion in general, with the size of effects generally modest.

Very few effects on work outcomes were reported, with the exception of some positive results from physical activity programmes on absence. The most effective interventions (of those presented here) made use of employee-employer partnerships or other consultations with workers, and were carefully targeted to individual or group needs.

6.1.2 Low back pain and musculoskeletal disorders

In terms of prevention (both primary and secondary), exercise was the only consistently recommended approach, with mainly positive results for effectiveness, despite small effect sizes. Back belts and other ergonomic or orthotic devices were all generally ineffective. Training and education based on traditional biomedical

or biomechanical information was also ineffective on the whole, whereas training and education providing information which promoted activity and coping skills was effective in achieving a positive shift in beliefs.

With regard to managing lower back pain (LBP), many reviews noted the significance stage of LBP in regard to recommending different intervention types. Those experiencing LBP in the acute phase could benefit from appropriate advice and guidance; however, because the majority of those in the acute phase recover without intervention, it was argued that more active interventions would be better focused on those in the sub-acute phase. This approach was perceived to be most effective in reducing numbers of people moving from the sub-acute to chronic stages, after which recovery rates rapidly decline.

Various specific recommendations about how to manage workers with LBP and other musculoskeletal disorders (MSDs) were identified through the reviews, including education and training based on the biopsychosocial model which addressed physical risk factors as well as psychosocial ones. Interventions which included cognitive-behavioural approaches generally, and cognitive behavioural therapy (CBT) specifically, were particularly effective in reducing the number of sick days taken. At the same time, interventions which consisted of physical ergonomic programmes alone were not recommended. Interventions which incorporated individual and organisational dimensions were supported by moderate to strong evidence; however, there was insufficient evidence about the specific content or combinations of components that made these multi-modal approaches effective.

For return to work, multi-disciplinary interventions with comprehensive occupational health care interventions resulted in faster returns. Prompt offers to modify work, improved communication and co-operation between worker, employer and health care professionals, were all effective in reducing time off and duration of work disability. In addition, there was some evidence the value of educational interventions for workers with LBP.

6.1.3 Common mental health problems

Individual-level interventions were effective in reducing absenteeism. In terms of intervention components, CBT was effective for employees absent from work due to mental health problems and for employees more generally. It was more effective for those employees who have a high degree of control over how they work and in short courses (up to eight weeks). Multi-modal interventions combining CBT and training in relaxation techniques were effective, although there was mixed evidence whether they were more effective than CBT alone. Other approaches which aimed to develop individual skills were effective in reducing psychological ill-health and absenteeism.

There was considerably less evidence available on organisational-level interventions: existing evidence was mixed. Changes in communication and work organisation were shown to reduce negative health outcomes, but the only evidence available which reported on work outcomes has not shown any effect. This may relate to

insufficient capture of longitudinal data or equally, may indicate that changes to the organisation may need to be accompanied with individual-level training to make use of improved opportunities (e.g. for job control).

Evidence was also shown that changes in absence management policies can reduce sickness absence for those on long-term sick leave but the extent to which this relates specifically to those with common mental health problems is unclear.

6.2 Impact of the scope of the research

A reliance on evidence from systematic reviews means that there are likely to be a range of other interventions which have been shown to be effective in evaluations but which are only represented in publications of that single study, and which have not been picked up by reviews. This might exclude unique or unconventional approaches, that are not easily compared or combined with evaluations of more commonly understood or practiced interventions. Furthermore, it is likely to exclude the most recent evaluations in each of the fields. In particular, the relationship between organisational factors and mental health are explored in literature which stands outside the scope of this research. Therefore, the absence of evidence which fits within the remit of this research does not necessarily mean that there is an absence of other types of evidence.

Restricting the research to work outcomes also has implications for the coverage of the findings. Interventions can, quite rightly, be considered effective if they solely achieve health outcomes; so in order to assess the overall effectiveness of an intervention, all relevant and appropriate outcomes should be taken into consideration, which we have not done here. Furthermore, it is important to emphasise that a positive result in terms of work outcomes does not necessarily equate to a positive result in terms of health. For example, current guidelines in the management of LBP are effective in reducing sickness absence, work disability, and long-term incapacity; however, this is in spite of recurrence of episodes of LBP and continued experiences of pain.

One final point is that there was an unequal distribution of evidence between the three health areas covered by this review. There were far more reviews that presented evidence in relation to LBP and MSDs and fewer reviews which covered issues relating to common mental health problems. While reviews of health promotion and general preventive interventions did address many of the health risk factors associated with cardio-respiratory diseases, there were no reviews which specifically addressed cardio-respiratory conditions in the workplace.

The fact that cardio-respiratory disease tends to be more severe, clinically speaking, than the other common health problems represented, may, in part, explain why interventions to address these health problems in the workplace are limited. Waddell and Burton (2004) have pointed out that evaluations of

cardiac rehabilitation (*'which is generally provided for hospital patients following major cardiac events'*[20]) have not paid much attention to employment status or occupational outcomes.

Despite the limited scope of the review, however, it does enable an assessment of the state of literature concerning work outcomes, and highlights the need for more work to be done in this area.

6.3 Points for further discussion and research

Having reviewed all of the identified evidence, a number of issues have been highlighted. These are discussed below.

6.3.1 Improved methodology in evaluation studies

There is a need for better quality evaluation evidence: this should be randomised, controlled and, where possible, longitudinal. Where it is not possible to allocate individuals randomly to treatment and control groups, employing quasi-experimental designs that attempt to control for confounding factors is an alternative. All aspects of the study design and interventions applied need to be clearly described and reported in publications. Evaluations of single and multi-modal interventions are also required, in order to disentangle the effects of individual components within multi-modal interventions.

There is, therefore, a need for significant research investment which brings together a focus on general health and work-related health. It is, therefore, important that the research programmes of a range of government departments are well co-ordinated to gain maximum returns on such an investment in the widest possible sense. Greater collaboration and communication between researchers from different disciplines would ensure that a more holistic approach is taken to moving forward the evidence base in this area.

6.3.2 Wider spectrum of evidence

While there is no doubt of the value of randomised controlled trials in assessing the effectiveness of a given intervention, there are many practical obstacles to implementing this type of evaluation study design in workplaces. Some reviewers have argued that a broader range of evidence types should be included in overall considerations of interventions. Other types of evidence may have an important role to play in informing the process issues around implementing an intervention: how an intervention is applied could be key in understanding why some interventions are effective, where others (of the same type) are not. It is particularly important to understand such factors when providing advice to employers about what might work best within their own particular work situation or for particular types of employees. A greater focus on work outcomes, but not in isolation from general health outcomes, needs to be a priority.

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[20] Waddell and Burton, 2004 (p47).

6.3.3 Interpreting the evidence for a wide audience

Achieving a better evidence base is an important starting point; however, for policy makers, there is clearly a priority that this should result, in the final analysis, in improved practice in the workplace. There is, therefore, a need for the academic community to collaborate more effectively with employers either directly or through an intermediary. Taking the research forward into viable actions requires that practical considerations are considered in interpreting results, and also that employer representatives are able to comment on the appropriateness of recommendations or what information would usefully help them to make best practice decisions. The same applies to communications with practitioners and with patient or worker groups. The aim is, therefore, not simply about moving forward the evidence base, but also about moving forward evidence-based practice, and this is not something that we should lose sight of.

6.3.4 Which intervention types work best?

This final point is also, perhaps, the most relevant for employers and policymakers. Considering what sort of intervention is going to work best will ultimately depend on several factors. Many of the interventions and practices described could fall into one of two categories: organisational or individual. While interventions of both types have been shown to be effective, there is also evidence from some areas that a combined approach is the most effective. These multi-modal interventions combine individual consultation, skill training, and health risk reduction, with improvements to work organisation, communication between employers and occupational health professionals and other organisational changes.

Therefore, implementing workplace health interventions in the most successful way requires the commitment of employers, the co-operation of workers and a sensible way of bringing together their collective needs, with the involvement of professional support where necessary. Ensuring that solutions are available in the early stages of problems is also important, as is taking steps to prevent them occurring in the first place by reducing the risks posed by work and enhancing the potential health benefits of employment. There is, however, not only a need to develop the evidence base on the efficacy of interventions but also a business case for implementing them. This is important if employers are to be encouraged to take on a full and active role in workplace health promotion and management and incorporate occupational health provision into broader business strategies.

Appendix A
Evidence summary

Table A.1 Cardio-respiratory health and health promotion

Authors	Key features
Aust, B. and Ducki, A. (2004) Literature review	'Comprehensive health promotion interventions at the workplace: experiences with health circles in Germany'. Looks at the concepts and development of health circles as a tool for addressing organisational and psychosocial factors in comprehensive health promotion interventions. Analysis of absence and productivity statistics are used to identify priority problem areas, which are subsequently discussed with selected employees and/or employee representatives and managers. The scientific quality of available data is limited but authors, nonetheless, conclude that health circles are an effective tool for the improvement of physical and psychosocial working conditions. They are also felt to have a favourable effect on workers' health, well-being and sickness absence; however, these conclusions should be treated with caution. No details of evidence rating assessment provided.

Continued

Authors	Key features
Engbers *et al.* (2005) Systematic review	'Worksite health promotion programs (*Sic.*) with environmental changes'. This research is based on the premise that environmental modifications are an important addition to worksite health promotion strategies and sets out to examine the effectiveness of these additions in achieving behavioural changes among target populations. Thirteen trials were included; however, the methodological quality of most of these were rated as poor; only four studies were rated as high quality. Worksite health promotion programmes in the represented trials were mostly multi-modal and tended to include promotional activities, education, policy changes (e.g. smoking), skill training and incentives. Strong evidence was found for an effect on dietary intake, inconclusive evidence for an effect on physical activity, and no evidence for an effect on health risk indicators. Environmental modifications attributed to the effectiveness of interventions on dietary intake related mostly to the review and provision, and labelling, of healthy food in canteens. Work outcomes were not included in this review. Evidence assessment based on five levels: (1) Strong evidence: at least two Randomised Controlled Trails (RCTs) of high quality with consistent (significant) results; (2) Moderate evidence: one RCT of high quality and at least one RCT of low quality or one RCT of high quality, and at least one controlled trial of high quality (for both situations, consistent results were required); (3) Limited evidence: one RCT of high quality and at least one controlled trial of low quality or more than one RCT of low quality, or more than one controlled trial of high quality (for all situations, consistent results were required); (4) Inconclusive evidence: only one study or multiple controlled trials of low quality or contradictory results; (5) No evidence: more than one study with consistent results that no significant or relevant results were shown.
Harden *et al.* (1999) Systematic review	'A systematic review of the effectiveness of health promotion interventions in the workplace'. In addition to critically reviewing the successful components of health promotion interventions, this review also explores the extent to which evaluated interventions considered employees' expressed needs or involved employee-employer partnerships. The authors refrain from making any strong statements in support of workplace health promotion in terms of benefits for health and other outcomes, due to the lack of sufficient methodological rigour in the represented studies. However, only 21 per cent of the outcome evaluations considered, reported that evaluated interventions were based on what employees said they wanted or what they thought were the problems that needed addressing. Overall, it's suggested that the findings undermine the claim that workplaces provide easy access to large captive audiences and recommend that effort is invested in workplace health promotion being more responsive to the needs of workers. Work outcomes are not discussed. No details of evidence rating system were provided.

Continued

Authors	Key features
Kallestal *et al.* (2004) Review of systematic reviews	'Workplace health promotion: effects of interventions referred to in systematic knowledge reviews and in Swedish reports'. The history and development of health promotion at work is presented and discussed in both the Swedish and international contexts. The report then goes on to review the evidence for effectiveness of all types of measures and programmes aimed at promoting health and reducing the risk of ill-health at the workplace. Interventions covered a variety of targeted health risks, including all three groups of health problems of interest to the current review, plus accidents and injuries which are outside the current scope. The summary of evidence took all reported outcomes into account. No details of evidence rating system provided.
Kreis and Bodeker (2004) Summary of scientific evidence	'Health-related and economic benefits of workplace health promotion and prevention'. This review, commissioned by the Health and Work Initiative (Initiative Gesundheit und Arbeit: which represents a partnership between German private health insurers and statutory accident insurers), is a comprehensive literature review which has included evidence summaries provided by systematic reviews. While the English version of the report suffers from inadequate translation from German, at times, several key conclusions are clear. The reviewed evidence supports the effectiveness of occupational health promotion programmes with regard to the reduction of health risks, although the evidence for this is more well-defined in some areas than in others. The reviewed health promotion programmes were also effective in reducing absenteeism. Evidence assessment based on five levels: Conclusive: cause-effect relationship between intervention and outcome, supported by substantial number of well-designed studies with randomised control groups. Nearly universal agreement by experts in the field regarding impact; Acceptable: cause-effect relationship supported by well-designed studies with randomised control groups. Agreement by majority of experts in the field regarding impact; Indicative: relationship supported by substantial number of well-designed studies, but few or no studies with randomised control groups. Majority of experts in the field believe that relationship is causal based on existing body of evidence but view as tentative due to lack of randomised studies and potential alternative explanations; Suggestive: multiple studies consistent with relationship, but no well-designed studies with randomised control groups. Majority of experts in the field believe causal impact is consistent with knowledge in areas but see support as limited and acknowledge plausible alternative explanations; Weak: research evidence supporting relationship is fragmentary, non-experimental, and/or poorly operationalised. Majority of experts in the field believe causal impact is plausible but no more than alternative explanations.

Continued

Authors	Key features
Proper *et al.* (2002) Systematic review	'Effectiveness of physical activity programs (sic) at worksites with respect to work-related outcomes'. This publication presents the work-related outcomes of a systematic review which included eight studies. Four of the studies were RCTs, four others were Controlled Clinical Trails (CCTs); however, the overall methodological quality was rated as poor. Interventions were mixed: three of the RCTs involved a combined programme of aerobic, strength, and flexibility exercise, and the fourth RCT focused exclusively on aerobic training. Among the CCTs there was greater variation of intervention type: one study focused on developing cardiorespiratory fitness, another aimed to improve cardiorespiratory fitness and strength, while a third used two intervention programmes (aerobic and anaerobic) and compared them with a reference programme. The evidence of an effect was limited for absenteeism, inconclusive for job satisfaction, job stress and employee turnover, and nil for productivity. Evidence assessment based on five levels: Strong evidence, provided by at least two RCTs of high quality with consistent (significant) results; moderate evidence, provided by one RCT of high quality and at least one RCT of low quality or one RCT of high quality, and at least one controlled trial of high quality (for both situations, consistent results were required); limited evidence, provided by one RCT of high quality and at least one controlled trial of low quality or more than one RCT of low quality, or more than one controlled trial of high quality (for all situations, consistent results were required); inconclusive evidence, provided by only one study or multiple controlled trials of low quality or contradictory results; No evidence, provided by more than one study with consistent results with no significant or relevant results were shown.
Proper *et al.* (2003) Critical review	'The effectiveness of worksite physical activity programs (sic) on physical activity, physical fitness, and health'. This review identified 15 RCTs and 11 CCTs which met strict inclusion criteria; however, only six of the RCTs and none of the CCTs were rated as being of high methodological quality. Taking these ratings of methodology into account alongside observed effects, the authors conclude that there was strong evidence for a positive effect of worksite physical activity programme on physical activity and the occurrence of musculoskeletal disorders. Only limited evidence was found for a positive effect on fatigue, and inconclusive or no evidence on a positive effect on health risk indicators (physical fitness, general health, blood serum lipids and blood pressure). The lack of more conclusive findings on outcomes other than physical activity and musculoskeletal disorders (MSDs) is attributed to the small number of high quality studies. Work outcomes were not discussed in this publication (Proper *et al.*, 2002, systematically reviews the evidence on work outcomes). Evidence assessment based on five levels as above in Proper (2002).

Continued

Authors	Key features
Smedslund *et al.* (2004) Meta-analysis	'The effectiveness of workplace smoking cessation programmes: a meta-analysis of recent studies'. This analysis combined the observations from 19 studies which conformed to pre-determined inclusion criteria; this included interventions which ranged from self-help manuals, physician advice, health education, cessation groups, incentives, and competitions. While the worksite interventions showed initial effectiveness in smoking cessation, the effect seemed to decrease over time and was not present beyond 12 months. Methodological inadequacies and insufficient reporting of key variables prevented the authors from determining much about the most effective components of interventions.

Table A.2 Back pain and musculoskeletal disorders

Authors	Key features
Elders *et al.* (2000) Systematic review	'Return to work after sickness absence due to back disorders – a systematic review on intervention strategies'. The main purpose of this review was to examine the effectiveness of secondary prevention for back disorders in the working population, with return to work as the primary outcome measure. Only 12 studies met the subject and quality selection criteria, nine of which are RCTs and the remaining three prospective cohort studies. Analysis showed that back school type interventions showed more effect after 60 days of sickness absence than other non-back school type interventions, regardless of their programme and heterogeneity. Authors suggest that interventions in the sub-acute phase were preferable, unless a strong intervention effect can be exercised upon the already strong recovery among patients in the early phase of lower back pain (LBP). No details of an evidence rating system provided.

Continued

Authors	Key features
Franche *et al.* (2005) Systematic review	'Workplace-based return-to-work interventions: A systematic review of the quantitative literature'. This publication presents the findings of a larger systematic review, with other publications collating results of qualitative literature and other systematic reviews. Ten studies met the detailed inclusion criteria and data was extracted on several outcomes, including work disability duration (referring to time when worker is absent from work). The review found strong evidence that work disability duration is significantly reduced by work accommodation offers and contact between healthcare provider and workplace. Moderate evidence was shown for reductions in work disability duration in interventions which included early contact with worker by workplace (within first three months following onset of work disability), ergonomic worksite visits, and presence of a return to work (RTW) co-ordinator. Evidence for the sustainability of these effects was insufficient or limited. Evidence assessment criteria: Strong evidence, provided by consistent findings for at least three very high quality studies and for at least half of high quality studies; moderate evidence, provided by consistent findings for at least three high quality studies or two-thirds of very high quality studies are consistent with at least half of the high quality studies; limited evidence, provided by two high quality studies that converge on the same findings; mixed evidence, provided by at least two high quality studies with divergent results; insufficient evidence, provided by one high quality study; none, there are no high or very high quality studies on the subject.
Frank *et al.* (1998) Narrative review	'Preventing disability from work-related low-back pain: new evidence gives hope – if we can just get all players onside'. This review explores the importance of stage of back pain in relation to required treatments and interventions, arguing that early treatments offered non-selectively to all patients are inefficient due to the already high rate of return to work in the first weeks after the onset of pain. The conclusion (supported by references to 'better quality intervention studies') is that clinical interventions are largely ineffective (in terms of 'numbers needed to treat') in reducing subsequent disability unless they are targeted to people who are still disabled and off work after the initial acute phase is over (>4 weeks). The author argues that although many of the individual studies have design flaws, the overall body of evidence is persuasive by virtue of the large effect sizes reported, and their consistency. Recommendations are made for General Practitioners (GPs) and workplaces to adhere to guidelines such as those provided by the US Agency on Health Care Policy Research, especially with regard to accommodative workplace response and practice styles which are sensitive to prevention of occupational disability. No details of an evidence rating system provided.

Continued

Authors	Key features
Gatty *et al.* (2003) Critical review	'The effectiveness of back pain and injury prevention programs (sic) in the workplace'. Nine studies published between 1995 and 2000 were included in this review, each primarily based on three types of preventative strategies: back belts, education and task modification, and education and task modification with workstation redesign. Work outcomes were not the main outcome effect examined, but was reported on in four of the nine studies reviewed. Of these, study designs included two randomised control trials (van Poppel *et al.*, 1998, Daltroy *et al.*, 1997), one non-randomised control study (Lynch and Freund, 2000), and one pre-test – post-test design (Charney, 1997). The findings on sick leave were mixed, with small or no effects observed; however, quality of data reporting was poor (results only for collapsed intervention groups, not reporting significance of effect size, and unreported group sizes). Overall findings noted that few studies were reviewed due to strict inclusion criteria, and even fewer were given an overall high rating (on achieved methodology). Authors recommend descriptive and qualitative studies to elucidate the complexities inherent in implementing prevention programmes in the workplace. No details of an evidence rating system were provided.
Karjalainen *et al.* (2002) Cochrane systematic review	'Multi-disciplinary biopsychosocial rehabilitation for subacute low back pain among working age adults'. This review conducted a thorough search, screening 1,808 abstracts and references of 65 reviews, for RCT and CCT examining the effectiveness of multi-disciplinary rehabilitation for subacute (more than four weeks but less than three months) LBP for working age adults. Both studies were considered to be methodologically low quality RCTs; however, the clinical relevance of included studies was sufficient. Moderate scientific evidence was found to show that multi-disciplinary rehabilitation, which includes a workplace visit or more comprehensive occupational health care intervention, helps patients to return to work faster, results in less sick leave and alleviates subjective disability. Further evidence on cost effectiveness is required. Evidence assessment criteria as stated in Glossary of terms.

Continued

Authors	Key features
Karsh *et al.* (2001) Critical analysis	'The efficacy of workplace ergonomic interventions to control musculoskeletal disorders: a critical analysis of the peer-reviewed literature'. Analysis of ergonomic interventions, which collated the results of 101 peer-reviewed studies, of varying quality. Eighty-four per cent of studies found some positive results, although the majority had mixed results. Only 32 per cent of the studies used experimental or quasi-experimental designs. Results of this review are difficult to contextualise as evidence was not weighted based on study design or quality, and results for multiple outcomes are discussed in aggregate. The authors conclude with a discussion on the interpretation of study findings, arguing that there is much to be learned from studies using non-randomised and other quasi-experimental designs previously excluded in other reviews as being 'low-quality'. No details of an evidence rating system were provided.
Linton and van Tulder (2001) Systematic review	'Preventive interventions for back and neck pain problems'. This review included only controlled trials, and evaluated the effects of three main types of intervention for back and neck pain problems. Time off work was one of several outcome measures extracted in the review, and was reported on in 12 out of 27 included studies. The overall conclusions (including additional clinical measures) showed little empirical evidence to support 'traditional' approaches to prevention such as back schools, lumbar supports and ergonomics. Only exercise had evidence to support its use. Authors note a dire lack of controlled trials examining broad-based multi-dimensional programmes, underscoring the need for high quality outcome studies. Evidence assessment criteria: strong evidence provided by generally consistent findings from multiple RCTs; moderate evidence provided by one RCT or generally consistent findings from multiple CCTs; limited evidence from only one CCT; no evidence if there were no RCTs or CCTs.
MacEachern *et al.* (2006) Systematic review	'Systematic review of the qualitative literature on return to work after injury'. Results from 13 qualitative peer-reviewed papers are collated and synthesised using a qualitative framework assessment tool. Study populations included workers who were off work due to musculoskeletal and pain-related injuries. Eight key concepts were identified as being central in supporting or hindering successful return to work, which were then reduced to three main factors in an meta-ethnographic analysis. These conclusions relate to the complexity of the process, overarching social conditions relating to trust and goodwill, and the relevance of two key intermediary players in the return-to-work process: rehabilitation or occupational health care providers and supervisors or line managers. No details of an evidence rating system were provided.

Continued

Authors	Key features
Maher (2000) Systematic review	'A systematic review of workplace interventions to prevent low back pain'. This review included only RCTs, and located 13 trials deemed to be generally of moderate quality. Data extraction of several outcomes (including work outcomes) focused on examining the efficacy of four main types of intervention: braces (e.g. back belts), education, exercise, and workplace modification and education. Strong evidence was found that belts are ineffective in reducing leave due to LBP. Moderate evidence was found that education was ineffective in reducing leave due to LBP. No evidence was found for the effectiveness of workplace modification and education, with respect to leave due to LBP. The only positive outcome, was the assertion of moderate evidence for exercise reducing leave due to LBP. Overall, the review suggests that braces and education are ineffective, that workplace modification and education is of unknown value and that, in contrast, exercise programmes are effective for the prevention of work-related LBP. Evidence assessment criteria: Strong evidence, more than one high quality RCT with consistent outcomes; moderate evidence, one high quality and one low quality RCT with consistent outcomes; limited evidence, one high quality or more than one low quality RCT with consistent outcomes; no evidence, one low quality RCT, no RCTs or inconsistent outcomes.
Schonstein *et al.* (2003) Cochrane systematic review	'Physical Conditioning Programs (sic) for Workers With Back and Neck Pain: A Cochrane Systematic Review'. The main objective of this study was to examine the effect on time lost from work of physical conditioning programmes for workers with back and neck pain. The review identified 23 relevant contrasts, taken from 19 randomised trials (23 publications), and also reported results of its own meta-analysis. The collated evidence demonstrated that physical conditioning programmes that included a cognitive-behavioural approach could produce a clinically worthwhile reduction in the number of sick days taken at 12 months, when compared to GP care or advice for workers with chronic back pain[21]. No evidence rating system is provided.

Continued

[21] Neck pain was not examined in the included trials, and there was also little evidence of an effect on time lost from work of specific exercise programmes that did not include a cognitive-behavioural component.

Authors	Key features
Tveito *et al.* (2004) Systematic literature review	'Low back pain interventions at the workplace: a systematic literature review'. This review summarised evidence from 28 interventions for low back pain at the workplace, rating the pooled evidence using a qualitative assessment based on design, quality, and outcomes. Preventive interventions covered five different subcategories: educational (ten studies), exercise (six studies), back belts (five studies), multi-disciplinary (two studies), and pamphlets (one study). A further four interventions included a treatment. Reported outcomes for sickness absence were limited. None of the interventions which involved education, back belts, and pamphlets yielded any evidence of effect, while multi-disciplinary interventions showed limited evidence of no effect. Exercise interventions resulted in limited evidence of a positive effect on sick leave. Treatment interventions showed moderate evidence of a positive effect on sick leave; however, description of the types of treatments given to subjects is limited to *'all treatment interventions were comprehensive, focusing on several of the factors known to be associated with LBP'*. The authors note that the overall quality of assessed studies was low, and call for a raising of standards to measure the effect of interventions in the workplace. Evidence assessment criteria: strong evidence, provided by multiple methodologically strong studies; moderate evidence, provided by one methodologically strong and at least one weak study; limited evidence, provided by one methodologically strong or multiple weak studies; no evidence, provided by one methodologically weak study or contradictory outcomes.
Waddell and Burton (2000) Systematic review	'Occupational health guidelines for the management of low back pain at work: evidence review'. This publication from the Faculty of Occupational Medicine presents guidelines on pre-placement assessment, prevention, assessment of workers presenting with back pain, management principles for workers presenting with back pain, and management for the worker having difficulty returning to normal occupational duties at 4-12 weeks. All guidelines are based on evidence statements and linked to a systematic review which started with published, methodologically sound, systematic reviews, and was supplemented by narrative reviews, and original scientific studies in key areas of interest of where systematic reviews were unavailable. Evidence assessment criteria used: strong evidence, provided by generally consistent findings in multiple, high quality scientific studies; moderate evidence, provided by generally consistent findings in fewer, smaller or lower quality scientific studies; limited or contradictory evidence, provided by one scientific study or inconsistent findings in multiple scientific studies; no scientific evidence, based on clinical studies, theoretical considerations and/or clinical consensus.

Continued

Authors	Key features
Whysall *et al.* (2005) HSE research report	'A staged approach to reducing musculoskeletal disorders (MSDs) in the workplace'. The report represents the findings of the Health and Safety Executive (HSE)-commissioned research which aimed to assess the effectiveness of implementing tailored interventions compared with standard interventions. Tailored interventions were designed according to results of an assessment tool which aimed to identify managers' and workers' state of change. Tailored interventions were significantly more effective in promoting risk awareness, promoting behaviour change aimed at reducing risks and reducing self-reported musculoskeletal discomfort in a number of body areas. The study took place in 16 different organisations and results were reported on 190 workers. Authors conclude that providing interventions which are tailored to stage of change, increases the effectiveness of the interventions. While the study tested the model with specific reference to MSDs, it is felt that this approach could have equal potential in all areas of risk reduction.
Lock and Colford (2005) Literature review and gap analysis	'International review of the literature relating to the benefits of limbering up exercises at work'. A review commissioned by the HSE to explore English and Japanese literature investigating the benefits of 'limbering up' exercises at work. Analysis of evidence revealed insufficient quantitative and reliable scientific evidence to support recommendations to industry about implementing limbering up exercises as a means to reducing work-related MSDs. Evidence did point to a reduction in absenteeism and a general improvement of cardio-vascular physical health, suggesting that recommendations could be made on these grounds. (HSE research report). No evidence rating system provided.

Continued

Authors	Key features
COST B13 (2006) European Spine Journal – Various Authors	COST B13: European guidelines for the management of low back pain. An evidence review bringing together evidence-based recommendations for the management of LBP. Three separate chapters focus on: prevention of LBP, management of acute non-specific LBP in primary care, and management of chronic non-specific LBP. The guidelines include a review of clinical and occupational recommendations, for all populations. Specific advice for workers in regards to prevention is also provided. Evidence assessment criteria used: Level A provided by generally consistent findings provided by (a systematic review of) multiple RCTs; Level B provided by generally consistent findings provided by (a systematic review of) multiple weaker scientific studies; Level C provided by one RCT/weaker scientific study, or inconsistent findings provided by (a systematic review of) multiple scientific studies; Level D provided by no RCTs or no weaker studies. 'Weaker studies' includes non-randomised controlled trials, controlled before/after studies, interrupted time series designs, and longitudinal epidemiological studies. For consistency with other reviews, Levels A to D are referred to in the main report as: Strong, Moderate, Limited, and No or insufficient evidence.

Table A.3 Common mental health problems

Authors	Key features
Edwards and Burnard (2003) Systematic review	'A systematic review of stress and stress management interventions for mental health nurses'. The focus of this review was to identify stressors, moderators and stress outcomes for mental health nurses, and also to determine the effectiveness of stress management interventions for the same group. The review included 77 studies, eight of which evaluated stress management interventions and focused primarily on studies undertaken in the UK, although studies from non-UK countries were examined as potential models of good practice. The authors note a number of methodological flaws with the studies reported and several difficulties in comparing the results of studies that evaluated stress management interventions. They concluded that a great deal is known about the sources of stress at work, about how to measure it and about the impact on a range of outcome indicators; the translation of this knowledge into practice is lacking; and there is a lack of research that assesses the impact of interventions that attempt to reduce stress. Of the six studies that evaluated stress management interventions in the UK, only one included a work-related outcome measure (Milne *et al.*, 1986). No statistical tests were reported. This study found that an intervention designed to develop nurses' skills in dealing with patient problems reduced levels of absenteeism. The other interventions focused on outcomes such as burnout, psychological distress and ability to cope with anxiety and stress. The degree to which these findings can be generalised is limited due to both the population studied and the focus of some of the interventions on therapeutic skills. No evidence rating system provided.
Fothergill *et al.* (2004) Systematic review	'Stress, Burnout, Coping and Stress Management in Psychiatrists: Findings from a Systematic Review'. This review was conducted in two parts. The first part focused on stressors, moderators and stress outcomes. The second part reviewed studies that evaluated stress management interventions. Twenty-three studies undertaken in UK dating from 1966 to 2000 identified psychiatrists as participants. Psychiatrists reported a number of both work and personal stressors. The authors noted a number of methodological weaknesses in the studies reviewed and concluded that the effectiveness of specific stress management techniques needs to be formally evaluated. None of the 23 studies evaluated the use of stress management interventions. No evidence rating system provided.

Continued

Authors	Key features
Kreis and Bodeker (2004) Evidence summary	'Health-related and economic benefits of workplace health promotion and prevention'. This review includes two reviews of stress management programmes. Bamberg and Busch (1996) assessed interventions including cognitive-behavioural training courses; namely Meichenbaum's stress immunisation training, multi-component stress management training and stress management workshops. While effects were observed at both the individual and organisational level (including absence and intention to quit), significance was not reported. Effects were much lower at the organisational level compared with the individual level. Additionally, the authors report that the framework of the training courses lacked any description of special consideration of the job activity, thereby limiting the 'occupational' component of the intervention to the actual setting (the respective company) and the research participants (those in employment). Murphy (1996) reviewed a range of studies looking at individual-level stress management interventions. Studies registered in the review applied various techniques including muscle relaxation, meditation, bio-feedback, CBT and combinations of techniques. The author concluded that muscle relaxation appeared to be the most effective in respect of physiological outcome variables, whilst on the other hand, cognitive-behavioural approaches were more effective for psychological symptoms. A combination of stress management techniques appeared to have the best effect on somatic complaints. With respect to work outcomes, the review found contradictory findings in relation to absenteeism. A combination muscle relaxation and CBT showed positive effects on all result variables (including absenteeism). For evidence rating system used, see previous entry in Table A.1.

Continued

Authors	Key features
Marine *et al.* (2006) Cochrane systematic review	'Preventing occupational stress in healthcare workers (review)'. This review evaluated the effectiveness of work and person-directed interventions in preventing stress at work in healthcare workers. Fourteen RCTs, three cluster-randomised trials and two crossover trials were identified. Meta-analysis and qualitative synthesis were performed where appropriate. The authors concluded that there was limited evidence to support the effectiveness of interventions to reduce stress levels in healthcare workers; there was evidence from one trial that interventions which contain cognitive elements yield better results than those with behavioural elements; at best, the results of the interventions are still apparent six months to two years after the end of interventions. Only two trials reviewed were rated as being of high quality; larger and better quality trials are called for. The review focused on outcomes measuring stress, burnout and the detrimental effects of both, but did not report on work outcomes. Evidence assessment criteria: strong evidence, provided by two or more high quality studies with similar positive or negative effects that are confirmed by the quantitative analysis; limited evidence, provided by only one high quality study and/or multiple low quality studies with similar positive or negative effects or the results of the high quality studies are not confirmed by the quantitative analysis; no evidence, where there are no studies available; conflicting evidence, if the results of studies point in opposite directions.
Michie and Williams (2003) Systematic review	'Reducing work related psychological ill-health and sickness absence: a systematic literature review'. Review of evidence about the work factors associated with, and about successful interventions to prevent or reduce psychological ill-health and sickness absence. Key work factors associated with psychological ill-health and sickness absence in staff were long hours worked, work overload and pressure, and the effects of these on personal lives; lack of control over work; lack of participation in decision making; poor social support; and unclear management and work role. There was some evidence that sickness absence was associated with poor management style. Interventions aimed at changing these workplace factors reduced psychological ill-health. Two of six intervention studies reduced sickness absence. The authors note more evaluations of interventions are required; particularly those based on employment practices and management style, and randomised or longitudinal research designs. No evidence rating system provided.

Continued

Authors	Key features
Mimura and Griffiths (2003) Evidence based literature review	'The effectiveness of current approaches to workplace stress management in the nursing profession: an evidence based literature review'. The review focused exclusively on RCT and prospective cohort studies (PCS), using outcome measures of stress: 11 studies met the inclusion criteria. The review did not include work outcomes. The authors conclude there is more evidence for the effectiveness of programmes based on providing personal support than environmental management to reduce stressors; the number and quality of studies is low; it cannot be said definitively which approach, if any, is more effective; further research is required before clear recommendations for the use of particular interventions for work-related stress in nursing can be made. No evidence rating system provided.
Murta *et al.* (2006) Systematic review	'Process Evaluation in Occupational Stress Management Programs (sic): A Systematic Review'. This review focused on 52 studies that included either individual- or organisational-level stress management interventions at the workplace; an outcome evaluation; and at least one of several identified key process-relevant variables. The authors conclude the incomplete reporting of information relevant to process evaluation makes it difficult to identify reliable determinants of effective intervention implementation or outcomes; and the implementation of more rigorous and broader process evaluation should be a priority for future research. They also note a number of trends: the greater the involvement and support from supervisors and managers, the better the intervention implementation and likely outcomes achieved; the smaller the intervention dose delivered, the smaller the chances of altering organisational climate; the more positively participants perceived the sessions to be and the context in terms of 'warmth' and 'safe climate', the greater the likelihood of altering job-related stress; the more frequent the monitoring of participants' attitudes toward intervention and its effects, the more awareness is raised about personal stress. No evidence rating system provided.

Continued

Authors	Key features
Seymour Grove (2005) BOHRF report (evidence review)	'Workplace interventions for people with common mental health problems: Evidence review and recommendations (British Occupational Health Research Foundation)'. This review aimed to identify evidence-based interventions that support the effective management of common mental health problems at work. Nineteen experimental studies and 12 non-experimental and narrative studies were included. Return to work for non-work-based interventions was among the outcome measures. The authors concluded that there is strong evidence that CBT interventions are effective for employees with common mental health problems and they are more effective than other intervention types; individual approaches to stress reduction, management and prevention for a range of healthcare professionals was effective and was preferable to multi-modal approaches. They also concluded that there is moderate evidence that brief (up to eight weeks) therapeutic interventions such as individual counselling are effective for employees with job-related or psychological distress. Evidence assessment criteria: strong evidence, provided by generally consistent findings in multiple, high quality scientific studies; moderate evidence, provided by generally consistent findings in fewer, smaller, or lower quality scientific studies; limited or contradictory evidence, provided by one scientific study or inconsistent findings in multiple scientific or narrative studies; no scientific evidence, based on theoretical considerations.
Thomson *et al.* (2003) HSE research report	'Best practice in rehabilitating employees following absence due to work-related stress'. This study investigated the approaches of 14 case study organisations considered by experts to exhibit best practice in rehabilitating employees following absence due to work-related stress. Case study organisations included: both public and private sector; Small and Medium Sized Enterprises (SMEs); those with employees in occupations where there is a high incidence of work-related stress; both local authority-enforced and HSE-enforced; and regional diversity. A review of existing rehabilitation practices and the evidence for their effectiveness was also provided. The authors concluded rehabilitation for work-related stress has yet to enjoy the thorough research attention devoted to other areas of stress. As a result, it is not possible to be definitive about certain aspects of rehabilitation as it relates to stress. A wide range of approaches and techniques are believed to be effective in combating work-related stress, and examples of effective rehabilitation of employees following absence due to work-related stress are cited.

Continued

Authors	Key features
Van der Klink *et al.* (2001) Meta-analysis	'The Benefits of Interventions for Work-Related Stress'. The aim of this quantitative meta-analysis of 48 experimental studies (n=3,736) was to determine the effectiveness of occupational stress reducing interventions and the populations for which such interventions are most beneficial. Four intervention types are distinguished: cognitive-behavioural; relaxation techniques; multi-modal programmes that combine cognitive-behavioural and relaxation elements; and organisation-focused interventions. Outcome variables were quality of work life; psychological resources and responses; physiology; complaints such as stress or burnout; and absenteeism. Sample studied were employees with imminent or already manifested stress-related psychological problems. The authors' conclude that stress management interventions are effective; cognitive behavioural interventions are more effective than other intervention types; shorter programmes of CBT were more effective than programmes of longer duration; CBT was most effective with employees in high-control roles; and the effect size for organisation-focused interventions was non-significant. Only four studies – one organisational; one cognitive behavioural; and two relaxation training interventions (n=121 for the three individual-level interventions) – included absenteeism as an outcome measure. Effect sizes for absenteeism were non-significant.

Appendix B Bibliography

Aust, B. and Ducki, A. (2004) 'Comprehensive health promotion interventions at the workplace: experiences with health circles in Germany', Journal of Occupational Health Psychology, vol. 9, no. 3, pp258-70.

Bevan, S. (2003) *Corporate Partners Research Programme: Attendance management*, London: The Work Foundation.

Bond, F.W. and Bunce, D. (2001) 'Job control mediates change in a work re-organisation intervention for stress reduction', *Journal of Occupational Health Psychology*, vol. 6, no. 4, pp290-302.

Burchardt, T. (2003) 'Employment retention and the onset of sickness or disability: evidence from Labour Force Survey longitudinal datasets'. Department for Work and Pensions: In-house report 109.

CIPD (2006) 'Absence management: annual survey report'. Online report: www.cipd.co.uk/NR/rdonlyres/22CB05C5-E52D-445B-891A-9886C95FD90D/0/absmgmnt0706.pdf

Coats, D. and Max, C. (2005) 'Healthy work, productive workplaces: why the UK needs more "good jobs"'. London: The Work Foundation.

Davies, H.T.O. and Crombie, I.K. (2001) 'What is a systematic review', *Hayward Medical Communications*, vol. 1, no. 5, pp1-6.

DWP, HSE, DoH, Scottish Executive, and Welsh Assembly Government (2005) *Health, work and well-being: caring for our future*. London: The Stationery Office.

Edwards, D. and Burnard, P. (2003) 'A systematic review of stress and stress management interventions for mental health nurses', *Journal of Advanced Nursing*, vol. 42, no. 2, pp169-200.

Elders, L.A., van der Beek, A.J. and Burdorf, A. (2000) 'Return to work after sickness absence due to back disorders – a systematic review on intervention strategies', *International Archive of Occupational Environmental Health*, vol. 73, no. 5, pp339-48.

Engbers, L.H., van Poppel, M.N., Chin, A., Paw, M.J. and van Mechelen, W. (2005) 'Worksite health promotion programs with environmental changes: a systematic review', *American Journal of Preventative Medicine*, vol. 29, no.1, pp61-70.

ESRC (2006) *ESRC Seminar Series – mapping the public policy landscape: health and well-being of working age people*. Swindon: Economic and Social Research Council.

Fothergill, A., Edwards, D. and Burnard, P. (2004) 'Stress, burnout, coping and stress management in psychiatrists: findings from a systematic review'. *International Journal of Social Psychiatry*, vol. 50, no.1, pp54-65.

Franche, R.L., Cullen, K., Clarke, J., Irvin, E., Sinclair, S. and Frank, J. (2005) 'Workplace-based return to work interventions: a systematic review of the quantitative literature'. *Journal of Occupational Rehabilitation*, vol. 15, no. 4, pp607-31.

Frank, J., Sinclair, S., Hogg-Johnson, S., Shannon, H., Bombardier, C., Beaton, D. and Cole, D. (1998) 'Preventing disability from work-related low-back pain: new evidence gives hope – if we can just get all players onside', *Canadian Medical Association Journal*, vol. 158, no. 12, pp1,625-1,631.

Gatty, C.M., Turner, M., Buitendorp, D.J. and Batman, H. (2003) 'The Effectiveness of back pain and injury prevention programs in the workplace', *Work*, vol. 20, no. 3, pp257-266.

Harden, A., Peersman, G., Oliver, S., Mauthner, M. and Oakley, A. (1999) 'A systematic review of the effectiveness of health promotion interventions in the workplace', *Occupational Medicine (London)*, vol. 49, no. 8, pp540-548.

Harter, J.K., Schmidt, F.L. and Keys, C.L.M. (1999) ' Well-being in the workplace and its relationship to business outcomes'. Online report: www.media.gallup.com/DOCUMENTS/whitePaper--Well-BeingInTheWorkplace.pdf

Haslam, C., Haslam, R. and Whysall, Z. (2005) *A staged approach to reducing musculoskeletal disorders (MSDs) in the workplace: HSE research report 379*, London: The Stationary Office.

Health and Safety Executive (2006), *Health and Safety Statistics: 2005/2006*, Online report: www.hse.gov.uk/statistics/overall/hssh0506.pdf

Hulshof, C.T., Verbeek, J.H., van Dijk, F.J., van der Weide, W.E. and Braam, I.T. (1999) 'Evaluation research in occupational health services: general principles and a systematic review of empirical studies', *Occupational and Environmental Medicine*, vol. 56, no. 6, pp361-377.

Kallestal, C., Bjurvald, M., Menckel, E., Schoerstrom, A., Schelp, L. and Unge, C. (2004) *Workplace health promotion: effects of interventions referred to in systematic knowledge reviews and in Swedish reports*, Swedish National Institute of Public Health – Online report: www.fhi.se/upload/PDF/2004/English/r200454workplacehealthpromotion.pdf

Karjalainen, K., Malmivaara, A., van Tulder, M., Roine, R., Jauhiainen, M., Hurri, H. and Koes, B. (2003) 'Multidisciplinary biopsychosocial rehabilitation for subacute low back pain among working age adults', *Cochrane Database of Systematic Reviews (Online)*, no.3, CD002193.

Karsh, B.T., Moro, F.B.P. and Smith, M.J. (2001) 'The efficacy of workplace ergonomic interventions to control musculoskeletal disorders: a critical analysis of the peer-reviewed literature', *Theoretical Issues in Ergonomics Science*, vol. 2, no. 1, pp23-96.

Kreis, J. and Bödeker, W. (2004) *Health-related and economic benefits of workplace health promotion and prevention: summary of the scientific evidence*, Essen: BKK Bundesverband.

Linton, S.J. and van Tulder, M.W. (2001) 'Preventive Interventions for Back and Neck Pain Problems', *Spine*, vol. 26, no. 7, pp778-787.

Lock, D. and Colford, N. (2005) *International review of literature relating to benefits of limbering up exercises at work: HSE Research Report 309*, HSE Online report: www.hse.gov.uk/research/rrpdf/rr309.pdf

Lunt, J., Bowen, J. and Lee, R. (2005) *HSE Review of the risk prevention approach to occupational health: applying health models to 21st century occupational health needs - health models information pack*, Health and Safety Laboratory Online report: www.hse.gov.uk/research/hsl_pdf/2005/hsl0557.pdf

Lunt, J., Fox, D., Bowen, J., Higgins, G., Crozier, S. and Carter, L. (2007) *Applying the biopsychosocial approach to managing risks of contemporary occupational health conditions: scoping review'*, Health and Safety Laboratory Online report: www.hse.gov.uk/research/hsl_pdf/2007/hsl0724.pdf

MacEachen, E., Clarke, J., Franche, R. L. and Irvin, E. (2006) 'Systematic review of the qualitative literature on return to work after injury', *Scandinavian Journal of Work, Environment and Health*, vol. 32, no. 4, pp257-269.

Maher, C. G. (2000) 'A systematic review of workplace interventions to prevent low back pain', *Australian Journal of Physiotherapy*, vol. 46, no. 4, pp259-269.

Marine, A., Ruotsalainen, J., Serra, C. and Verbeek, J. (2006) 'Preventing occupational stress in healthcare workers', *Cochrane Database of Systematic Reviews (Online)*, no. 4: CD002892.

Michie, S. and Williams, S. (2003) 'Reducing work related psychological ill-health and sickness absence: a systematic literature review', *Occupational and Environmental Medicine*, vol. 60, no. 1, pp3-9.

Mimura, C. and Griffiths, P. (2003) 'The effectiveness of current approaches to workplace stress management in the nursing profession: an evidence based literature review', *Occupational and Environmental Medicine*, vol. 60, no. 1, pp10-15.

Murta, S.G., Sanderson, K. and Oldenburgh, B. (2007) 'Process Evaluation in Occupational Stress Management Programs: A Systematic Review', *American Journal of Health Promotion*, vol. 21, no. 4, pp248-254.

Pickvance, S. (2006) 'Too little too late: what went wrong with the Job Retention and Rehabilitation Pilot?' *Occupational Health at Work*, vol. 3, no. 1, pp23–25.

Proper, K.I., Koning, M., van der Beek, A.J., Hildebrandt, V.H., Bosscher, R.J. and van Mechelen, W. (2003) 'The Effectiveness of Worksite physical activity programs on physical activity, physical fitness, and health', *Clinical Journal of Sport Medicine*, vol. 13, no. 2, pp106-117.

Proper, K.I., Staal, B.J., Hildebrandt, V.H., van der Beek, A.J. and van Mechelen, W. (2002) 'Effectiveness of physical activity programs at worksites with respect to work-related outcomes', *Scandinavian Journal of Work, Environment and Health*, vol. 28, no. 2, pp75-85.

Purdon, S., Stratford, N., Taylor, R., Bell, S. and Wittenburg, D. (2006) *Impacts of the Job Retention and Rehabilitation Pilot: Research Report No.342*, DWP Online report: www.dwp.gov.uk/asd/asd5/rports2005-2006/rrep342.pdf

Ruotsalainen, J.H., Verbeek, J.H., Salmi, J.A., Jauhiainen, M., Laamanen, I., Pasternack, I. and Husman, K. (2006) 'Evidence on the effectiveness of occupational health interventions', *American Journal of Industrial Medicine*, vol. 49, no. 10, pp865-872.

Schonstein, E., Kenny, D., Keating, J., Koes, B. and Herbert, R.D. (2003) 'Physical Conditioning Programs for Workers With Back and Neck Pain: A Cochrane Systematic Review', *Spine*, vol. 28, no. 19, pp391-395.

Seymour, L. and Grove, B. (2005) *Workplace interventions for people with common mental health problems*. London: British Occupational Health Research Foundation.

Smedslund, G., Fisher, K.J., Boles, S.M. and Lichtenstein, E. (2004) 'The effectiveness of workplace smoking cessation programmes: a meta-analysis of recent studies', *Tobacco Control*, vol. 13, no. 2, pp197-204.

Spurgeon, A. (2002) *Managing attendance at work: an evidence-based review*, London: British Occupational Health Research Foundation.

Stansfeld, S., Head, J. and Marmot, M. (2000) *Work related factors and ill-health: the Whitehall II study*. Health and Safety Executive: Contract Research Report 266.

Thomson, L., Neathey, F. and Rick, J. (2003) *Best practice in rehabilitating employees following absence due to work-related stress*. Health & Safety Executive, Research Report 138.

Tveito, T.H. and Hysing, M. *et al.* (2004) 'Low back pain interventions at the workplace: a systematic literature review', *Occupational Medicine (London)*, vol. 54, no. 1, pp3-13.

van der Klink, J.L., Blonk, R.W.B., Schene, A.H. and van Dijk, F.J.H. (2001) 'The Benefits of Interventions for Work-Related Stress', *American Journal of Public Health*, vol. 91, no. 2, pp270-276.

Waddell, G. and Burton, K. (2000) *Occupational health guidelines for the management of low back pain at work: evidence review*, London: Faculty of Occupational Medicine.

Waddell, G. and Burton, K. (2001) 'Occupational health guidelines for the management of low back pain at work: evidence review', *Occupational Medecine*, vol. 51, no. 2, pp124-135.

Waddell, G. and Burton, K. (2004) *Concepts of rehabilitation for the management of common health problems*, London: The Stationary Office.

Waddell, G. and Burton, A. K. (2006) I*s Work Good for Your Health and Well-being?*, London: The Stationary Office.

Warr (1987) 'Well-being and the workplace' in Kahneman, D., Deiner, E. and Schwarz, N. (eds.), *Well-being: The foundations of hedonic psychology*, New York: Russell Sage Foundation.

Warr (2005) 'Work, well-being, and mental health' in Barling, J., Kelloway, K. and Frone, M. (eds.), *Handbook of Work Stress*, Thousand Oaks, California: Sage.

Wilson *et al.* (2006) *Working Futures: New Projections of Occupational Employment by Sector and Region, 2004 – 2014* (Forthcoming), Institute for Employment Research, University of Warwick.